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**'Fundamental and Applied
Studies in the Modern World'**



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Section 1. Medicine, Biology & Chemistry

Calculating Adjusted Survival Functions for Complex Sample Survey Data and Application to Vaccination Coverage Studies with National Immunization Survey

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1 Introduction

In vaccination studies with complex sample survey data, survival functions have been applied to account for time to vaccination to estimate cumulative vaccination coverage, assess the timeliness of vaccination, and compare cumulative vaccination coverage curves between any two levels of selected covariate [1-11]. It is important to develop alternative methods for generating covariate adjusted survival functions accounting for the complex sample survey design, such that we could reduce bias and increase the precision when evaluating the effect of a particular “exposure factor on cumulative vaccination coverage over time. In published literature, several methods for calculating adjusted survival functions in the context of noncomplex sample survey have been proposed. The average covariate adjusted method is frequently used in biomedical papers, which applies the parameter estimates obtained from the Cox proportional hazards model to the average value of the covariates of interest in the groups being compared [12]. The major problem of the average method is that for categorical covariates, the meaning of the *adjusted* survival for individuals with the average covariate value is quite difficult to explain [13]. The corrected group prognosis method [14-16] was proposed to overcome the limitation of the average covariate adjusted method. This method calculates the survival functions for each unique combination at all levels of the covariates with a Cox proportional hazards model and obtains the adjusted survival function as a weighted average of these individual survival functions, in which weights are based on the sample sizes in each combinations. Recently an adjusted Kaplan Meier estimator using inverse probability of treatment weighting was proposed [17] and it was shown to be a consistent estimate of the survival function. A non-parametric covariate-adjusted survival function approach was also introduced [18], but this method involves a loss of efficiency and power especially when the

proportional hazards assumption was valid. A direct adjustment method based on the Kaplan-Meier survival estimates calculates a weighted average of the strata-specific Kaplan-Meier estimates, weighting according to the baseline sample size of the study population in each stratum [19]. However this method produces very similar survival functions to those generated by the unadjusted Kaplan-Meier method.

Many national public health surveys employ complex sampling schemes, such as the National Immunization Survey (NIS), Behavioral Risk Factor Surveillance System (BRFSS), National Health and Nutrition Examination Survey (NHANES), and the National Health Interview Survey (NHIS). Brogan [20,21] has discussed the impact of sample survey design on data analysis and has illustrated the possible consequences of ignoring the survey design in analysis of national health survey data. Bieler et al. [22] pointed out that complex sample surveys are designed to yield population-based estimates and inferences, and they typically involve some combination of sample weighting, stratification, multistage sampling, clustering, and perhaps finite population adjustments. They also emphasized that special statistical methods are needed to account for these complex sample designs in order to obtain unbiased estimates of population parameters, appropriate standard errors and confidence intervals, and valid population inferences. Here the weighting is not just to account for unequal selection, rather in complex sample survey, weighting process play much more critical role such as to adjust sample-frame non-coverage, interview non-response, post-stratification of weights, raking adjustment and trimming of post-stratified weights, propensity score weighting adjustment for provider nonresponse etc. [23]. The covariate adjusted methods described above are intended to be used for non-population-based studies and are implemented with *Lifetest* and *Phreg* Procedures in SAS (SAS Institute Inc., Cary, North Carolina, USA). Alternative methods of calculating covariate adjusted survival functions for complex sample survey data have not been described.

Because the Kaplan-Meier product limits estimate and Cox proportional hazards model are two popular procedures in survival data analysis, we propose and describe two approaches for calculating covariate adjusted survival functions in the context of complex sample survey: the inverse probability weighting (IPW) adjusted Kaplan-Meier method and the Cox corrected group (CCG) adjusted method. The two methods are implemented with SUDAAN [24] software package which is an

international recognized statistical software package that specializes in providing efficient and accurate analysis of data from complex sample surveys since SUDAAN procedures properly account for complex sample survey design features, such as correlated observations, clustering, complex weighting, stratification, and multiple stages. Data from 2011 National Immunization Survey are used to illustrate the procedures of our proposed methods.

2 Methods

2.1 Inverse Probability Weighting (IPW) Adjusted Kaplan-Meier Survival Functions for Complex Sample Survey Data

Let (T_i, D_i, X_i, Z_i) , $i=1, 2, \dots, N$, denotes a survival data from a complex sample survey, where T_i is the possibly right-censored survival time, D_i is the censoring indicator, X_i is the group index variable, $X_i = 1, \dots, K$ for K different groups, and Z_i is the covariate vector. The IPW method has been implemented with 3 steps. First, the non-parametric censored linear rank test might be used to obtain the group variable and the covariates which are significantly associated with the survival time [25].

Second, a logistic regression analysis was conducted to obtain the predicted probability of an individual being in a target group for which the adjusted survival function will be evaluated. We assumed that all of the variables, except the event time, considered in a complex sample survey survival data analysis were categorical. Let p_{ik} be the predicted probability for the i th individual being in the k th group of the complex sample survey data, which was calculated by use of the *Logistic Procedure* in SUDAAN [24,26-27] with the original complex survey weights. These probabilities may depend on the covariate vector Z_i , i.e. $p_{ik} = P(X_i = k | Z_i)$, where X_i is the group index for the i th individual and Z_i the covariates to be controlled in order to obtain the IPW adjusted Kaplan-Meier survival function for the k th group.

Third, in order to reduce the confounding effects for different groups by controlling the covariates and accounting for the complex sample survey design scheme, we assigned a new weight $W_{ik} = 1/p_{ik}$ for the i th individual in group k , then applied the new weights W_{ik} to SUDAAN *Kapmeier Procedure* to obtain the inverse probability weighting (IPW) adjusted Kaplan-Meier survival function for the k th group.

2.2 Cox Corrected Group (CCG) Adjusted Survival Functions for Complex Sample Survey Data

The Cox corrected group (CCG) adjusted method has been implemented with 7 steps. First, Cox proportional hazard assumption is assumed to be valid for the survival data in the complex sample survey, evaluation of the proportional hazards assumption is needed. Also we assume that all of the variables in the survival data, except the survival time, are categorical. Second, the backward - selection method [28-29] was applied to the Cox proportional hazards model in SUDAAN *Survival* Procedure for complex sample survey survival data, to obtain the final model which contains the significant predictors including the group variable for which the adjusted survival functions will be evaluated for each level of the group variable, and the covariates to be controlled. Third, the individual cumulative hazards functions $H(t)$ were obtained for each of the unique combination at all levels of the predictors including the group variable and the covariates in the final Cox model by applying SUDAAN *Survival* Procedure and output the estimated cumulative hazard functions [24]. Fourth, the estimated individual survival functions $S(t)$ were calculated by $S(t)=Exp[-H(t)]$. Fifth, the weighted sample sizes for each of the individual survival functions were calculated using SUDAAN *Crosstab* Procedure, weighted sample size is the weighted count in each table cell of cross tabulation of all predictors in the complex sample survey. Sixth, when the group variable had m levels, all of the individual survival functions were separated into m subgroups. Finally, the CCG adjusted survival functions for each of the group level were estimated as a weighted average of those individual survival functions within each of the m subgroups with weights equal to the weighted sample sizes obtained in the fifth step.

3 Results

3.1 Data Source

In this study, the 2011 National Immunization Survey (NIS) Child data was used to calculate adjusted cumulative vaccination coverage curves accounting for the complex sample survey design of NIS and controlling for the selected socio-demographic factors. The NIS is conducted annually by the U.S. Centers for Disease Control and Prevention (CDC) to provide national, state, and selected urban-area estimates of vaccination coverage among U.S. children aged 19-35 months [30]. The NIS is a stratified clustered random-digit-dialed telephone survey of households

with age-eligible children. The NIS landline sample was used in this illustrative example. Data for 19,534 children who had adequate provider vaccination information were analyzed. In 2011, the NIS landline household survey response rate based on Council of American Survey and Research Organizations (CASRO) guidelines was 61.5%.

3.2 Adjusted Cumulative Vaccination Coverage Curves for the First Dose of Varicella Vaccination

The IPW and CCG methods were applied to generate the adjusted cumulative vaccination coverage curves across children's age in days upon receiving the first dose of varicella vaccination stratified by children's family mobility status (whether the state of family residence at child birth is different from current residence state: moved vs. not moved), and controlling for three other significant covariates: parental attitude of delay/refusal vaccination (yes vs. no); mother's age group (029 years vs. 030 years); and children first born status (yes vs. no). The association of family mobility status, parental attitude, mother's age, and children first born status with time in days of children receiving the first dose of varicella vaccination was examined by non-parametric censored linear rank tests [25], all of the four predictor are significantly associated with the vaccination time ($P < 0.05$) based on the 2011 NIS child data. Also, using the method recommended by Kleinbaum [12], the Cox proportional hazards assumption was evaluated graphically and found to be invalid for all of the four predictors. For comparison purpose, the unadjusted cumulative vaccination coverage curves were estimated using the original unadjusted Kaplan-Meier (KM) method in SUDAAN, abbreviated as unadjusted KM method, with the original sampling design weights in NIS.

Essentially the IPW method that we proposed for complex sample survey survival data is the extension of the AKME (Adjusted Kaplan Meier Estimator) method proposed by Xie and Liu [17] for observation studies. The AKME method applied the inverse probability weighting to adjust the covariates; our IPW method applied both the inverse probability weighting to adjust the covariates and the SUDAAN software to implement the complex sample survey design characteristics. Therefore IPW method is both an extension and a promotion of the AKME method. Xie and Liu conducted both a theoretical and a computer simulation studies. They show that the AKME is a consistent estimate of the survival function, i.e. the AKME

estimate is closer to the true survival function; simulated AKME survival curves centered at the true survival curve; the limit of survival curves by AKME is different from the limit of survival curves by unadjusted KM method; and the two target group survival curves by the unadjusted KM method are separate, whereas the two target group survival curves by AKME method are closer. The AKME reduces the confounding effect of covariates, and therefore provides a better estimation of survival functions for the two target groups [17].

Because the IPW method is an extension of the AKME method, the IPW method should possess the favorable property of AKME as mentioned above, i.e. the IPW could generate consistent estimate of the survival function and the estimated survival function may be closer to the true survival function. Comparison of the first dose of cumulative varicella vaccination coverage curves for children whose family moved vs. not-moved by IPW and unadjusted KM methods are shown in Fig. 1. The vaccination coverage curves among children whose family were not-moved by both IPW and unadjusted KM methods were higher than the corresponding vaccination coverage curves among children whose family were moved, as expected. The IPW adjustment made the curve for moved family closer to the curve for not-moved family and both IPW adjusted curves are positioned between the corresponding unadjusted KM curves, this movement of curves might be explained as follows: the socio-demographic factors act as confounders, therefore the association of mobility with status of vaccination is attenuated when controlling for those factors via adjusted survival curves [16-17]. Therefore the IPW method in this illustrative example generated better adjusted cumulative varicella vaccination coverage curves than the unadjusted KM method. Furthermore, we calculated the standard errors of the first dose varicella cumulative vaccination coverage across children age in days receiving the first dose of varicella by children whose family moved vs. not-moved and by the IPW vs. unadjusted KM method. Fig. 2 shown that the IPW method results in much smaller standard errors than the unadjusted KM method: the standard errors of the IPW methods are approximately 50% less than the standard errors of unadjusted KM method among children whose family moved; the standard errors of the unadjusted KM methods are about 45% higher than the standard errors of IPW method among children whose family not moved. The significant reductions in standard errors were not found alone in our IPW method. Jiang et al. obtained remarkable reductions in standard errors by using of

their covariate-adjusted non-parametric method [18]. In general covariate adjustment has been demonstrated to reduce bias, and increase estimation efficiency [31-37]. In summary, the adjusted cumulative varicella vaccination coverage curves by IPW method could be consistent estimates to the true coverage curves, the IPW adjustment made the curve for moved family closer to the curve for not-moved family and both IPW adjusted curves are positioned between the corresponding unadjusted KM curves, and the IPW method significantly reduces the standard errors of the cumulative varicella vaccination coverage across children age in days receiving the first dose of varicella comparing to the unadjusted KM method, therefore IPW method is the better choice over the unadjusted KM method for calculating adjusted survival curves in the context of complex sample survey.

On the other hand, as presented in Fig. 3, the CCG adjusted first dose of cumulative varicella vaccination coverage curves for moved and not-moved family were located approximately outside of the varicella vaccination coverage curves with unadjusted KM method for moved and not-moved family, and most time the CCG adjusted cumulative vaccination coverage curve for moved family was moved far below from the curve with unadjusted KM method for moved family. The CCG method requires the satisfaction of Cox proportional hazards assumption which is not met in this illustrative example with 2011 NIS child data.

4 Discussion

Because the IPW method is the extension of the AKME method, the IPW method should possess the favorable property of AKME, i.e. the IPW could generate consistent estimate of the survival function and the estimated survival function may be closer to the true survival function. In addition, the IPW method significantly reduced the standard errors of cumulative vaccination coverage comparing to the unadjusted KM method. The IPW adjusted Kaplan-Meier method accounts for the complex sample survey design and adjusts the confounding by using the inverse probability weights and SUDAAN software. It is a non-parametric method and easy to implement. In addition, the IPW method provides marginal survival function estimates, does not require the validity of the Cox proportional hazards assumption which may not be satisfied sometimes, and does not assume any semi-parametric or parametric survival model [17]. Thus, if the Cox proportional hazards assumption is not met, as in the illustrative example presented in this study, the IPW adjusted

Kaplan-Meier method is the only appropriate choice among the two proposed methods with regard to calculating adjusted survival functions. Kleinbaum [12] pointed out that “the Cox proportional hazards model is a “robust model, reasonable estimates of adjusted survival functions can be obtained for a wide variety of data situations, and the results from using the Cox model will closely approximate the results from the correct parametric model. The CCG adjusted method is also a flexible tool for adjusting important covariates [18]. If the Cox proportional hazards assumption is valid, either IPW and CCG adjusted methods can be used, or the two methods could be used in combination (e.g., IPW as the primary method and CCG for subsequent adjustment). In practice, we recommend presenting the unadjusted survival curves first. The objectives of the study will determine if adjusted survival curves are needed. For example, in a study of disparities by race/ethnicity, the unadjusted curves are most important and need to be shown first. If researchers want to explain the disparity in terms of causal factors, the adjusted survival curves may be useful.

One limitation of these two proposed methods for calculating adjusted survival functions with complex sample survey data is the assumption that all variables considered in the analysis are categorical. Estimation and group comparison of survival curves are two very common issues in survival analysis [17]. The purpose of our study is to propose the IPW and CCG methods for calculating adjusted survival function in the context of complex sample survey for EACH LEVELS OF THE GROUP VARIABLE. Therefore the group index variable must be a categorical variable. For IPW method, at the time of estimating the predicted probability of p_{ik} for the i th individual being in the k th group adjusting the covariates \mathbf{Z}_i which could contains the continuous elements. For CCG method, in order to evaluate the individual cumulative hazards functions $H(t)$ for each of the unique combination at all levels of the predictors including the group variable and the covariates in the final Cox model by applying SUDAAN *Survival* Procedure and output the estimated cumulative hazard functions [24], SUDAAN requires that all of the predictors including the group variable and the covariates must be categorical variable. In fact in the U.S. national public health surveys, almost all of the variables are categorical. Some variables such as mother’s age, education levels, or family income etc. might be treated as continuous variables, however they have been categorized to

make the variable more informative and easier to use in the subsequent data analysis.

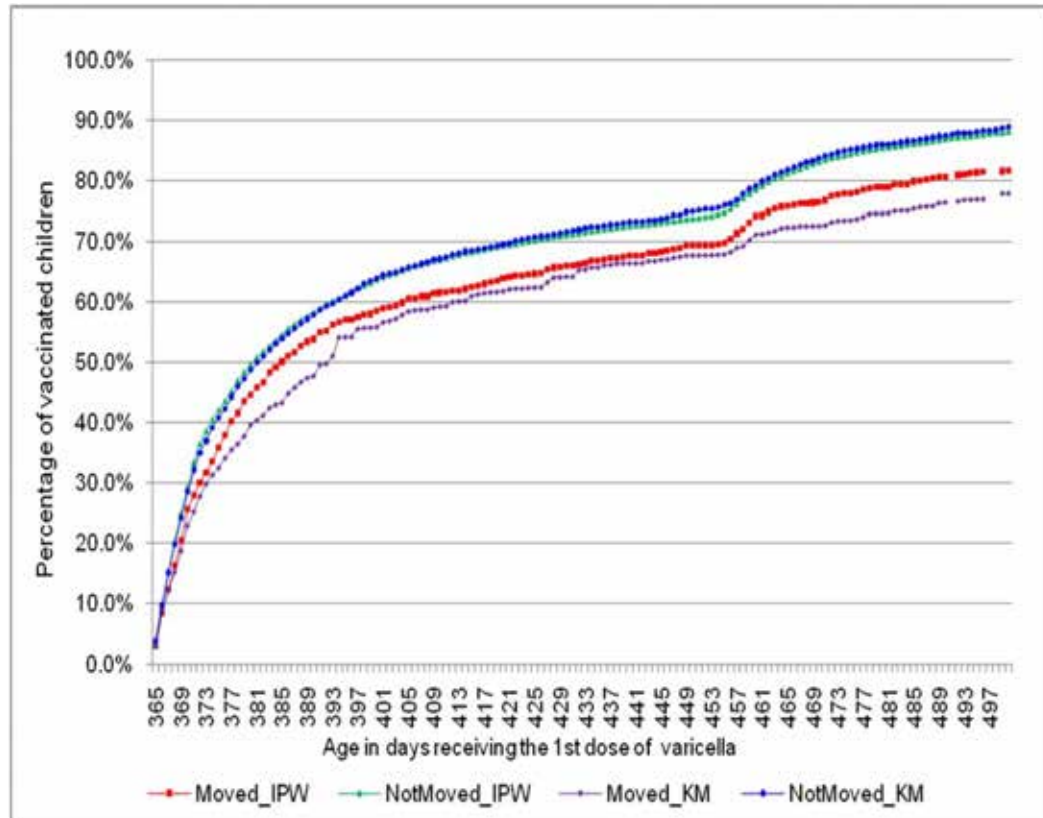


Fig. 1. Comparison of the first dose varicella cumulative vaccination coverage curves for children whose family moved vs. not-moved by IPW and unadjusted KM methods, 2011

National Immunization Survey (NIS)

Moved_IPW: Cumulative varicella vaccination coverage curve for children whose family moved by Inverse probability weighting (IPW) adjusted Kaplan-Meier method.

NotMoved_IPW: Cumulative varicella vaccination coverage curve for children whose family not moved by Inverse probability weighting (IPW) adjusted Kaplan-Meier method.

Moved_KM: Cumulative varicella vaccination coverage curve for children whose family moved by original unadjusted Kaplan-Meier method in SUDAAN.

NotMoved_KM: Cumulative varicella vaccination coverage curve for children whose family not moved by original unadjusted Kaplan-Meier method in SUDAAN

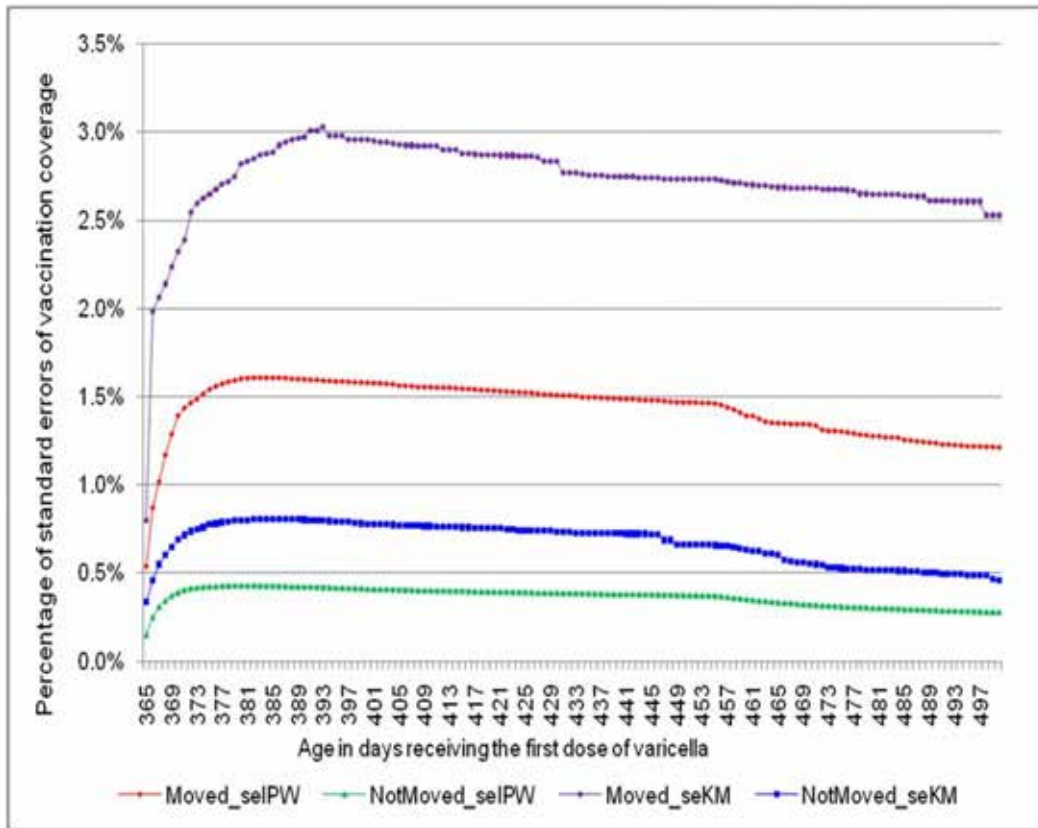


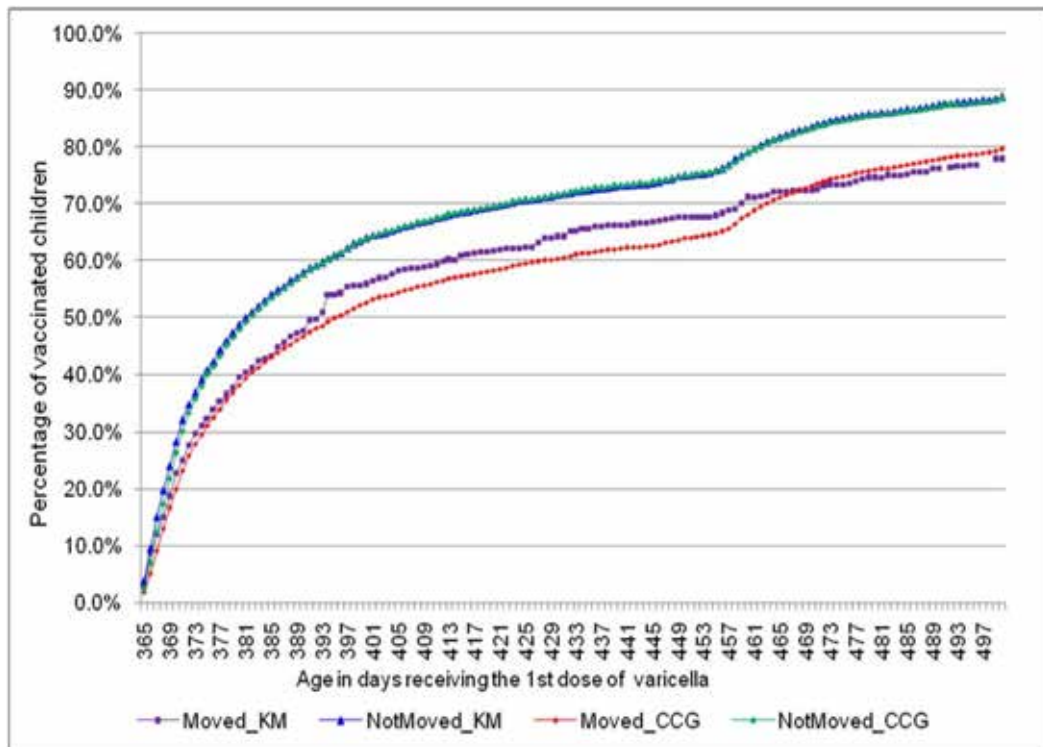
Fig. 2. Comparison of standard errors of the first dose varicella cumulative vaccination coverage across age in days receiving the first dose of varicella for children whose family moved vs. not-moved by IPW and unadjusted KM methods, 2011 National Immunization Survey (NIS)

Moved_selPW: Standard error of cumulative varicella vaccination coverage for children whose family moved by Inverse probability weighting (IPW) adjusted Kaplan-Meier method1

NotMoved_selPW: Standard error of cumulative varicella vaccination coverage for children whose family not moved by Inverse probability weighting (IPW) adjusted Kaplan-Meier method1

Moved_seKM: Standard error of cumulative varicella vaccination coverage for children whose family moved by original unadjusted Kaplan-Meier method in SUDAAN1

NotMoved_seKM: Standard error of cumulative varicella vaccination coverage for children whose family not moved by original unadjusted Kaplan-Meier method in SUDAAN



**Fig. 3. Comparison of the first dose varicella cumulative vaccination coverage curves for children whose family moved vs. not-moved by CCG and unadjusted KM methods, 2011
National Immunization Survey (NIS)**

Moved_KM: Cumulative varicella vaccination coverage curve for children whose family moved by original unadjusted Kaplan-Meier method in SUDAAN.

NotMoved_KM: Cumulative varicella vaccination coverage curve for children whose family not moved by original unadjusted Kaplan-Meier method in SUDAAN.

Moved_CCG: Cumulative varicella vaccination coverage curve for children whose family moved by Cox corrected group (CCG) adjusted method.

NotMoved_CCG: Cumulative varicella vaccination coverage curve for children whose family not moved by Cox corrected group (CCG) adjusted method

Another limitation might be the large number of variable combinations for which individual survival functions must be calculated if models contain many covariates by using CCG method. In these cases, researchers may apply stepwise survival analysis if Cox proportional hazards assumption is valid for all covariates, and adopt multicollinearity test, to get a small number, for example D 10, of significant predictors associated with survival time for calculating adjusted survival functions. This study is a statistical practice report that proposes and describes two

methods for calculating adjusted survival functions in the context of complex sample survey; the two methods are implemented with procedures in SUDAAN v11 software [24] and are illustrated using 2011 NIS child data. Comprehensive theoretical researches and sophisticated computer simulation for evaluating the performance of both IPW and CCG methods might be needed in the future.

5 Conclusion

If the Cox PH assumption is not met, then the IPW adjusted KM method is the only good choice, if adjusted survival estimates are desired. If the Cox PH assumption is valid, either the IPW or CCG methods can be used.

Disclaimer

The findings and conclusions in this article are solely the responsibility of the authors and do not necessarily represent the official view of Centers for Disease Control and Prevention.

Competing Interests

Authors have declared that no competing interests exist.

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Sex Determination Potential from Canine Tooth Dimensions

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ABBREVIATIONS

SD=Standard deviation; Min=Minimum; Max=Maximum; Signi.=Significance.

1. INTRODUCTION

Human beings are born with an identity and deserve the right to die with an identity [1]. Identity means the determination of the individuality of a person [2]. United Nations Declaration of Human Rights states that every freeborn person has the right to be identified even after death [3,4]. The identification of a dead body may be required in cases of sudden and unexpected death, fires, explosions, railway or aircraft accidents, mutilated or hidden decomposed bodies, or foul play and often needs great medico-legal acumen [2]. The law enforcement community expects and requires that forensic scientist report the identification of partial or complete remains of an individual to the best of his or her ability [5]. Various methods are used to establish the identity of unknown remains. The reliability of each method varies [1]. The methods vary and depend on the available bones and their condition [6]. The only method that can give a totally accurate result is the DNA technique, but in many cases and for several reasons it cannot be used [2,6].

Gender determination of skeletal remains is part of the archaeological and many medico legal examinations [6]. An important initial step in identification of the dismembered remains of mass disaster victims is the separation of sexes [7]. Complete skeletons with or without soft tissue present fewer problems. Those bodies, which are, less complete and consisting of parts of a skeleton only, present more

problems in identification and in many instances may not be identified at all [8]. Anthropological measurements of the skeleton and the comparison with the existing data must then be applied and may help to differentiate between male and female remains [6]. Osteometry is considered the preferred technique because it is more effective in determining sex [9]. On an individual basis however, gender differences are always distinctive, but taken collectively can give a good indication in majority of the cases [6]. The determination of sex is among the important aspect of forensic anthropology. These characteristics display population specific variation and therefore, need further attention for major populations of the world [10].

Many authors have done the measurements of crown in teeth between males and females and found certain variations. Though the morphology of the structure is similar to male and female, there is no need that, the size of the structure should remain same, as the size of structure is determined by various factors like exercise, nutrition, metabolic activities etc. Measurements of tooth dimensions are quick, less time consuming, non-invasive and can be easily performed compared to DNA technique.

The study aims to fulfill the following objectives:

Determination of sex by measuring Mesiodistal dimension of maxillary and mandibular permanent canines.

To find out the average size of canines in males and females of south Indian population.

To compare the findings with National and International Studies.

2. MATERIALS AND METHODS

This study was conducted in the Department of Oral Medicine & Radiology, Al-Badar Rural Dental College & Hospital, Gulbarga, Karnataka, India the ethical approval for which was taken from Institutional Review Board.

The study population constituted 300 males and 300 females in the age group of 17 to 25 years, reporting to the Department of Oral Medicine & Radiology, Al-Badar Rural Dental College & Hospital, Gulbarga, Karnataka, India.

The subjects for the study were selected based on simple random sampling technique and those who willingly consented to be a part of the study with following inclusion & exclusion criteria & the legal age of the subject was confirmed using one

of following documents: birth certificate, driving license, college or other identity card, 10th class certificate.

2.1 Inclusion Criteria

The subjects having complete set of fully erupted, morphologically well-formed, periodontally healthy, non-carious, non-atrited, intact and satisfactorily aligned maxillary and mandibular teeth with Angle's class I Malocclusion and no history of orthodontic treatment and no evidence of cleft palate or crown restorations were included in the study.

2.2 Exclusion Criteria

1. The Individuals who wear bridges, crowns and other appliances or had any anomalies that could influence the measurements.

2. Conservative treatment other than Class I occlusal restorations and class V on teeth other than canine.

3. Individuals with anodontia, partially edentulous, malformed/hypoplastic teeth and positional variations in any of the segments.

- Individuals with clinical features suggestive of developmental disturbances, metabolic disorders, history of prolonged illness and medically compromised states were excluded from the study.

An informed written consent was obtained from each of the subjects followed by full arch maxillary and mandibular impressions were taken by Irreversible Hydrocolloid impression material (Hydrogum soft; Zhermack clinical, Germany) and poured immediately by Type III Gypsum product, dental stone (Stone plaster; Neelkanth Healthcare Pvt. Ltd, India).

The following parameters were determined on casts by using electronic digital sliding caliper to the nearest 0.01 mm (Mitutoya Co., Utsunomiya, Japan).

Mesiodistal crown width of right maxillary canine;

Mesiodistal crown width of left maxillary canine;

Mesiodistal crown width of right mandibular canine; Mesiodistal crown width of left mandibular canine.

Intra-observer reliability or precision (differences between the repeated measurements) and inter-observer errors (differences between the means of two sets measurements) were 0.08 mm and 0.16 mm, respectively; representing only 1.2% and 2.1% of the mean measurements.

The readings obtained were subjected for analysis to derive conclusions. Sexual dimorphism in right and left mandibular and maxillary canines was calculated using a formula given by Garn et al. [11].

Sexual dimorphism = $[(x_m/x_f)-1] \times 100$ x_m =mean value for males;

x_f = mean value for females.

The results obtained were subjected to statistical analysis (Mean, Standard deviation and coefficient of variation, t-test, step-wise discriminant analysis and percentage accuracy of reporting gender identity by cross validated discriminant analysis and computed for both sexes using SPSS (Statistical Package for the Social Sciences) Version 11.00.

3. RESULTS

It was observed that the mean value of the mesiodistal crown width of right maxillary canines was 7.90 ± 0.54 mm in males and 7.60 ± 0.37 mm in females, while the mean value of the mesiodistal crown width of left maxillary canines was 7.85 ± 0.64 mm in males and 7.60 ± 0.37 mm in females (Table 1). The differences in these values are statistically significant ($P < 0.001$).

The mean value of the mesiodistal crown width of right mandibular canines was 7.00 ± 0.31 mm in males and 6.65 ± 0.55 mm in women and the mean value of the mesiodistal crown width of left mandibular canines was 7.00 ± 0.32 mm in the males and was 6.65 ± 0.55 mm in females (Table 1). The differences in these values are statistically significant ($P < 0.001$).

Table 1. Mesiodistal crown width of maxillary and mandibular canines – genderwise distribution in mm

Variable	Gender	Min (in mm)	Max (in mm)	Mean (in mm)	SD	t-value	p-value
Maxillary Right Canine	Male	7.0	9.0	7.9000	0.5394	7.9108	<0.0001
Maxillary Right Canine	Female	7.0	8.0	7.6000	0.3748		
Maxillary Left Canine	Male	7.0	9.0	7.8500	0.6355	5.8692	<0.0001
Maxillary Left Canine	Female	7.0	8.0	7.6000	0.3748		
Mandibular Right Canine	Male	6.5	7.5	7.0000	0.3168	9.5394	<0.0001
Mandibular Right Canine	Female	6.0	7.5	6.6500	0.5509		
Mandibular Left Canine	Male	6.5	7.5	7.0000	0.3168	9.5394	<0.0001
Mandibular Left Canine	Female	6.0	7.5	6.6500	0.5509		

*SD=Standard deviation; Min=Minimum; Max=Maximum; Signi.=Significanc; mm=Millimeter

The sexual dimorphism from the mesiodistal crown width of the canine tooth was calculated by the formula $X_m/X_f-1 \times 100$; X_m is the mean mesiodistal width of canines in men and X_f is the mean mesiodistal width of canines in women.

The sexual dimorphism of right maxillary canines was 3.947% and that of left maxillary canines, 3.28% and the sexual dimorphism was 5.263% for the right mandibular canine and 5.263% for the left mandibular canine.

We derived the mean measurement of right and left maxillary canines for males and females and mean of these measurements were taken to arrive at a single value for maxillary canine. Similarly one single value was measured for mandibular canine. These values were compared with the values given by Wheeler's [12]. (Table 2 & 3). Both the maxillary and mandibular canine measurements in the present study were found to be less than the Wheeler's. This finding is very important as it indicates that normative data based on one population cannot be used for other population.

Table 2. Comparing maxillary canine width with the Wheeler's study results

Maxillary canines	Male right (in mm)	Male left (in mm)	Female right (in mm)	Female left (in mm)
Mean	7.90	7.85	7.60	7.60
Maxillary right ,left mean	7.875		7.60	
Combined male female mean	7.73			
According to Wheeler	7.5			

Table 3. Comparing Mandibular canine width with the Wheeler's study results

Mandibular canines	Male right (in mm)	Male left (in mm)	Female right (in mm)	Female left (in mm)
Mean	7.00	7.00	6.65	6.65
Mandibular right ,left mean	7.00		6.65	
Combined male female mean	6.825			
According to Wheeler	7.0			

Comparing the mean canine measurement of our findings with other studies, the values of our study on South Indian population are similar to the other studies (Table 4).

Table 4. Comparison with other studies

Author	Year	Population	M/F	MxRt (mm)	Mxlt (mm)	Mn Rt (mm)	Mn lt (mm)
Present study	2014	South Indian	M	7.90	7.85	7.00	7.00
			F	7.60	7.60	6.65	6.65
Madhavi Yuwanati [20]	2013	Central Indian	M	8.04	8.32	7.76	8.01
			F	7.73	8.01	7.44	7.74
Gorea & Sharma [27]	2010	North Indian	M	7.61	7.67	6.78	6.71
			F	7.31	7.39	6.39	6.41
Karan Boaz [19]	2009	South Indian	M			7.05	6.98
			F			7.00	6.90
Kaushal [15]	2004	North Indian	M			7.32	7.198
			F			6.69	6.67
Mohd QA & Abdulla [28]	1997	Saudi	M	7.53	7.53	6.90	6.93
			F	7.55	7.36	6.83	6.80

4. DISCUSSION

Teeth form an excellent material in living and non-living populations for anthropological, genetic, odontogenic and forensic investigation. Measurements of tooth dimensions are quick, less time consuming, non-invasive and can be easily performed. Tooth dimensions are used to establish the sex of a victim in major accidents/disasters, medico-legal cases and natural disasters. Sex can be determined well in mature individuals if the human skeletal remains are intact [2].

The dentition takes precedence particularly when preferred parameters such as the pelvis are unavailable and cranial and long bones fragmentary. However, linear tooth measurements usually give moderate levels of accuracy in sex identification [3,4]. Two approaches to sex identification have been described. The first is based on a visual assessment of the shape or relative proportions of sexually dimorphic features. The second is a metric approach, which offers advantages over the visual approach as it is inherently more objective, has higher reliability, is less dependent on the previous observer experience and is more readily amenable to statistical analysis and thus helps comparisons within the sample as well as with previous studies [5]. The present study was based on the second approach of sex identification and the advantages quoted for the metric method hold good for it too. This study was intended to analyze the sexual dimorphism in the maxillary and mandibular permanent canines. Permanent canines were considered as the canines erupt by the age of 12 years with mean age of eruption being 10.87 years [6] and canines are less affected than other teeth by periodontal disease [7,8] and are the last teeth to be extracted with respect to age [9]. Canines are also better likely to survive severe trauma, such as air disasters, hurricane and accidents. The present study utilized a Vernier Caliper with

0.01 mm resolution. Since the anatomic landmarks are standardized and the instruments calibrated, little variation may be expected in the measurements. In other words, the values reported may be comparable to previous studies. The measurements were made on the dental casts of all the subjects. It is advantageous to measure the tooth dimensions on the casts as they may be examined at a later date to eliminate errors due to fatigue during measurements. Also, it provides convenience for the second investigator to make measurements at a later date.

Garn et al. [13] revealed the magnitude of sexual dimorphism in tooth size as well as percentage dimorphism in 117 subjects from Southwest Ohio, representing 75 families. The largest sexual dimorphism in mesiodistal tooth size was exhibited by the mandibular first and second molars, 7% and 6.2%, respectively, with the mandibular and maxillary canines next in order with 6.2% and 6%, respectively. On percentage basis, dimorphism was greatest for canines and least for mandibular incisors. But canine dimorphism was specific to mesiodistal diameter. Mesiodistally the lower canines showed the greatest difference between the sexes.

Lysell and Myrberg [14] studied the records of 530 boys and 580 girls who were born to Swedish parents and grew up in the Stockholm area, and reported expression of sexual dimorphism in the deciduous dentition as well as in the permanent dentition. Boys exhibited larger mesiodistal tooth widths than girls in both deciduous and permanent dentitions. The largest male and female tooth widths were found in permanent canines (5–6%).

Kaushal et al. [15] found a statistically significant dimorphism in the mandibular canines in 60 subjects in a North Indian population, where the mandibular left canine was seen to exhibit greater sexual dimorphism. They also concluded that if the width of the canine is greater than 7 mm, the probability of the sex of the person under consideration being male was 100%.

Hashim and Murshid, [16] conducted a study on Saudi males and females in the age group of 13-20 years to determine the teeth in human dentition with the highest likelihood of dimorphism and found that only the canines in both the jaws exhibited a significant sexual difference while the other teeth did not. In a continuation of the same study, they also determined that there was no statistically significant difference between the left and right sides suggesting that measurements of teeth on one side could be truly representative when the corresponding measurements on other side was unobtainable.

Schild et al. [17] observed sexual difference in tooth size among American black, European and Mongoloid populations. The degree of sexual dimorphism of mandibular canine width was more in Ohio Caucasians and Australian aborigines than in Pima Indians and Tristanite population [11].

Acharya and Mainali [18] found reverse dimorphism in the mesiodistal dimension of mandibular second premolar in Nepalese population. The finding could be attributed to evolution resulting in a reduction in sexual dimorphism, causing an overlap of tooth dimension in modern males and females. Similar finding was observed by Karen Boaz and Chaavi Gupta [19] in a dimorphic study of maxillary and mandibular canines in 100 subjects in South Indian population and revealed the lack of significant dimorphism in canines and also the finding of reverse dimorphism where the females exhibited larger canines than males.

Madhavi yuwanati et al. [20] conducted a study on 100 cases in 17-21 years in central Indian population with mean maxillary canine width in males and females was 8.02 mm and the mean mandibular canine width in males and females was 7.73 mm.

In this study an attempt has been made to establish the sex of a person by using the mesiodistal width of canine teeth in the Karnataka population.

In our study, there were no significant differences between the mesiodistal width of right and left, mandibular and maxillary canines among males. Similar observations were made among the female counterparts. These findings were in agreement with the studies conducted by Kaushal et al. [15] Garn et al. [11] Al-Rifaiy et al. [21] Acharya and Mainali, [18] and Anderson and Thompson [22].

The mean mesiodistal width of the right and left mandibular canines in our study was found to be greater in males (right: 7.00 ± 0.31 mm; left: 7.00 ± 0.32 mm) than in females (right: 6.65 ± 0.55 mm; left: 6.65 ± 0.55 mm), which was statistically significant with a *P* value of <0.001 . This greater dimension of mesiodistal width of canines in males can be attributed to the Y chromosome, which is responsible for the thickness of dentine, contributing to the width of a tooth [18,22]. These findings are in agreement with the studies conducted by Kavitha [23] (males: 7.2–7.9 mm and females: 6.7–7.6 mm) for the Tamil Nadu population (South India), Kaushal et al. [15] (men: right 7.22 ± 0.28 mm; left 7.29 ± 0.29 mm and women: right 6.69 ± 0.25 mm; left 6.69 ± 0.32 mm) for the North Indian population and by Acharya and Mainali [18] (Males: right 6.96 ± 0.39 mm; left 7.00 ± 0.4 mm and Females: right 6.58 ± 0.35 mm; left 6.63 ± 0.35 mm) for the Nepalee population on mandibular canines.

However, the studies conducted by Ates et al. [24] and Al-Rifaiy et al. [21] on Turkish and Saudi populations did not find significant gender differences for the mesiodistal width of mandibular and maxillary canines.

The value for sexual dimorphism of maxillary canines in our study was 3.947% for the right canine and 3.289% for the left canine similar to the study done by Bakkannavar et al. [25] (3.31% right canine; 3.29% left canine). The study conducted by Garn et al. on the Tristanite population showed the sexual dimorphism for maxillary canines to be 2.5%, which has lower dimorphic value than our study. However, Garn et al.'s study on different ethnic groups revealed the value to be 4.5% for Australian Aborigines, 5.3% for Pima Indians and 5.9% for Ohio Caucasians [11]. Their study showed the combined value for both canines.

In our study, the value for sexual dimorphism of mandibular canines was 5.263% for the right canine and 5.263% for the left canine as compared to the study done by Bakkannavar et al. (4.50% right canine; 4.61% left canine) [25], Garn et al. on the Tristanite population (4.1%) [11]. Garn et al.'s study further reported the values for sexual dimorphism in Ohio Caucasians (6.4%), Australian Aborigines (6.8%) and Pima Indians (6.3%). The higher sexual dimorphism values, 6.2% (right canines) and 7.7% (left canines), were computed for the South Indian population by Nair et al. [26] and 7.954% for the right canines and 8.891% for the left canines computed for the North Indian population by Kaushal et al. [15]. The higher values obtained in their studies could be attributed to the small sample size and use of dental casts for their study. The mandibular canines are considered to demonstrate the greatest percentage of sexual dimorphism among all teeth in their mesiodistal width [15,11,23].

5. CONCLUSION

The present study measured only linear dimensions because of simplicity, reliability, inexpensibility and in a setup where latest technology utilizing DNA methods are not available and gender estimation has to be managed based on jaw fragments. The mandibular canine index may also be used as an adjunct to enhance accuracy.

5.1 From the Present Study We Can Conclude That

- The mesiodistal width of canines of both the jaws is significantly greater in males than females.

- The mean maxillary canine width in males and females is 7.73 mm. The mean mandibular canine width in males and females is 6.825 mm.
- The mean (male and female), maxillary and mandibular canine width is found to be less in South Indian Population as compared to Central Indian population.
- The mean (male and female), maxillary and mandibular canine width is found to be less in South India Population as compared to values given by Wheelers and similar to the study done in the Saudi population.

Further investigations are desired with larger samples and in populations of varied ethnic origin in the direction of improving accuracy of using linear dimensions of teeth as a method of sex identification.

CONSENT

Not applicable.

ETHICAL APPROVAL

This study was approved by the Ethical Research Board of the Institution.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Cell-Based Therapies in Musculoskeletal Injuries: The Evolving Role of Bone Marrow-Derived Mesenchymal Stem Cells

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1. INTRODUCTION

Tissue engineering is an exciting strategy being explored to deal with damaged or lost tissue. Tissue engineering can include the use of cells, scaffolds and growth factors in any combination (Mahapatra and Khan 2011; Nannaparaju et al., 2011). Stem cells are a self-renewing, slow-cycling cell population that exhibit high clonogenicity, low cellular proliferation and the ability to undergo multilineage differentiation. Stem cells can be derived from a number of sources and are able to undergo chondrogenic, osteogenic and adipogenic differentiation (Pittenger et al., 1999). These cells are identified by a number of cell surface markers that they express on their cell surface including CD105 as shown in Figure 1. These cells are often used with scaffolds that provide a three-dimensional structural template. Scaffolds are natural (e.g. collagen and alginate) or synthetic (e.g. polyglycolic acid and polyacrylonitrile polyvinyl chloride) materials used for cell attachment and proliferation. The ideal scaffold is biocompatible and meets the biological needs of growing tissue.

Bone marrow derived stem cells have been widely studied and there is a wealth of information in literature concerning those (Mafi et al., 2011). Adult mammalian bone marrow contains two discrete stem cell populations, haematopoietic stem cells and MSCs (Pittenger et al., 1999; Short et al., 2003). Protocols for the culture (Freidenstein et al., 1970) and, chondrogenic, osteogenic and adipogenic differentiation of bone marrow-derived mesenchymal stem cells (BM-MSCs) have been described (Johnstone et al., 1998; Pittenger et al., 1999; Sekiya et al., 2002; Thanabalasundaram et al., in press). BM-MSCs have been associated with the repair and regeneration of musculoskeletal injuries.

Musculoskeletal injury can involve muscle, tendon, ligament, bone, meniscus and cartilage. The high incidence of such injuries highlights the need for novel, more effective treatments. Currently a lot of research is being carried out into this area. The use of BM-MSCs is one such option (Tucker et al., in press) and the aim of this review is to critique and clarify their findings.

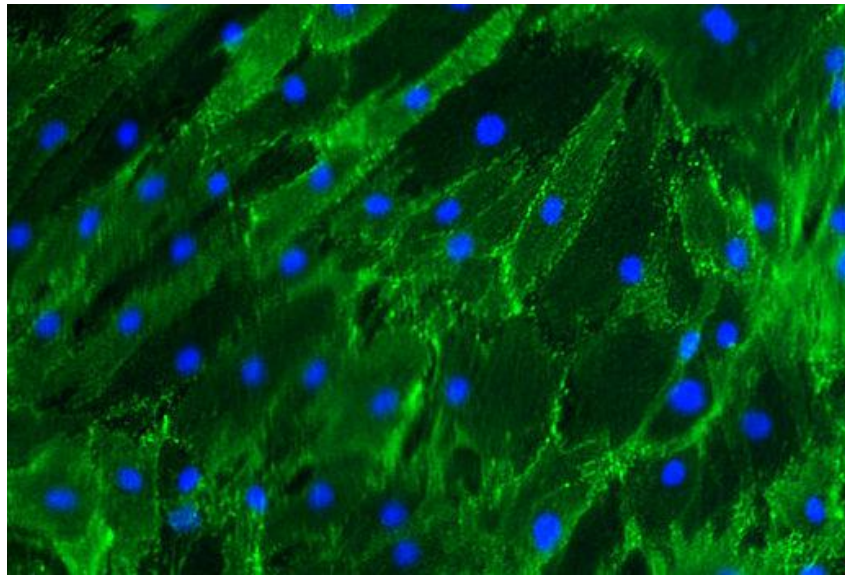


Figure 1: Cell surface epitope characterisation of mesenchymal stem cells using cell surface staining with a primary antibody that recognises CD105 and a fluorescent secondary antibody that shows up green. The nuclei are counterstained with a blue dye. The figure shows strong staining for CD105, a mesenchymal stem cell marker

2. METHODOLOGY

A thorough literature review was conducted and articles relating to the use of BM-MSCs for the treatment of musculoskeletal injuries were identified. The searched primarily focused on the use of the cells to treat common conditions affecting muscles, tendons, ligaments, bones, meniscii, cartilage and their role in osteoarthritis.

3. RESULTS AND DISCUSSION

3.1 Muscle

Increased musculoskeletal activities can exert abnormal biomechanical environments onto muscle which can lead to injuries such as muscular strain and tears which can sufficiently hinder the patient's mobility. The incidence of such injuries in the professional sporting setting is considerable and troublesome for both sporting professionals and their teams (Elliott et al., 2011).

Following muscular injury, repair and regeneration is triggered by local multipotent stem cells. BM-MSCs act as a reserve for muscle precursors and aid in its repair by migrating physiologically into the regenerating muscle. Ferrari et al. (1998) however showed that when BM-MSCs were administered systemically

in immunodeficient mice, they had minimal impact on muscular regeneration. However, in cases of extended damage, they maintained the population of more differentiated, muscle-forming precursors (Ferrari et al., 1998).

3.2 Tendon

Tendons act to both transmit muscular forces but also as a store of elastic energy (Fukashiro et al., 1995; Oragui et al., 2011). Thus repetitive cyclical loading, such as that exhibited in the Achilles tendon may result in overuse injury (Kvist, 1994), and consequently tendon rupture.

The role of BM-MSCs cells in the treatment of tendinitis has been a subject of investigation (Khan and Longo, 2011). Two recent studies evaluated the efficacy of intralesional BM-MSCs injections into equine flexor tendons (Godwin et al., 2011; Schnabel et al., 2009). Both studies reported excellent clinical, radiological and histological improvement in tendons treated with this method and so, provide an incentive for further evaluation in both animal and human models.

One study (Chong et al., 2007) looking at rabbit Achilles tendon using a fibrin gel into which BM-MSCs were seeded, demonstrated an increased modulus of elasticity by 32% and an increased proportion of collagen type I compared to the fibrin gel alone group at 3 weeks. However, after 6 and 12 weeks no difference was observed between groups. In a second study looking at rabbit Achilles tendon injuries, Ouyang et al. (2003) used 3 groups: group 1 received BM-MSCs seeded onto a poly-lactide-co-glycolide (PLGA) scaffold; group 2, a PLGA scaffold alone and group 3 received no laceration to act as a control. Group 1 exhibited greater tissue formation and remodelling compared to group 2. Both groups 1 and 2 had similar histological appearance to native tendon by 12 weeks. The tensile stiffness and modulus in group 1 was 87% and 62.6% respectively of a normal tendon whereas in group 2 they were 56.4% and 52.9% respectively suggestive of a potential benefit for these types of injuries.

In another study, incised rabbit patella tendons were treated with a collagen gel-BM-MSC composite (treatment group) or simply a collagen gel (control group) (Awad et al., 1999). Histologically, only 40% of the treatment group expressed more physiological, well integrated collagen types, whilst the remainders showed comparable collagen integration types to the control group. However, there was a demonstrable biomechanical advantage in the treatment

group; tendon stiffness, modulus of elasticity, maximum stress and strain energy increased by 15%, 7%, 16% and 32% respectively as compared to the control group. This may suggest an advantageous biomechanical effect which is not apparent histologically and may simply be due to an increased cross sectional area provided by the cells.

Damage at the tendon bone interface in rabbits was also explored (Ouyang et al., 2004) using fibrin glue with and without BM-MSCs. Both groups showed evidence of perpendicular collagen type fibre formation. However, the control group had type I and III fibres only while the treatment group had a higher proportion of fibres and consisted of collagen type I, II and III. This demonstrates the ability of BM-MSCs to promote fibrocartilage-like tissue formation and thus aids in the healing process.

The results from these studies show improved biomechanical properties and healing rates of tendons when BM-MSCs are inserted.

3.3 Ligament

Ligaments stabilize joints and control their movements. During sporting activities, they are subjected to higher stress and strain rates as the joints are subjected to more forceful and exaggerated movements. Additionally, they help coordinate the complex movements required during sporting activities via a proprioceptive input into the nervous system (Frank, 2004).

The cruciate ligaments are probably the most famous and one of the commonest ligaments that can be damaged. Anterior cruciate ligament (ACL) tears can be caused by torsional forces created at the knee whilst the foot is firmly planted on the ground or upon landing or by direct blows to the outside of the knee. Damage to ligaments can also disrupt the physiological loads and movements of joints which may predispose to osteoarthritis (OA) (Muthuri et al., 2011).

Effective treatment is essential for the successful recovery from these injuries (Laboute et al., 2010). In cases of severe tears or complete rupture, surgery is a viable option, where the debate on how to repair still rages. This may involve either primary repair by suturing the ligament (Gobbi et al., 2009) or reconstruction using extra- or intra-articular tendon grafts therefore causing donor site morbidity (Streich et al., 2010). BM-MSCs potentially enhance the efficacy of some of the current treatments (Lim et al., 2004) or may act as a treatment in their own

right (Al-Rashid and Khan, 2011). Kanaya et al. (2007) injected BM-MSCs into partial torn rat anterior cruciate ligaments and found that this appeared to accelerate their healing and concluded that they may be a viable treatment option. The ultimate failure load of the femur-ACL-tibia complex of the BM-MSC treated group was significantly higher than the control group. The transected area of the ACLs in the BM-MSC group demonstrated no retraction and a better histological grading score. The BM-MSCs survived the intra-articular environment and enhanced the healing of partial tears resulting in more biomechanically and histologically viable results.

This potential benefit is supported by other studies (Oe et al., 2011; Wei et al., 2011). In fact, Wei et al concluded that not only do BM-MSCs promote ligamentous healing, but expression of TGF β 1 and VEGF(165) within these cells significantly promoted angiogenesis of the reconstructed ligament at 3, 6, 12 weeks, with the best mechanical properties being achieved at 24 weeks.

Bilateral ACL reconstructions using hamstring tendon autografts were carried out on rabbits to investigate whether the use of BM-MSCs would reduce the incidence of early tendon autograft pull out following ligament reconstruction (Lim et al., 2004). The treatment limb autograft was coated with autologous BM-MSCs within a fibrin glue carrier. The control limb autograft received only fibrin glue. At 8 weeks post surgery the control had a distinct fibrous interface with the bone, containing collagen type I and III with occasional fibres resembling Sharpey's fibres bridging the gap. Conversely the treatment group had matured zones of cartilage rich in collagen type II resembling normal entheses. The overall mean failure load and stiffness were 66% and 51% respectively, which was statistically significantly higher in the BM-MSC group. Despite this benefit, 44% of BM-MSC limbs failed by pullout highlighting that although the resulting biomechanical properties are apparent, more work is needed to evaluate this benefit.

BM-MSCs appear to be the optimum cell sources for ligament repair and produce better results biomechanically, histologically and physiologically.

3.4 Bone

The management of bone defects is challenging. Although bone defects commonly occur after musculoskeletal injury, they can also be caused by surgery or disease (Khan et al., 2009). Non-union is a significant problem affecting up

to 10% of fractures (Axelrad et al., 2007). Any approach to deal with bone defects need to address three fundamental features for bone repair: osteoconduction, osteoinduction and osteogenesis. The current 'gold standard' autologous cancellous bone grafting is limited by tissue availability and donor site morbidity. Allogenic bone grafting has the potential for disease transmission. The use of growth factors including BMPs has shown promising results (Friedlaender et al., 2001) but their role is limited in the absence of an osteoconductive and osteogenic component.

A possible alternative is to use BM-MSCs (Gidado et al., 2009). Some clinical sites are deficient in MSCs and may benefit from BM-MSCs to reactivate fracture healing. The therapeutic options include the use of bone marrow, the use of selected but unexpanded BM-MSCs, or the use of expanded BM-MSCs (Chimutengwende-Gordon et al., in press).

Petite et al. (2000) investigated the results of using a coral scaffold with and without BM-MSCs, and with fresh bone marrow (FBM) in sheep. The BM-MSC seeded scaffold allowed bone deposition at the same rate as scaffold degradation. It was the only composite that resembled physiological bone and allowed bony union to occur after 16 weeks. Although the coral scaffold was osteoconductive resulting in bone deposition in the medullary centre, scaffold degradation outweighed bone deposition in coral and FBM scaffolds.

A different study evaluating the effect of BM-MSCs in healing rates of femoral fractures in rats, a porous hydroxyapatite-tricalcium phosphate ceramic cylinder was used. In one leg the rat received the cylinder alone and in the contralateral leg received the cylinder embedded with BM-MSCs. By 12 weeks union was complete in the BM-MSC group with bony ingrowth into the pores of the scaffold displaying increased strength (215%), stiffness (245%) and torsional energy absorbed (212%) compared to the scaffold side (Bruder et al., 1998b).

In a similarly designed study by Bruder et al. (1998a), a ceramic cylinder composed of hydroxyapatite and β -tricalcium phosphate was used to investigate fracture healing in a canine model. The dogs received a cylinder with or without BM-MSCs. In the dogs with cell-free cylinders union occurred between the implant and the bone cortex in ten of twelve dogs by 16 weeks however no callus was visible and most of the pores were filled with fibrous tissue. In the BM-MSC group, bone was distributed evenly throughout the implant and integrated well

with the host bone. By 8 weeks solid union had occurred in all 12 bone implant interfaces with a continuous bridge of mineralized bone surrounding the defect. An osseous callus formed around the implant and the adjacent host bone in 84% of specimens. The implant pores were filled with woven or lamellar bone in direct contact with the ceramic (Bruder et al., 1998a). This finding is supported by another study using mice models and fracture of the tibia (Granero-Molto et al., 2009).

The preferred treatment for large bone defects is currently autologous bone grafts. However, the supply of suitable bone is limited and its collection is painful, with a risk of infection, nerve damage, and a loss of function (Calori GM et al 2011). Hence BM-MSC embedded scaffolds offer a safer, less destructive alternative with good results (Khaled et al., 2011).

3.5 Meniscus

The meniscus is a vital part of the joint. It acts to prevent the deterioration and degeneration of articular cartilage and the onset and development of osteoarthritis. For this reason, research into meniscus repair has been the recipient of particular interest from the orthopedic and bioengineering communities. They also function to absorb shock during dynamic loading and have a major role in the tribological properties of the knee joint (Makris et al., 2011).

Meniscal tears often occur in conjunction with ACL injuries (Noyes et al., 1980). Although lesions in the peripheral vascular region of the meniscus heal well but lesions in the central avascular area fail to do so (Klompaker et al., 1996). The results with allograft are variable. Isolating meniscal cells from the resected region is another option that has been explored but the quantity and quality of these cells limits applications (Ha et al., 2011). Prosthetic replacement has received promising results from early animal studies but further studies are needed.

Another approach currently being investigated is the use of BM-MSCs seeded scaffolds. Fibrin glue scaffolds were inserted into meniscal lesions in rats with and without BM-MSCs.

At 12 weeks, the cell-free scaffold group had many small round cells within the fibrin glue that were synthesising ECM in 25% of the specimens. The BM-MSC group at that stage contained an abundance of round cells within the

scaffold which were surrounded completely by ECM in 75% specimens. In addition, cartilage-like tissue could also be seen (Izuta et al., 2001).

Walsh et al. (1999) investigated the effect of cell-seeded collagen type I scaffolds in rabbits. The rabbits underwent bilateral partial meniscectomy and then either no treatment, autogenous periosteal graft, type I collagen sponge or a type I collagen sponge with BM-MSCs. Time-dependant osteoarthritic changes developed in all groups. These changes were greater in the autogenous periosteal graft group and fewer in the collagen scaffold group, especially when used with BM-MSCs. The addition of BM-MSCs to the scaffold enhanced fibrocartilage regeneration with evidence of mature bundles of collagen and proteoglycan.

In another study, rabbits with meniscal resection of the pars intermedia received either a hyaluronon/gelatine scaffold with or without BM-MSCs, or received no treatment. The BM-MSC knees had high cellularity of chondrocyte-like morphology and extensive ECM resembling that of normal meniscus. There was nearly complete filling of the defects with good integration of the scaffold. The amount of fibrocartilage seen was significantly greater than in the cell-free scaffold. The cell-free scaffold group had a partially filled defect with good repair tissue integration but the extracellular matrix produced did not contain any type II collagen. The defect in the control was, in the majority, unfilled (Angele et al., 2008).

The effect of BM-MSCs when applied within a blood clot by sutures to a defected middle third of meniscus was investigated using a goat model. The goats were divided into four groups; Group 1 received only sutures, group 2 sutures and a blood clot, group 3 sutures, a blood clot and BM-MSCs and group 4 received nothing. Group 1 had 4 healed and 4 partially healed knees (3 at 75% and 1 at 50%) with no failed repairs. In group 2, 5 defects were healed and 2 partially healed (by 50%) and 1 failed repair. The repaired sections were more organised with less cellularity compared to group 1. Group 3 had 3 healed, 1 partially healed (25%) and 4 failed repairs. The repair site had reduced cellularity, increased matrix and increased orientation of the matrix. Finally, Group 4 had 7 knees with no healing and 1 partial healing (25%). This study therefore proved that BM-MSCs were detrimental to meniscal healing (Port et al., 1996).

Most of these studies show the positive effects of BM-MSCs on meniscal healing. These cells have an ability to withstand the avascular meniscal conditions

and appear well-suited to defects within this area. *In vitro* studies have demonstrated that the matrix forming phenotype of human meniscus cells can be enhanced by expansion in growth factors and altering the oxygen tension (Adesida et al., 2006; Adesida et al., 2007) and further work on these aspects is ongoing.

3.6 Cartilage

Articular cartilage is integral to the tribological properties of joints. Cartilage lesions are common in sporting activities, with some studies showing up to 49% of injuries associated with athletic activity (Aroen et al., 2004). Their high load bearing and shock absorbing capacity help to withstand the mechanical force exerted across joints during sporting activity (Williams et al., 2007). Once damaged cartilage, is vulnerable due to its poor ability to heal, even small defects may degenerate over time, ultimately causing osteoarthritis (Redman et al., 2005).

Articular cartilage is particularly suitable for tissue engineering applications as it is avascular, aneural and alymphatic (Khan and Hardingham, 2009). Articular cartilage shows a limited capacity for repair following injury. Cartilage injuries that extend to the subchondral bone show some signs of repair due to the release of BM-MSCs from the subchondral bone, and this principle is employed in microfractures (Punwar and Khan, 2011). Current treatments such as arthroscopic management, autologous osteochondral transfer and autologous chondrocyte implantation (ACI) have all shown positive results. However a systematic review comparing autologous chondrocyte implantation, osteochondral autograft transfer, matrix-induced autologous chondrocyte implantation and microfracture failed to identify a single technique consistently showing superior results compared with the others. It did however find that outcomes for microfracture tended to be worse in larger lesions (Magnussen et al., 2008).

Im et al. investigated the ability of BM-MSCs to treat cartilage defects (Im et al., 2001). They suspended BM-MSCs in Ham F-12 medium before injecting into full thickness cartilage defects in the patellar groove of rabbits. The control group received cell free medium. At 14 weeks the BM-MSC group contained reparative tissue resembling articular cartilage with a fully repaired subchondral bone layer. However, the reparative tissue of the control defects was thin, irregular and undifferentiated with less matrix collagen type II. Histological grading scores

indicated the treatment group performed significantly better than the control (14.8 vs 8.9). Thus, the findings suggest the use of BM-MSCs in this way enhances cartilage repair but does not guarantee cartilaginous healing.

Wakitani et al. (1994) used BM-MSCs or periosteum derived mesenchymal stem cells (PD-MSCs) from rabbits and seeded them into a type 1 collagen gel. They were then implanted into large (3x6 mm), full thickness osteochondral defects located in the weight bearing surface of the medial femoral condyle. The contralateral knee served as a control with its defect either left empty or filled with collagen free gel. The BM-MSC group produced reparative tissue more similar to hyaline cartilage with better integration by week 4. However by week 24, the quality of this tissue progressively declined as the thickness of the articular cartilage portion reduced below that of normal cartilage. The control group showed markedly inferior repair throughout the assessment. PD-MSCs yielded results very similar to BM-MSCs but in addition exhibited a progressive increase in surface irregularity.

Hybrid designs for scaffolds have also been used. Shao et al. (2006) seeded BM-MSCs into a Polycaprolactone (PCL) scaffold for the cartilage portion and a tricalcium phosphate-reinforced PCL scaffold for the bone portion. With fibrin glue, the seeded scaffolds were implanted into large osteochondral defects in the load bearing medial femoral condyle of rabbits. Controls received a cell free scaffold. After 6 months, repair tissue from the BM-MSC group was well integrated with host bone in all specimens. Most samples were hyaline like in nature with identifiable collagen type II and glycosaminoglycan, and an almost normal physiological stiffness. Defects in the control group were incompletely filled with fibrous repair tissue with little resemblance to cartilage or bone. However, some repair tissues in the BM-MSC group also experienced fissures and cracks at the integration site and microscopically demonstrated a lack of typical zonal arrangement (Shao et al., 2006).

Similar to Shao et al. (2006), Uematsu et al. used poly-lactic-glycolic acid (PLGA) scaffolds seeded with BM-MSCs (Uematsu et al., 2005) to treat full thickness osteochondral defects in the femoropatellar groove of rabbit knees. Control defects were treated with cell free PLGA scaffolds or left empty. The findings of this study supported the findings by Shao et al. but they were able to show signs

of zonal organization within the newly formed cartilage were similar to the previous scaffold studies. Although in support of Wakitani et al. (1994), it did not, however, report the trend in thinning of the reparative cartilage at 12 weeks. Unlike Shao et al there were signs of zonal organisation of the newly formed cartilage. Additionally, the PLGA scaffold was able to prevent leakage of the injected cells away from the defect, as reported by Im et al. (2001).

It is clear that BM-MSCs do have a role to play in the treatment of osteochondral defects, however it is an area of research that must be investigated further. The use of scaffolds, growth factors and altered culture conditions for *in vitro* expansion are synergistic factors that also require further evaluation (Khan et al., 2007; Khan et al., 2008).

3.7 Spinal Cord and Nerve Tissue

Spinal cord injuries have a significant socioeconomic impact on patients and on society as a whole. Even though endogenous stem cells are present in the spinal cord, recovery from spinal cord injuries is unpredictable. Sanchez-Ramos et al. (2000) have shown that BM-MSCs can successfully differentiate down the neuronal lineage *in vitro*. In a spinal cord injury animal model, Akiyama et al. (2002) have shown that BM-MSCs implantation results in the formation of neural and myelin-producing cells, axonal regeneration and functional recovery. There have only been limited studies in humans. Park et al. (2005) showed that intralésional injections of bone marrow mononuclear cell fraction in five patients with acute spinal cord injury resulted in improvement in sensory and motor functions. Syková et al. (2006) found similar results in 20 patients who were given intravenous injections in the acute post-injury period.

Nerve tissue is currently routinely replaced using autografts that results in variable regeneration and is associated with donor site morbidity. Current tissue engineering strategies are exploring nerve guidance conduits, and culture-expanded Schwann cells with polylactic acid and polylactic-co-glycolic acid scaffolds for regeneration through the conduit (Hadlock et al., 1998; Hadlock et al., 1999). There are currently no randomised controlled trials and better quality studies are needed before any definitive conclusions can be drawn on the role of stem cells in spinal cord and nerve tissue repair (Khan et al., 2009).

4. CONCLUSION

Unlike other sources of stem cells, bone marrow is easy to obtain requiring minimal donor site morbidity, invasiveness and anaesthetic and these properties make BM-MSCs an appropriate choice for musculoskeletal injuries (Kennard et al., 2011; Malik and Khan, 2011). For example, to obtain ACL fibroblasts an arthroscopy is required in an already injured knee, whereas BM-MSCs can be aspirated from the iliac crest. BM-MSCs can be isolated with relative ease due to their superior ability to bind to tissue culture plastic relative to other bone marrow cells (Petite et al., 2000). Once isolated, BM-MSCs can be easily proliferated *in vitro* without losing their capacity for differentiation. Due to their multi-lineage potential, repair of complex injuries is possible. For example, when injected into a knee joint with injuries to the ACL, medial meniscus and cartilage of the femoral condyles, BM-MSCs mobilize to affected areas and contribute to regeneration (Agung et al., 2006).

Bone marrow derived cells appear to have several advantages over other mesenchymal cells (Khan et al., 2010). They undergo a higher degree of mineralisation when differentiating down an osteogenic lineage compared with amniotic fluid (AF-MSC) and equine umbilical cord MSCs (EUC-MSC) (Lovati et al., 2011). In addition, their autologous nature eliminates the issue of immunoreactions and ethical problems.

Any successful future therapy is likely to involve the use of scaffolds has been shown to be efficacious. They provide architectural support and prevent leakage of cells from the defect.

The limitation of the evidence to date is that most of the studies involve small numbers of animal models with inflicted injuries; this does mean that they findings may not be translated to trauma patients or human subjects. Further work in larger animal and ultimately ethically approved clinical trials should be explored before any clinical relevance can be assessed.

Key Points:

- (i) Damage to musculoskeletal tissues can be treated with BM-MSCs.
- (ii) BM-MSCs can be administered directly into the tissue defects via injection however there is a growing body of evidence to support the use of scaffolds. When scaffolds are used, there is still inconclusive evidence to support one medium over another.

(iii) As a cell source for tissue engineering, BM-MSCs are autologous in nature and hence eliminate the issue of immunoreactions and ethical problems. They can be harvested aspiration and have a high *in vitro* proliferation rate whilst maintaining their differentiating capacity.

(iv) The vast majority of these studies are at the small animal stage and therefore further work using larger animal models, and ideally humans is required.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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Oesophageal Carcinoma: An Atypical Presentation – A Case Report

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1. INTRODUCTION

Oesophageal carcinoma typically presents with dysphagia and weight loss [1], but naturally there are atypical cases also. Oesophageal carcinoma is the 9th commonest cancer worldwide with an annual incidence of 7300 cases in the United Kingdom [2] with smoking and alcohol each increasing the risk of developing the cancer fivefold. In terms of presentation the elasticity of the oesophagus means that around two-thirds of the lumen needs to be obstructed to produce dysphagia. Untreated, the tumour tends to be locally invasive and can eventually metastasise to the liver, lungs, bone and nervous system causing breathlessness in rare cases as a manifestation of a malignant pleural effusion. Treatment options include surgery and radiotherapy but the overall 5-year survival rates are approximately 20-25% for all stages [3].

Published epidemiological data regarding the presentation of oesophageal carcinoma is very scarce with no concrete figures for those that may present with respiratory signs. The authors here present a case of oesophageal carcinoma that presented with acute respiratory distress.

2. CASE

A 62-year-old Caucasian male presented to the Emergency Department after an episode of sudden collapse earlier that day. Presenting signs included extreme dyspnoea and wheeze of sudden onset with no apparent trigger. On further enquiry he had no respiratory history and his only risk factor was the fact he was a chronic smoker. A recent weight loss of 6 kg over the previous 8 weeks was also noted. He was afebrile but tachycardic with a respiratory rate of 24. On examination patient was in severe respiratory distress using all his

accessory muscles and unable to speak in full sentences with chest auscultation revealing poor bilateral air entry but no crepitations. The clinical diagnosis at this stage was acute exacerbation of a first presentation of chronic obstructive pulmonary disease. Arterial blood gases on high flow oxygen (60%) revealed an acidosis (pH 7.29) with a degree of CO₂ retention (7.91 kPa). However these improved on 24% oxygen to pH 7.40 and pCO₂ of 5.40 kPa respectively. Haemoglobin was 16.0 g/dL and white cell count was 12.6 x 10²/L. Renal and liver function tests were normal. A chest radiograph revealed hyper inflated lung fields but nothing else of note.

The patient was initially managed with a course of intravenous antibiotics, steroids and regular nebulisers and his condition improved. The sudden sporadic nature of his symptoms together with the recent weight loss led one to the possibility of intermittent obstruction caused by a tumour in a main bronchus. A respiratory opinion was sought and subsequent bronchoscopy proved normal which now pointed to a possible diagnosis of acute laryngeal spasm. A CT (computed tomography) scan booked as next line investigation revealed a 3.6 x 3.2 cm mass with a density of 58 (soft tissue) causing partial mid-oesophageal obstructions with an air fluid level at the level of the carina (Fig. 1). No mediastinal lymphadenopathy was seen and no surrounding fat stranding was seen at this level either. The lungs and visualised bones were unaffected and there was no evidence of metastasis or infiltration to any surrounding thoracic or abdominal structures. A subsequent barium swallow revealed there to be a 5 cm irregular tight stricture in the subcarinal oesophagus with a positive apple core sign and pooling of contrast with food residue being noted also. An urgent gastroscopy showed a tight stricture beginning at 30 cm from the incisors through which the scope was unable to pass without revealing any other possible features to explain these atypical presenting symptoms. Six biopsies were taken from the site all measuring 0.2-0.4 cm each. The biopsies comprised of oesophageal mucosa and clot that was confirmed histopathologically to be squamous cell carcinoma grade G2. The tumour cells were confined to the superficial layer of the oesophagus and determined to be stage IB. Following informed discussion of the potential treatment options with the patient he opted for a course of radiotherapy.

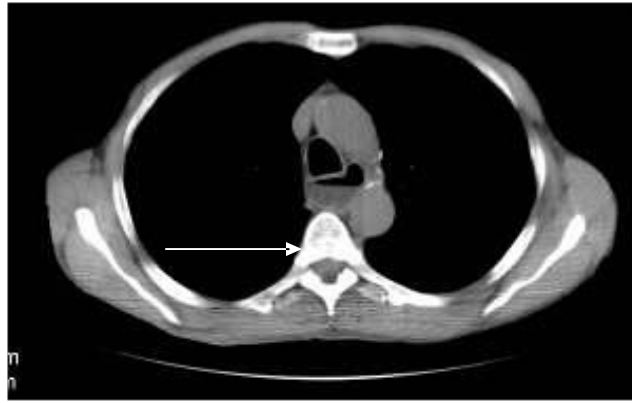


Fig. 1. CT Thorax indicating oesophageal mass (arrow)

3. DISCUSSION

The sudden sporadic onset of respiratory symptoms in this case with no prior respiratory history perplexed many of the physicians involved. Galandiuk et al. [4] have reported that dysphagia (80-90% of patients); vomiting (50%) and pain (45%) are the commonest presenting symptoms of oesophageal carcinoma but the reported patient presented with none of these. Indeed here the normal bronchoscopy findings pointed to a diagnosis of acute laryngeal spasm as the cause of the patients' respiratory symptoms in keeping with previously reported cases [5]. Literature searches have revealed cases of airway obstruction [6] due to oesophageal carcinoma but they have all been caused by oesophagotracheal fistulas which this patient did not have [7].

In this case the patient presented with bizarre sudden respiratory distress sufficient to cause collapse. A respiratory cause was sought but all tests including bronchoscopy proved normal. The eventual diagnosis of oesophageal carcinoma is highly unusual in that the patient did not present with the typical symptoms. In retrospect further discussions with the patient revealed that he had avoided certain foods that had caused him to wheeze but he was never investigated for this. The authors surmise that the sudden respiratory symptoms were due to acute laryngeal spasm secondary to overflow caused by the oesophageal tumour and this gave the picture of hypercapnoeic respiratory failure present on the initial results. The acute laryngeal spasm is highly likely to be linked in this way to the oesophageal carcinoma diagnosed by subsequent CT scan.

4. CONCLUSION

Doctors may encounter several patients with acute respiratory symptoms but subsequent investigations focused on finding a respiratory cause fail to reveal any pathology. In such cases repeated evaluations of the patient must include alternative pathologies in anatomical areas closely related to the respiratory system. Physicians should be cautious to label any patient with acute dyspnoea as having a respiratory cause without any definitive respiratory past medical history.

CONSENT

All authors declare that written informed consent was obtained from the patient for publication of this case report and accompanying images.

ETHICAL APPROVAL

Not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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The Enzymatic Activity of Microsomes in Rats' Hepatocytes by Fluoride Intoxication

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Abstract: In 40 Wistar rats' populations in subacute experiment the effect of small doses of sub-toxic sodium fluoride the activity of microsomal hepatocytes were investigated. Analysis of the results suggests abuse reductase activity hepatocyte microsomes experimental animals subjected to seed aqueous solutions of sodium fluoride at doses of 1/10 and 1/100 LD₅₀, and as a result, the operation of the electron-transport systems. Detected changes, especially in the 60th and in some cases also on the 50th day oral administration of sodium fluoride associated with the restructuring of the lipid environment of microsomal reductases possible result, the formation of a significant amount of reactive oxygen species (ROS). The observed decrease in the overall pool of cytochrome P-450 on the 50th and especially on the 60th day administration of sodium fluoride can be seen as an indicator of its inactivation process.

The effect of inhibition of cytochrome P-450 in conditions of prolonged exposure to sodium fluoride is rather significant fact in terms of structural integration membranes. For the level of cytochrome b5 was characterized by opposite trends change - an increase of 50% on the 50th day and a decline of 47% on the 60th day of action FN. Increased activity of NAD (P) H-cytochrome c reductase in rats when administered sodium fluoride for one month can be viewed on the one hand as a protective compensatory response, and on the other - as the cause of a more rapid flow of electrons from the reduced form of NAD (P) H in cytochrome P-450 and b5 and significant formation of ROS.

Keywords: active liver microsomes of hepatocytes, NAD (P) H-cytochrome c reductase, cytochrome P-450 and b5, sodium fluoride.

Introduction. Investigation was performed at the Department of Clinical Pathophysiology, Topographical Anatomy and Operative Surgery at Kharkiv Medical Academy of Postgraduate Education according to the issue "Radiotoxins' pathophysiological mechanisms on the body and methods of early diagnostics and correction".

Fluoride is an essential trace mineral for alive organisms, but clearly in limited quantities. The main biological role of fluoride and its compounds - bone formation, formation of dentin, enamel, preventing the development of senile osteoporosis. Fluoride is involved in many biochemical processes as enzyme activator and inhibitor. In addition, high concentrations of fluoride stimulates lipid peroxidation and inhibit antioxidant defense system. It belongs to the elements of the first class of danger - especially hazardous chemicals. Prolonged excessive intake of fluoride compounds in the composition of the body can cause pathological condition - fluorosis. Despite the significant content of fluoride in different tissues of the human body, its physiological role so far not been clarified. Excess fluoride in drinking water and food causes the destruction of tooth enamel, inhibits carbohydrate, phosphorous-calcium metabolism, the activity of certain enzymes. As an inhibitor of many enzymes, fluoride can inhibit the synthesis of intracellular processes that weaken the body's immune protection and physiological processes can accelerate aging.

The purpose of this study is the examination of enzymatic activity of microsomes of hepatocytes during chronic fluoride intoxication.

Materials and methods. Studies were conducted on mature rats Wistar line weighing 180-220 g, which were kept in hospital vivarium. Rats were subjected to oral subjected to seed (n=30) using a probe aqueous solutions of sodium fluoride (FS) once daily for 60 days at doses of 1/10, 1/100 and 1/1000 LD₅₀, which was under 20 mg/kg, 2 mg/kg and 0.2 mg/kg body weight (FS average lethal dose for rats received orally, is 200 mg / kg). The animals in the control group injected with appropriate amounts of drinking water (n=10). Research conducted indices 10, 20, 30, 50 and 60 days after the start of the experiment. Each group had 10 animals (N=40). Slaughter was performed by decapitation guillotine knife, pre-anesthetic thiopental sodium 50 mg/kg. Subcellular fractions of rat liver were isolated by differential centrifugation. To separate the microsomal fraction centrifuged supernatant hour at 18,000 g, thus resulting precipitate was washed and suspending among the selection (protein in the microsomal suspension was 15-20 mg/ml).

The activity of NAD (P) H-cytochrome c reductase in rat liver microsomal suspensions assessed in the presence of electron acceptor cytochrome c, determining the change in absorption electron acceptor in the transition from the oxidized form of the restored two-bam on spectrophotometer «Specord UV VIS» at 30°S and wavelength 550 nm [1]. The enzyme activity was calculated using the molar extinction coefficient of cytochrome c, equal to $18,5 \cdot 10^3 \text{ cm}^{-1} \text{M}^{-1}$. The content of cytochrome P-450 in rat liver microsomal suspension was determined by spectrophotometer absorption values of the reduced form of the complex with carbon monoxide at 450 nm [1].

Results. The constancy of internal environment under physiological conditions is supported primarily by detoxification and excretion - the liver and kidneys and vital functions are implemented through specific biochemical relationships under the control of the central nervous system. In the case of the body of foreign chemicals when homeostatic authorities fail to ensure their detoxification and elimination, developing normally cytotoxic effects and apathy body. The main body is exposed to foreign chemicals are liver [2, 3]. Study pathochemical mechanisms of sodium fluoride (FS) is considered appropriate to begin the assess to structural and metabolic status of the body. Enzymatic rat liver microsomes state initially evaluated the activity of NAD (P) H-cytochrome c reductase in the dynamics of observation (10, 20, 30, 50, and 60 days) when administered to rats in doses of FS 1/10, 1/100 and 1/1000 LD₅₀.

The results showed that 10 and 20-th day oral dose of FS 1/10 LD₅₀ observed statistically significant ($r \leq 0,002$) when compared to control gradual increase in activity of NADPH-cytochrome c reductase, respectively 24 and 36%. On the 30th day of observation recorded some tendency to decrease enzyme activity compared with the previous values, but relative to the control activity remained significantly ($p < 0.001$) increased by 29%. Since this time the experiment was statistically significant ($p < 0.001$) reduction when compared with a control group of animals the activity of NADPH-cytochrome c reductase by 20 and 30% respectively on 50 and 60th day of action FS in a dose of 1/10 LD₅₀.

FS oral administration at a dose 1/100 LD₅₀ caused significant ($r \leq 0,004$) when compared to control increases in microsomal fraction of rat hepatocytes activity of NADPH-cytochrome c reductase 6, 26 and 32%, respectively 10, 20 and 30th day of the experiment. On the 50th day determined tendency to a significant reduction in enzyme activity (average 40%) relative to the value on the 30th day, but compared with controls there was a slight but statistically significant ($p < 0.001$) increase rate of 19%. On the 60th day of action FS 1/100 LD₅₀ dose was accompanied by the comparison with a control group of animals decreased activity of NADPH-cytochrome c reductase by 20%.

The impact of UNFPA in 1/1000 LD₅₀ dose did not cause statistically significant when compared with the control effect against NADPH-cytochrome c reductase 10 and 20th day of observation, but 30, 50 and 60th day determined slight, but significant ($p \leq 0,005$) increase enzyme activity an average of 4-6%. Microsomes in rats' hepatocytes FS oral administration at a dose of 1/10 LD₅₀ also led to an increase ($p < 0.001$) compared with the control group of animals the activity of NADH-cytochrome c reductase 10, 23, 31 and 20% respectively at 10, 20, 30 and 50th day of the experiment. On the 60th day of UNFPA contributed to this dose statistically significant ($p < 0.001$) decrease in enzyme activity an average of 39%.

Action in FS 1/100 LD₅₀ dose was accompanied by a gradual increase ($r \leq 0,038$) activity of microsomal NADH-cytochrome c reductase, 5, 11, 22 and 30%, respectively, 10, 20, 30 and 50th day of observation. On the 60th day the indicator decreased relative to the previous term experiment an average of 38%, but in relation to the value of control - remained increased ($p < 0.001$) by 18%. UNFPA in action 1/1000 LD₅₀ practically did not cause changes in the rat microsomal activity of NADH-cytochrome c reductase when compared with a control group of animals; only 30 and 50th day

turned out slightly (by 4.5%), but statistically significant ($p=0.013$ and $p=0.045$) increase in enzyme activity.

Overall analysis of the results suggests abuse reductase activity microsomes of hepatocytes of experimental animals at doses toxification FS 1/10 and 1/100 LD₅₀, and as a result, the operation of the electron-transport systems. Probably detected changes, especially in the 60th and in some cases also on the 50th day oral administration of FS associated with the restructuring of the lipid environment of microsomal reductases result possible, according to the literature [4] initiating the formation of a significant amount of reactive oxygen species (ROS). Increased activity of NAD (P) H-cytochrome c reductase in rats when administered FS for a month can be seen on one hand as a protective compensatory response, and the other - as the cause of a more rapid flow of electrons from the reduced form of NAD (P) H in cytochrome P-450 and b5 and significant formation of ROS.

In connection with the assumption represented evaluate dynamic changes in the general pool of cytochrome P-450 and b5 in the microsomal fraction of hepatocytes experimental animals injected with doses of FS 1/10 and 1/100 LD₅₀ (dose 1/1000 LD₅₀ preliminary results are practically ineffective, allowing it not to consider) within 60 days. On 10, 20 and 30th day toxification FS rats at a dose of 1/10 LD₅₀ observed statistically significant ($p<0.001$) relative to controls increase the overall pool of cytochrome P-450 respectively 44, 74 and 23.

A similar but more pronounced dynamic changes characteristic of the general pool of cytochrome b5 under the action of UNFPA in the doses of 60, 113 and 78%. 50 and 60-day observation that the level of cytochrome P-450 microsomes in rat hepatocytes when compared with the control decreased ($p<0.001$), respectively 48 and 52%.

For the level of cytochrome b5 in this observation period was characterized by opposite trends change - an increase of 50% on the 50th day and a decline of 47% on the 60th day of action FS.

Oral administration to rats in doses of FS 1/100 LD₅₀ contributed statistically significant ($r\leq 0,001$) increase the content of cytochrome P-450 to the 50th day of the experiment (most pronounced on the 20th day - 40%) and cytochrome b5 and (the most pronounced on the 30th day - 112%). On the 60th day of observation in the level of cytochrome microsomal fraction of rat hepatocytes under conditions in steps UNFPA

1/100 LD₅₀ dose was significantly ($p < 0.001$) when compared with controls was reduced by an average of 35-39%.

The observed (mostly within 30 days) increase the overall pool of cytochrome hepatocyte microsomes in experimental animals when administered FS can be seen as an adaptive response. But it should be borne in mind that the oxidation of xenobiotics and endogenous substrates in hepatocytes monooxygenase system is an essential source for the formation of free radicals - lipid peroxidation initiators whose products increases with the activation system [5]. In turn, the deployment of lipid peroxidation process inevitably leads to the destruction of membrane endoplasmic reticulum [6], which may be accompanied by inactivation of cytochrome P-450 because of its conversion to an inactive form - cytochrome P-420 [7-12]. With this in mind, showed a reduction in the overall pool of cytochrome P-450 on the 50th and especially on the 60th day administration FN can be seen as an indicator of its inactivation process.

The effect of inhibition of cytochrome P-450 in conditions of prolonged exposure FS is rather significant fact in terms of structural integration membranes. It should be noted that the activity of microsomal enzymes, including cytochrome P-450, essentially depends on the membrane conformation and physicochemical properties of the lipid bilayer. Identified changes in their activity for UNFPA action may affect the detoxification capabilities hepatocytes key role which belongs to the cytochrome P-450.

Reduction of cytochrome b5 as well, according to the literature [8-12], often associated with the initiation of lipid peroxidation in microsomal membranes of hepatocytes as a result of cytotoxic xenobiotics.

Analysis of the results can also be assumed occurrence of violations in different layers microsomal membranes due to inhibition of FN (especially on the 60th day of the experiment) cytochrome P-450, localized mainly in the hydrophobic zone, and cytochrome b5, localized in the outer hydrophilic zone [9-12].

Conclusion. In general, long-term oral administration of FN, especially at a dose of 1/10 LD₅₀, leads to violation in detoxification function of microsomal membranes in rats' hepatocytes due to the gradual suppression of enzymes activity and reduction in biotransformation of xenobiotics as well as endogenous substrates.

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Section 2. Agricultural Science & Economics

Impact of Customs Regulation in the Efficiency on International Trade

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1. INTRODUCTION

A few years ago the role of customs was to be able to enforce regulation tariffs, non-tariffs and administrative regulations for all products that enter or leave the countries, following international trade agreements [1]. However, consumers demand has been changing as international trade with it. Whereby, customs under this trend should be facilitators of foreign trade through the tax and regulatory simplification.

Overall, the role of the customs service is to be a business facilitator, policy adviser and implementer and safety provider. The proper execution of these functions can foster a fair market, ensure timely delivery and reduce costs of international trade, which leads to the competitive advantage of firms and nations in the global value chain [2].

Currently, customs are confronted to a rapidly changing environment: changing patterns of production and consumption intensified international trade, new global threats. In this context, customs play a major role by ensuring a constant balance between protecting society and simplification of trade.

Customs efficiency has a significant impact on reducing cost associated with trade and business performance management, so a close link between competitiveness in international trade and customs can be identified [2]. In the other hand, a poorly function of customs administration may indeed affect the improvements that have been made in other areas related to international trade [1].

In such conditions customs administrations are relevant regulatory operators on international trade and goods movements, with more important roles and complex tasks. Customs administrations are expected to facilitate and accelerate international trade and transport [3].

The main questions of this paper are: 1. How big is the trade impact caused by customs regulation across countries on economic variables such as efficiency and 2. What measures should be taken in order to achieve the efficiency goal. The objective of this research is focused on determining the relative efficiency of countries customs as a key of international trade. This paper is concentrated on research into the relative efficiency of 29 countries Customs Service's organizational units. For this purpose, dimensions of customs service efficiency, and relevant inputs and outputs were identified. Data have been collected from World Bank data base and the World Customs Organization, and Data Envelopment Analysis is used for the purpose of data processing and quantifying relative efficiency.

2. LITERATURE REVIEW

Every organization that want to stand out or survive the past of the time is looking for be efficient. When we talk about efficiency different concepts pop out. The efficiency defined as the degree of optimization of the result obtained in relation with the resources used [4]. Efficiency as the relationship between goods and services consumed and the goods and services produced; or what is the same, services provided (outputs) in relation to the resources used to such an effect (inputs) [5]. Whereas in the private sector inputs and outputs are expressed in financial terms, identification of inputs and, especially, outputs in the public sector is much more complex [3].

Observing the public sector, *effectiveness*, which can be defined as *capacity to achieve goals*, gains a greater importance than efficiency [6]. In the public services there is no direct correlation between revenues and expenses [7]. The political system is oriented primarily to the achievement of goals defined in the political process, regardless of the cost-benefit ratio.

The assessment of the performance of the public sector has long been a topic of interest to economists, public administration scholars and management scientists [8] and [9]. Some studies analyzed the productivity of government and

compared the productivity of whole public sectors of different countries. That is the case of [10] have carried out an international comparison of public sector efficiency based on the public sector performance (PSP) and efficiency (PSE) indicators. These indicators comprise a composite and seven sub-indicators. Four of them are “opportunity sub-indicators that take into account administrative, education and health outcomes and the quality of public infrastructure and those that support the rule of law and a level playing-field in a market economy. Three other indicators reflect the standard “Musgravian tasks for government: allocation, distribution and stabilization. After defining indicators, the efficiency is measured via the non-parametric frontier technique.

[11] performed a study of efficiency using Free Disposal Hull (FDH) – FDH model has a discrete nature, i.e. the efficient reference point for an inefficient DMU is not chosen as a point on a continuous efficiency frontier, but among the existing DMUs-model based on sixteen countries of European Union, United States and Japan where he used as inputs variables such as health spending, GDP, population, spending on health, spending on public order and security. [12] examined the tax efficiency of twenty countries of the Organization for Economic cooperation and Development (OECD) using as inputs the public expenditure on education (PPA) and public expenditure on health and as output the PISA test performance, death rate and infant mortality and maternal.

Other studies focus on the public sector productivity measurement can also take place at the level of the organization and from a bottom up or service-user perspective [9]. The World Bank has adopted this approach with regard to assessing some aspects of the effects of regulation with the development of their Doing Business database, where three indicators from the database are particularly relevant to the assessment of public administration quality and productivity.

Some customs administrations have developed some systems to measure efficiency. The European Commission has established its Measurement of Results (MoR) project for the customs services of member states. Work on measuring the results of customs activities performed by member states is underway and the results achieved enable member states to compare their performance to the Community standard and act to improved customs operations where necessary. [3] focus on research into the relative efficiency of the Croatian Customs Service’s organizational units considering the number of employees and cost as inputs and

number of customs declarations, public revenues and number of offences as outputs.

3. MATERIALS AND METHODS

The method used in this study is the Data Envelopment Analysis known as DEA, developed by [13] and [14]. The DEA approach has been widely applied to address various decision analysis problems due to its usefulness in evaluating multi-criterion systems and providing improvement targets for such systems. DEA is a non-parametric mathematical programming technique that determines an efficient frontier of the most efficient decision-making units (DMUs) regarding the notion of Pareto optimality and calculates the efficiency of each DMU relative to this efficient frontier based on multiple observed inputs and outputs. An efficiency score of a DMU is generally defined as the weighted sum of outputs divided by the weighted sum of inputs, while weights need to be assigned. To avoid the potential difficulty in assigning these weights among various DMUs, a DEA model computes weights that give the highest possible relative efficiency score to a DMU while keeping the efficiency scores of all DMUs less than or equal to one under the same set of weights [16].

DEA defines the ratio between all weighted relevant outputs and inputs, so it could be presented by following equation [17]:

$$efficiency = \frac{\sum_{r=1}^s u_r y_r}{\sum_{i=1}^m v_i x_i}$$

where:

- y_r =amount of output r ,
- u_r =weight assigned to output r ,
- s =total number of output r ,
- x_i =amount of input i ,
- v_i =weight assigned to input i ,
- m =total number of input i .

Another useful output obtainable from DEA model is reference or lambda weights. Reference weights can be used to identify where along the efficient frontier a particular DMU would be located if that DMU were efficient. Efficient DMUs receive a reference weight of one and for DMUs, which are not efficient, reference weights varying between zero to one are calculated mathematically by DEA model

referencing one or more efficient DMUs [18]. These reference weights indicate the proportion of each of these efficient DMUs criteria values which, when summed together, determine the point of efficiency for the inefficient DMUs being evaluated. In this way, DEA can identify not only how efficient a particular DMU may be, but also provide a benchmark on the non-inferior frontier, where the DMU would be efficient. This benchmark can then be used as a value for negotiation with inefficient DMUs and necessary improvement [19].

Data envelopment analysis was initially introduced by [13] Charnes, Cooper and Rhodes in 1978. They proposed the basic DEA model, which was named the CCR model, departing constant returns to scale (CRS) where a change in the levels of inputs leads to a change in proportional output level. The mathematical formulation for the model developed by [13] is:

$$\begin{aligned} \max \quad & \sum_{k=1}^s v_k y_{kp} \\ \text{s.t.} \quad & \sum_{j=1}^m u_j x_{jp} = 1 \end{aligned}$$

$$\sum_{k=1}^s v_k y_{ki} - \sum_{j=1}^m u_j x_{ji} \geq 0 \quad \forall i$$

$$v_k, u_j \geq 0 \quad \forall k, j$$

where:

- $k = 1 \text{ a } s,$
- $j = 1 \text{ a } m,$
- $i = 1 \text{ a } n,$
- y_{ki} = Amount of output K produced by DMU i ,
- x_{ji} = Amount of input j produced by DMU i ,
- v_k = Weight given by the output k ,
- u_j = Weight given by the input j .

Banker, Charnes and Cooper modified the CCR model by adding a constraint for the calculation of the variable returns-to-scale (VRS). The new model is called the BCC model [14,15] being this model:

$$\min \theta_k$$

Subject to:

$$\theta_k x_{ik} - \sum_{l=1}^n \theta_l x_{il} \geq 0, \quad i = 1, 2, \dots, M$$

$$\sum_{l=1}^n \theta_l y_{jl} - \theta y_{jk} \geq 0, \quad j = 1, 2, \dots, S$$

$$\sum_{l=1}^n \theta_l = 1$$

DEA methodology allows to determine CCR and VRS models of efficiency [20]. The main differences between two models are presented in Fig. 1.

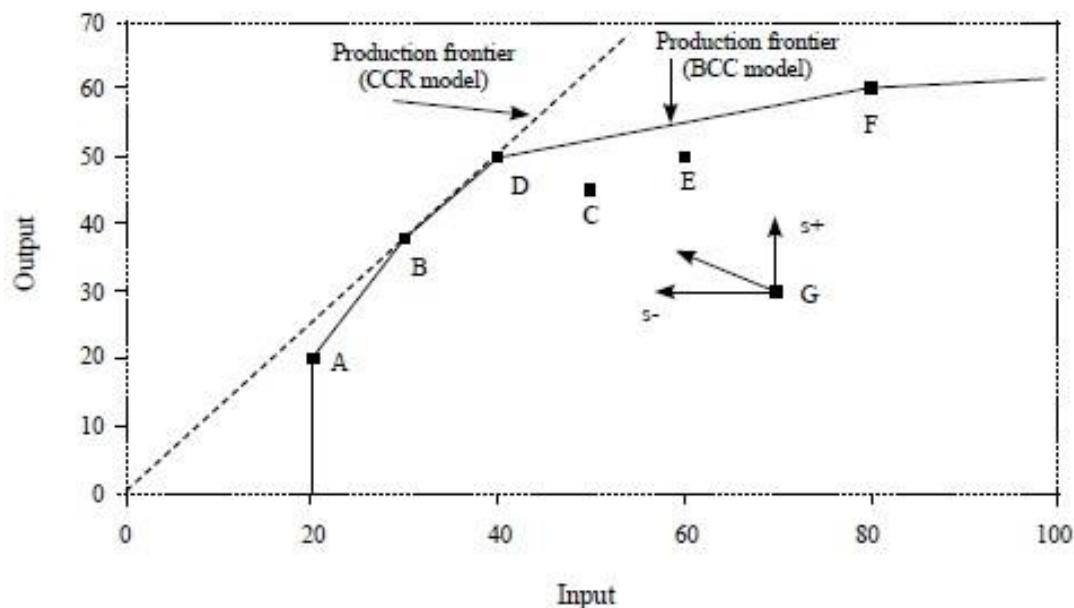


Fig. 1. Differences between CCR and BCC models

Source: Cooper, Seiford and Tone (2006)

3.1 Choice of DEA Model, the Selection of the Input and Output and Efficiency Assessment

From the literature review and the descriptions of the main customs functions described it is possible to recognize the economic and social purpose of the customs service, i.e. by meeting the main functions, customs services achieve their outcome that represents an impact on society of a particular public sector activity [21].

Customs service uses inputs similar to those of other organizations. In general, human and financial resources, assets and information can be highlighted [3].

When creating the model for the assessment of efficiency using DEA methodology, it is necessary to take into account several elements. In this study, these elements are the orientation of the model, differences in returns-to-scale that DEA models assume and the number of analyzed inputs and outputs. Anyway, in order to obtain reliable results, it is necessary to know the characteristics of business processes of the analyzed DMUs.

At the beginning, it is necessary to define the orientation of the model, i.e. make a choice between input, output or input-output (mixed) oriented models. Given the needed rationality in using inputs, for this research, the most suitable are input-

oriented models. In addition, because of the present financial and economic situation of most of the countries, rationalization of inputs is the most suitable option.

DEA models assume constant (CRS) or variable (VRS) returns-to-scale. It is not possible to determine reliably which models are more suitable before the analysis, because the real characteristics of returns-to-scale are not known. This is the reason why authors of DEA recommend the application of both, constant and variable returns to-scale models. When the results of both models coincide to a large extent, it is proper model that assumes constant returns-to-scale. Otherwise, a more suitable model is that which assumes variable returns-to-scale [18].

One of the limitations of DEA is the total number of inputs and outputs that can be included in the analysis. Specifically, it is advisable for the number of analyzed DMUs to be at least three times greater than the sum of inputs and outputs included in the analysis [22]. Therefore, one of the main problems is the selection of relevant inputs and outputs that depict the best way the business processes of the analyzed DMUs. Based on previously conducted research, for this study the following inputs and outputs were selected:

3.1.1 Inputs

- o Number of employees. Human resources are the basis for building strategy of organization, and all other resources arise from their activities [23]. Their skills, capabilities, quality and ethics are among the most important determinants of organizational efficiency, including customs services. In other words, human resources are the basis of the administrative capacity of every customs system, and they are the most important and unavoidable factor that affects all aspects of customs service s organization [3].

- o Cost. Financial resources are needed to achieve the preconditions for the purchase of necessary assets and other material resources and the recruitment of human resources in customs service.

- o Number of customs agencies. Assets and material resources are constituted by different kinds of buildings and equipment.

Number of documents required. In the knowledge society information is a very important input. The basis on which to obtain quality information is a quality information system capable of collecting and processing large amount of data in order to select those that are important for the direction of the customs

services resources. However this not necessarily implies the use of extensive paper works that ends as bureaucratic ballast.

3.1.2 Outputs

- o Collected public revenues. Although customs revenues are decreasing due to the liberalization of international trade and reduction of tariffs, customs service's still retain an important role in financing public needs. Therefore, measuring revenue leakages gives information to customs services about effectiveness and efficiency in collecting taxes.

- o Volume of the international trade and value of the international trade. Participation in international trade has become one of the key factors in the international competitiveness of nations and customs. Conditions in the business environment in past decades have changed under the influence of the relevant growth of trade volume (as the result of elimination of tariffs and other barriers to trade, i.e. consequence of trade liberalization), growth of trade complexity (under the influence of globalization, many different countries organize production of commodities, and many of them have concluded treaties that regulate international trade flows), increased speed of trade (information technology and technological development) in general allow the application of just in time production, which requires fast and seamless cross-border movement of goods [24].

For the purposes of this study, inputs and outputs of customs houses from 2012. 2012 was the year when the economies start to grow after been hit by the world financial crisis. The data recollected for the inputs and outputs was obtained from the [24,25,26,27,28].

4. RESULTS AND DISCUSSION

Technical scores (CRS and VRS) and scale efficiency have been estimated in an input-oriented model. The Table 1 shows that, according to the global technical efficiency, which departs from constant returns to scale (CRS), 8 customs houses were efficient. While the scores of the pure technical efficiency (variable returns-to-scale), 14 customs houses were efficient. The efficiency of de CRS efficiency to VRS efficiency increase which is particularly significant. This gives rise questions on the role played by the effect of the variable returns to scale in the inputs behavior of customs houses.

Table 1. Efficiency scores: CRS, VRS and SE

DMU	CRS	VRS	SECRS/VRS	Rank	Type
Argentina	0.70	0.73	0.97		increasing
Australia	0.94	0.96	0.97		decreasing
Chile	0.93	1.00	0.93	1	decreasing
China	1.00	1.00	1.00	1	constant
Costa Rica	0.71	0.83	0.85		increasing
Hong Kong	0.98	1.00	0.98		increasing
India	1.00	1.00	1.00	1	constant
Indonesia	0.53	0.58	0.91		increasing
Panama	1.00	1.00	1.00	1	constant
Singapore	1.00	1.00	1.00	1	constant
Sweden	0.68	1.00	0.68		increasing
Switzerland	0.96	1.00	0.97		decreasing
Thailand	0.56	0.65	0.86		increasing
Venezuela	0.36	0.52	0.69		increasing
Belgium	0.78	0.90	0.87		increasing
Brazil	0.88	0.88	1.00		increasing
Canada	0.77	0.86	0.89		increasing
Denmark	0.79	0.94	0.84		increasing
France	0.82	1.00	0.82		decreasing
Germany	1.00	1.00	1.00	1	constant
Italy	0.60	0.73	0.82		increasing
Japan	0.78	0.83	0.94		increasing
Korea	1.00	1.00	1.00	1	constant
Mexico	0.65	0.80	0.81		increasing
Russian Federation	1.00	1.00	1.00	1	constant
Spain	0.96	1.00	0.96		decreasing
Turkey	1.00	1.00	1.00	1	constant
United Kingdom	0.78	0.84	0.93		increasing
United States	0.65	0.82	0.79		increasing

Source: Author's calculation

The customs with lowest scores of efficiency were Venezuela with 0.36 score, followed by Indonesia with 0.53 score in the first analysis (CRS) and with scores of 0.52 and 0.58 scores respectively at the second analysis (VRS), meaning that they should be able to attain the same level output using only 52 and 58 per cent of the inputs they are currently using. The average value of scale efficiency is 0.91 in the model. The average scores are quite high indicating a strong efficiency among customs houses.

It should be noted that although some customs houses show values of efficiency some of the them shows a type of diminishing performance (the increase of a factor generates an increase of minor proportion to the initial increase). For example, Chile, Switzerland, France and Spain custom houses show a diminishing performance.

At the opposite some customs houses do not show efficiency of any type but the increase of a factor generates an increase of major proportion to the initial increase as it is the case of the customs houses as Argentina, Costa Rica,

Indonesia, Thailand, Venezuela, Belgium, Brazil, Canada, Denmark, Italy, Japan, Mexico, United Kingdom and United States.

Relatively efficient customs houses appear in the reference set of relatively inefficient customs houses. So, frequency of occurrence in the reference set can be considered as indicator of whether the customs house is a model for other customs houses. Particularly, if a relatively efficient customs house is not a member of any reference set, that means that it is relatively efficient, but it does not appear as a model that should be achieved by the other customs houses. On the other hand, a higher frequency of occurrence in the reference set means a higher probability that it is an example of a good performance. Therefore, Fig. 2 shows the frequency of relatively efficient in the reference set of relatively inefficient customs houses.

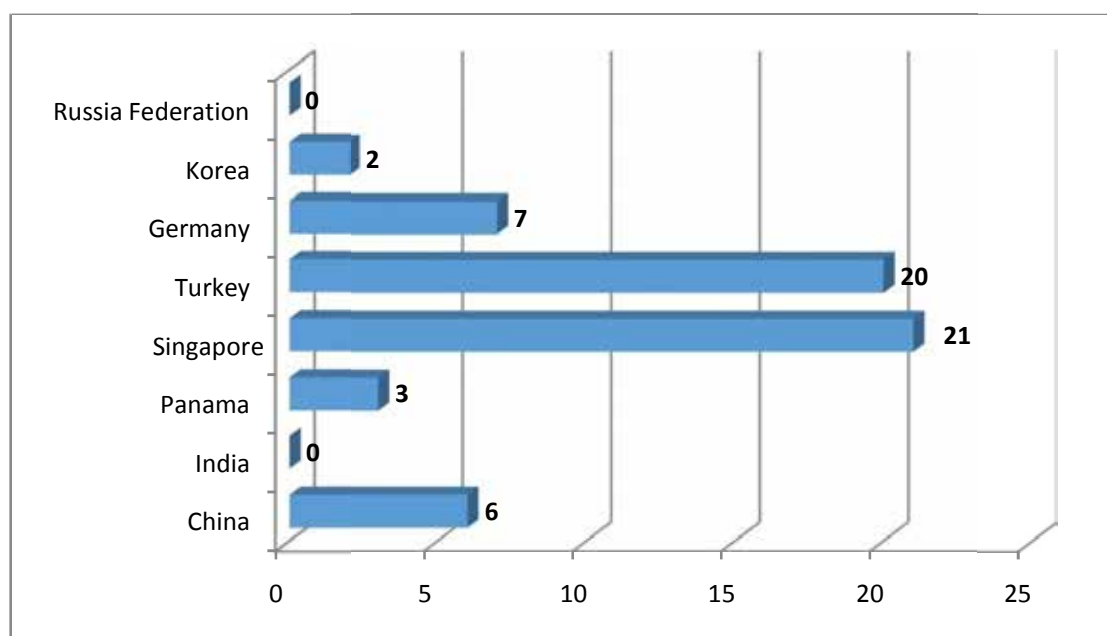


Fig. 2. Frequency in reference set

Source: Author's calculation

After examining occurrences in inefficient customs houses references set, it can be concluded that customs houses of Singapore, Turkey, Germany and China are the most frequent DMUs in the reference set. This means that mentioned customs houses are models of efficient performance and their scores are targets for the inefficient.

Analyzing the frequency set by input and output individually it can be observed which countries are the most used as reference by variable and which countries could be observed as a role model by country. In the case of Mexico as we

can observed in Table 2 Singapore is a good role model for number of customs, while Sweden is a good example for customs expenses and Turkey for the employment of human resources.

Table 2. Frequency in reference set by inputs and outputs

Unit name	Customs Number {Input}	Customs expenses {Input}	Humans Resources {Input}	Papers {Input}	Taxes {Output}
Argentina	Germany	Singapore	Sweden	Turkey	
Australia	Germany	Chile	China	Singapore	Turkey
Belgium	Germany	Singapore	Sweden		
Brazil	Panama	Singapore	Turkey		
Canada	Germany	Singapore	Sweden	Turkey	
Costa Rica	Singapore	Sweden	Turkey		
Denmark	Germany	Singapore	Sweden		
Hong Kong	Singapore				
Indonesia	Singapore	Turkey			
Italy	Singapore	Turkey			
Japan	Singapore	Turkey			
Mexico	Singapore	Sweden	Turkey		
Switzerland	Singapore	Turkey			
Thailand	Singapore	Turkey			
United Kingdom	Singapore	Turkey			
United States	Singapore	Turkey			
Venezuela	Singapore	Turkey			

Source: Author's calculation

With regard to the question addressed of what measures should be taken in order to achieve the efficiency goal? The Table 3 shows a final analysis by country of each one of the inputs and outputs used divided in three stages: the actual value of the input/output, the target value, and the improvements that need to be done.

Taking for example the case of Mexico, the Table 3 shows in order to achieve efficiency (keeping the same number of outputs) costs are necessary to cut down the number of these by 19 percent; take down the total expenses by 26 percent and even reduce the number of employees from 14,992 to 12, 028 employees.

There are several targets that need to be apply toward efficiency, but as we can observe in Table 3 there isn't a common strategy for all the customs due to each country has different problems to solve if each country wants to have a better customs administration which lead eventually an even better performance at global markets.

Table 3. Actual, target and slacks analysis by inputs and outputs

Unit name	Score	Actual	Actual customers number (I)	Actual customers expenses (I)	Actual Human resources (I)	Actual doc numb (I)	Actual revenues (O)	Actual trade vol (O)	Actual trade value (O)	Target Customs number (I)	Target customers expenses (I)	Target doc numb (I)	Target revenues (O)	Target trade vol (O)	Target trade value (O)	Slacks Customs number (I)	Slacks customers expenses (I)	Slacks Human resources (I)	Slacks doc numb (I)				
Argentina	72.51	3	3	2.55	14995	3	22.85	191.5	292.6	2.175	1.266	10873	2.175	22.85	211.3	332.3	0	0.197	0	0	0.022	0.034	
Australia	96.43	2	2	1.4	14994	3	22.85	169.2	383	1.929	1.35	14459	2.519	22.85	254.1	383	0	0	0	0.047	0	0.094	0
Belgium	90.2	2	2	1.15	14996	2	20.1	131.1	256.8	1.804	1.037	13527	1.416	21.69	187.5	267.3	0	0	0	0.049	0.063	0.063	0.009
Brazil	88.15	3	3	2.49	14996	2	21.33	201.4	432.7	2.545	1.226	13219	1.763	21.34	318.8	432.7	0.017	0.327	0	0	5E-04	0.13	0
Canada	86.33	2	2	1.42	14987	2	20.1	109.9	174	1.727	1.136	12938	1.727	20.1	175.1	265.4	0	0.03	0	0	0	0.072	0.078
Costa Rica	83.07	3	3	2.53	14363	2	19.85	201.6	214.4	2.145	1.131	11931	1.661	22.37	201.6	297.9	0.058	0.328	0	0	0.1	0	0.071
Denmark	93.96	2	2	1.07	14465	2	20.1	130.6	218	1.879	1.005	13592	1.306	22.41	194.1	271.2	0	0	0	0.072	0.092	0.07	0.045
Hong Kong	100	2	2	1.03	14994	1	24.37	182.6	219.8	2	0.9	14159	1	24.93	215.5	284.5	0	0.044	0.056	0	0.022	0.036	0.055
Indonesia	57.86	5	5	2.47	14990	5	21.54	158.1	358.7	2.563	1.429	8672	2.688	24.13	234.1	385.5	0.055	0	0	0.026	0.104	0.084	0.023
Italy	72.94	4	4	1.66	14990	4	20.1	102.2	225.8	2.331	1.211	10935	1.992	24.46	226.4	343.8	0.098	0	0	0.116	0.174	0.138	0.101
Japan	83.11	3	3	1.28	14991	4	23.22	137.1	198.3	2.174	1.064	12460	1.523	24.68	221.2	315.8	0.053	0	0	0.225	0.059	0.093	0.1
Mexico	80.23	4	4	2.37	14992	2	19.87	140.3	205.9	2.042	1.14	12028	1.605	19.87	177.3	265.2	0.194	0.257	0	0	0	0.041	0.051
Switzerland	99.56	4	4	1.12	12800	2	24.72	174.3	272.1	2.145	1.036	12744	1.435	24.72	220.3	310.6	0.306	0.027	0	0.069	0	0.051	0.033
Thailand	64.99	5	5	2.04	14994	5	19.26	211.5	348.9	2.453	1.326	9744	2.359	24.29	230.5	365.8	0.133	0	0	0.111	0.201	0.021	0.014
United Kingdom	83.59	3	3	1.27	14934	3	22.89	120.6	174.7	2.172	1.062	12483	1.516	24.69	221.2	315.3	0.056	0	0	0.124	0.072	0.112	0.12
United States	81.76	3	3	1.33	14942	4	19.45	135.1	184.6	2.199	1.087	12216	1.598	24.65	222.1	320.3	0.042	0	0	0.209	0.208	0.096	0.116
Venezuela	52.12	6	6	2.9	14997	8	15.99	141.3	288.5	2.651	1.512	7817	2.952	24.01	237	401.2	0.079	0	0	0.152	0.32	0.106	0.096

Source: Author's calculation

4. CONCLUSION

The purpose of this study has been to estimate the characteristics of technical and scale efficiency of the customs for 29 countries. DEA methodology has been adopted in order to construct an efficient boundary against which to measure the degree of efficiency of the involved units.

This methodology does not require a uniform reduction of all inputs, as in the standard model. Instead, this method minimizes the distance friction for each input and output separately. As a result, the reductions in inputs and increases in outputs necessary to reach the efficiency frontier are smaller than in the standard model.

The results of our study can be summarized as follows:

1) The level of the global technical efficiency is equal, on average, to 83%, the level of pure technical efficiency on average is 89%. This means that the same levels of output could be provided using around the 83 - 89% of the original amount of input.

2) According with the result obtained of scale efficiency on average the scores is 91%, what shows the necessity of reduction of inputs for most of the economies.

3) These results also show the similar degree of performance on the economies considerate for this study.

4) It also important remarks the type of performance that the countries had according to the analyzed indicators. As it is the case of some countries with a low efficiency score but with an increasing performance, or at the opposite behavior countries with an efficient score but with a decreasing performance. These results point out the importance on the improvement of the inputs used.

5) Examples of good performance for most of the countries analyzed are the customs houses from Singapore and Turkey. These leads to look closer the strategies and politics implemented in these countries related to customs administration.

The aim of the study concerns the identification of the strength and weaknesses in customs houses of 29 countries, not only in order to know which customs houses performance is efficient and which not. But also to guide through these study the behavior of the public administration in these matter. However, it is necessary to be careful with the judgment and conclusions that can be drawn from the results. The comparison between the outcomes with the targets settled will determinate if performance is satisfactory. The scope of this study is just a

comparative analysis of the activity conducted by the customs houses as a key of international trade.

There are several points where the research has placed its emphasis that deserve further studies. The analysis indicates that the organizational structure of some Customs Administration is inadequate. This stems from the fact that if particular customs houses reduced their inputs to the desirable level, their existence would not be possible, because in particular cases, projected inputs are so low that they could not ensure fulfillment of main customs houses tasks. Thus, future research should focus on finding and proposing a more adequate organizational structure.

Contemporary circumstances in which customs services operating imply new challenges at global markets. From the initial, primarily fiscal role, customs services in developed and most other countries, have transformed, or are in the process of transformation into organizations with broader and still very important tasks. In addition, further efforts should be focused on the quantification of undetected irregularities and the size of tax evasion. Besides the possibility of obtaining a more reliable assessment of efficiency, the detecting of the undetected provides an opportunity for quality risk assessment and eventually for increasing overall efficiency and effectiveness.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Consumption Diagnosis of Sweet Cassava in Three Municipalities in Cuba

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1. INTRODUCTION

The consumption of cassava in Cuba is a tradition inherited from the islanders who lived there before its colonization by Spain. In that country, cassava is known as *vianda*, a generic name given to the roots, fruits and tubers that can be boiled, fried and even cooked as stews, soups and sweets [1,2].

Cassava is currently considered an important source of energy for human food and animal feed in tropical and in developing countries, where their use has increased considerably, whether fresh, processed or industrialized [3]. However, each region or country has a certain nutritional profile that is strongly associated with their cultural, nutritional, socio-economic and demographic aspects [4].

According to [5], there is little or no information that identifies localized preferences and frequencies of consumption of cassava as well as the factors that determine such parameters. Investigative results of such issue partially characterize the nutritional profile of a population and serve as a reference to plant breeding programmes, contributing to increase local food security [4,7].

Thus, this paper characterizes the preferences and frequency of consumption of cassava in the municipalities of Plaza de la Revolución - La Habana province, El Salvador – Guantánamo province and San José de Las Lajas – Mayabeque province in Cuba.

2. MATERIALS AND METHODS

The preparation of the survey questionnaire was preceded by a gathering of information on the subject through pre interviews with individuals belonging to the universe of the study. The research was thus conducted in two stages. The first one consisted of the preparation of the questionnaire from the information previously obtained in the pre interviews and the second one consisted of the administration and evaluation of the questionnaire.

After drawing up the questionnaire, the sample size that would be surveyed was determined based on the population of the municipalities [7] of Plaza de la Revolución (227) - Havana province, San José de Las Lajas (226) - Mayabeque province and El Salvador (226) - province of Guantanamo, in Cuba. Sample size was determined using probability sampling method based on the equation given below:

$$n = \frac{Nt^2 pq}{d^2N + t^2pq},$$

N = population number of Plaza de la Revolución, San José de las Lajas and El Salvador (152,318; 73,939; 45,305),

t = t value for confidence interval (for 95% confidence interval),

t = (1.96),

p = existed probability (0.5),

q = non-existed probability (0.5),

d = error rate (0.065).

The questionnaire was administered to men and women (40 and 60%) respectively, between twenty and sixty years old, with at least high school graduates (eleven years of literacy), strictly limited to residents of urban areas of each municipality.

After determining the sample size the study was conducted by applying individual questionnaire with 12 closed questions and two open ones. Subsequently, the data were statistically analyzed by calculating the relative and absolute frequencies of each question.

3. RESULTS

In the urban area of the municipalities under study, cassava is mainly obtained by purchase, however cultivation is more representative in El Salvador. Since about 90% of respondents are unaware of the variety of cassava cultivated or consumed (Table 1), knowledge of the variety does not determine the preference of consumers at the moment of purchase or choice the cassava branches to plant.

Table 1. Percentage distribution of respondents about cassava consumption way in three urban municipalities in Cuba

	Plaza de la Revolución %	El Salvador %	San José de las Lajas %
Cassava acquisition way			
Buy	89	73	87
Cultivate	9	21	13
Buy and cultivate	2	6	0
Awareness of cassava variety			
Yes	5	10	7
No	95	90	93
Decision criteria for obtaining cassava			
Pulp colour	11	10	6
Skin colour	57	62	3
Empirical knowledge	26	16	77
Other	6	12	14
Most consumed cassava pulp colour			
White	99	97	98
Yellow	1	3	2

The choice of cassava at the moment of purchase or cultivation is determined either by the morphological criteria of pulp colour and the skin colour or by an empirical knowledge about the ease of cooking. In Plaza de la Revolución and El Salvador, the skin colour is the main criterion when choosing the root, followed by empirical knowledge about the ease of cooking. White pulp cassava is the most consumed variety in the three municipalities.

According to the survey results, the market supply is the main factor that determines the frequency of consumption. When a supply exists cassava is consumed 1 or 2 times a week in Plaza de la Revolución and San José de las Lajas and 1 to 4 times per week in El Salvador (Table 2). The price is not a determining choice factor at the moment of cassava purchase or consumption, given that it was the one the least chosen by respondents in all municipalities.

Table 2. Frequency and criteria that determine cassava consumption frequency in three urban municipalities in Cuba

	Plaza de la Revolución %	El Salvador %	San José de las Lajas %
Weekly frequency of cassava consumption			
0	1	3	1
1 to 2	77	46	82
3 to 4	15	47	13
5 to 7	7	4	4
The frequency of cassava consumption is determined by			
Market supply	71	85	63
Cost	1	3	8
Prefers other	20	2	14
Other	8	10	15
Is there any difference during cassava cooking			
Yes	59	84	85
No	41	16	15
Kinds of differences that occur during cassava cooking			
Taste	3	4	1
Texture	21	16	19
Pulp colour	49	30	7
Other	27	50	73

When asked about the occurrence of changes in the qualitative characteristics such as taste, texture, pulp colour or the occurrence of more than one of these items, during and/or after cooking, the pulp colour was the most cited by citizens of Plaza de la Revolución and San José de las Lajas, followed by the change of more than one factor in the three municipalities. About 90% of the answers “others - more than one factor” were associated with changes in texture and pulp colour.

In Cuba, the most common form of cassava consumption are boiled or fried. Cassava is usually purchased in small quantities, for short-term storage or immediate use. About 50% Plaza de la Revolución citizens are able to storage cassava in the refrigerator and the other 50% keep the roots in a natural, without post-harvest treatment or protection. A small group of people whose cultivate cassava in the backyard keep the roots in the ground. The option “other” represents the group of people whose chosed the options “frozen” and “storage in the natural ambient” (Table 3).

In most cases the use of cassava residues are discarded as domestic waste, mainly in the municipalities of Plaza de la Revolución and El Salvador. In San José de las Lajas almost 60% of respondents declared to use them as animal feed.

Table 3. Consumption, strategies to prevent post-harvest deterioration of roots and utilization of cassava residues (skin and bark) in three urban municipalities in Cuba

	Plaza de la Revolución	El Salvador	San José de las Lajas
	%	%	%
The most common way to consume			
Cooked	51	42	72
Fried	1	3	1
Cooked and fried	45	53	27
As flour	3	1	0
Strategies to prevent post harvest deterioration of cassava			
Frozen peeled	44	42	81
Buried	2	2	8
In natura	50	19	5
Other	4	37	6
Disposal of cassava bark			
Discarded as waste	76	70	42
Animal feeding	21	12	53
Organic fertilizer	0	4	3
Other	3	14	2
Knowledge about cassava industrial processes			
Yes	3	12	7
No	97	88	93

When asked about the knowledge of cassava processing and industrialization, approximately 90% of respondents in the three counties, declared to ignore these types of processing. Those who answered "yes" mentioned the production of starch and cassava yogurt, used in animal feed.

Finally, respondents were asked about the use of cassava as a main ingredient in dishes of Cuban cuisine. In Plaza de la Revolución and San José de las Lajas, it was stated that cassava is present in all Cuban dishes as vianda as well as in caldosas, atol and frituras, while in El Salvador, the cazabe was mentioned.

4. DISCUSSION

Given the lack of space in urban areas and the ease of purchase, the most common way of obtaining cassava in urban areas in Cuba is purchase in agricultural markets. Although El Salvador is an urban region, the province of Guantanamo in Cuba is known as a rural region, ie, does not have the same development and life rhythm of the urban areas of the provinces of La Habana and Mayabeque. Cassava production scale is in the range of what respondents named the "backyard farming", ie, production just for family consumption without surpluses for sale.

Another factor that makes purchasing the most common form of achievement is that the price does not limit the cassava acquisition by purchasing (maximum 8%). In addition to that, when houses have outside spaces people preferably used the space to develop backyard livestock, in order to produce mainly chicken and pork, as can be seen by comparing the percentage of those that cultivate cassava (Table 1) and those whom use the cassava residues as animal feed (Table 3).

The morphological traits as pulp and skin colour are the factors that determine the choice of cassava and can be explained by the characteristics of cassava varieties that are cultivated in Cuba. According to data provided by (Instituto de Investigaciones de Viandas Tropicales, local handout) Cuban cassava germplasm bank are composed with varieties which have light pink (32%) and cream (30%) bark colour, white pulp (82%), and only 5% of the accesses have high content of hydrocyanic acid or are bitter cassava.

Thus the most cultivated cassava varieties are those with white pulp, light brown skin and light pink bark, and are represented by the follow varieties: CMC-40, INIVIT Y 93-4, CEMSA74-725, CEMSA74-6329 and Señorita. Varieties as Selección Holguin, Enana Rosada and Jagüey Dulce are grown primarily in the eastern regions of the country, where are the province of Guantanamo (Instituto de Investigaciones de Viandas Tropicales, local handout).

The frequency of consumption determined by market supply, is related to the supply of roots that cook easily and have fast softening. In Cuba there is supply of cassava throughout the year, however cassava which are those characteristics and with a texture pleasant to the consumer are available only from September to December.

The changes in texture and pulp colour after cooking identified by respondents can be determined by factors such as genotype, interaction between genotype and environment, age or stress endured by the plant throughout its life cycle, which can promote an increase in fiber content, reduction in dry matter content and change in chemical and physical composition of starch granules [8,9,10,11].

According to [12,13], in Cuba the cultivation of varieties not adapted to certain localities is explained by the fact that peasants act as key players in the

management of plant genetic resource, i.e., preservation, production, selection and exchange of local improved propagation material due, among other factors, the peasants' limitation of access to improved materials adapted to each region.

In order to control or improve the quality of cassava produced, [2,6] reported the development of participatory plant breeding projects to establish an improvement strategy, through the stimulation of the selection, conservation, multiplication and seed exchange capabilities of farmers with different socioeconomic conditions and levels of varietal diversity on their farms.

The change of the colour of cassava pulp at cooking time is determined by the total or partial gelatinization of the starch, which may be related to chemical composition as well as to the presence of physical barriers (cell wall) that prevent the entrance of water in cells at the moment of cooking [14,15].

Cassava is a highly perishable food and so it is seldom acquired in large quantities, i.e., consumers typically purchases a small amount to be used in no more than a week. Processing or manufacturing of cassava for human consumption is rare or nonexistent in Cuba, boiled cassava have being the most significant way of consumption and accompany any dish in daily meals.

Those who know some cassava industrialization processes cited the starch used for ironing clothes or cassava yogurt for animal feed. The flour used in Cuba is a whole flour (pulp+bark dried and mashed).

Cassava is the main ingredient of the follow Cuban dishes *yuca con mojo*, dish made by marinading cassava in garlic, lime, and olive oil, *caldosa* or *sopón cubano*, a soup with meat, vegetables and cassava, *atol*, sort of porridge of milk thickened with the starch removed from the mashed cassava, *frituras*, fried cassava, and the *cazabe* that has the shape of a thin-crust pizza dough made with raw mashed cassava, and roasted.

5. CONCLUSION

The acquisition of cassava in the municipalities of Plaza de la Revolución, El Salvador and San José de las Lajas in Cuba is done by purchase small quantities of fresh cassava for home consumption within one week, due to the extreme perishability of cassava, which limits consumers' ability to store fresh roots at home.

The choice of cassava is made based on both skin colour (light brown) and pulp (white) and empirical knowledge about its ease of cooking.

Cassava is mostly consumed in boiled and fried forms up to four times a week in times where there is root market supply with the desirable culinary characteristics (cooking facility), that is, from September to December.

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Current Account and Exchange Rate Dynamics in Presence of Risk and Economic Shocks

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1. INTRODUCTION

The recent oil shocks¹, the huge debts², the financial crisis³, and the deep recession⁴, created an enormous mistrust for the international financial system, a big disturbance to the real sector of the economy, and an uncertain future for the entire world. For an oil importing country a rise in the price of oil leads to currency depreciation (direct effect), which causes an increase in the value of imports and an improvement in exports. The high income of oil exporting countries is going to be spent on purchases of goods or assets from the country with the devaluated currency and its currency will appreciate (indirect effect). Thus, if the value of imported oil (capital outflow) is equal to the value of foreign investment (capital inflow) by the oil producers, the currency must stay unchanged. The elasticity of demand for importing oil is inelastic and the value of imports is large; but, the elasticity of demand for investment is relatively elastic, due to diversification and competition among financial assets issued by different countries, so the value of capital inflow will be less than outflow. In this case the currency of the oil importing country will depreciate.

¹ It reached \$143.67 per barrel on June 30, 2008. Now, the oil price is \$96.16.

² The U.S. national debt was \$16.028.

³ The DJIA from 14,164.53 (October 9, 2007) fell to 6,547.05 (March 9, 2009); an enormous decline by -7,617.48 points or -53.78%, a loss of \$18 trillion. Now (3/12/2013), its nominal value has surpassed the 2007 level, it is 14,447.29, but the real (inflation-adjusted) level is where it was in 1999. (The Wall Street Journal, March 6 and 12, 2013).

⁴ The real GDP fell drastically in 2008:Q4 (g_y -6.78%) and the unemployment rate became a double digit in October 2009 (u -10.1%). Lately, the g_y -2.2% for 2012 (and for the 4th quarter of 2012, it was -0.14%) and the unemployment rate was u -7.9% (January 2013).

Recently there have been numerous studies of the determinants and behavior of current account balance for both the advanced developed countries and the developing countries. See for example, [1], [2], [3], [4], [5], [6], and [7] among many others. Given increased globalization over the past twenty years it is not surprising that there is tremendous interest in studying current account balance. The behaviors of current account balance for most countries have also been sufficiently varied to warrant such renewed interest in current account balance, after the latest debt crises and the enormous unemployment.

Consider for example the current account balance for the United States. Fig. 1 shows the behavior of the U.S. current account balance since 1980. Starting from a zero current account deficit in 1980 within about twenty five years the current account deficit increased to \$800 billion. Over the last thirty years the current account deficit in the U.S. increased marginally during the recessions of 1982-83 and 2001. There was significant improvement in the current account balance during the recession of 1991-92 and in the first half of the recession of 2008-2009, while the second half of the 2008-2009 recession witnessed a worsening of the current account balance. The rise and fall of the current account deficit occurred over periods of increasing or stable oil prices, increasing uncertainty in global economic and political arena. Such diverse behavior of the current account balance is not limited to the United States. But, it implies that the behavior of the current account deficit in the United States and elsewhere cannot often be easily explained by traditional theories of the current account balance and that it needs to be constantly examined and reexamined.

The purpose of this paper is to analyze the determinants of the current account balance in the U.S. using a micro theory based intertemporal model of capital account balance and also to empirically examine the behavior of the spot dollar exchange rate. The structure of the paper is as follows. In section 2, we develop the intertemporal model of consumption and capital account balance and provide a graphical analysis of the effects of various economic shocks on the current account balance. In section 3, we estimate the U.S. current account balance using the data for 1999-2011. We also provide a related empirical estimation of the U.S. spot exchange rate using similar explanatory variables as

used in the current account balance estimation. Concluding remarks are made in section 4.

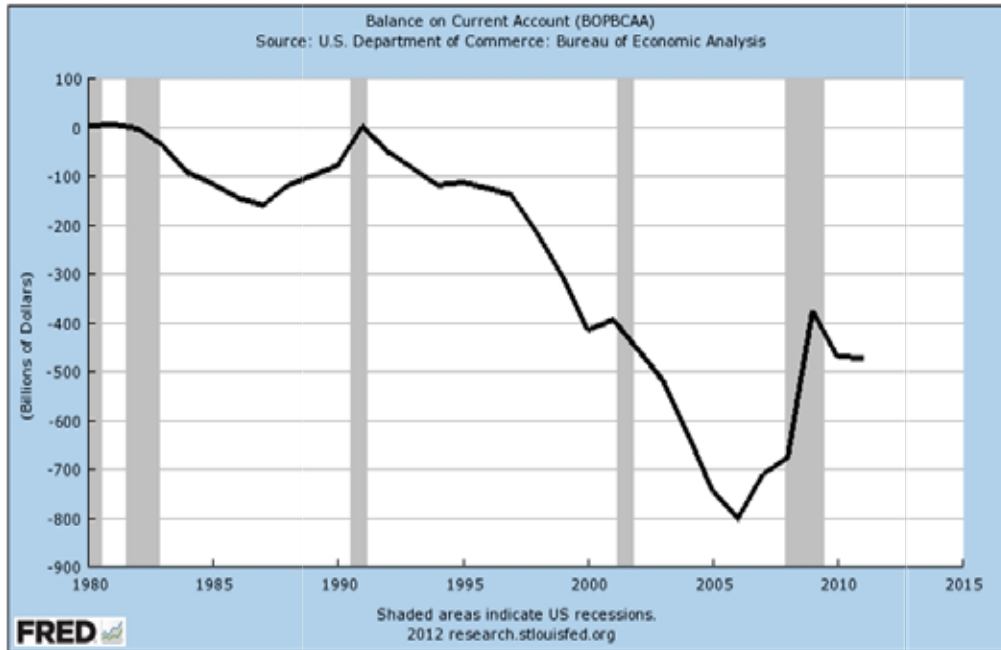


Fig. 1. U.S. Current account

Note: Current account = exports - imports (of goods and services).

Source: Federal Reserve Bank of St. Louis: Federal Reserve Economic Data (FRED)

2. CONSUMPTION AND CURRENT ACCOUNT BALANCE

In this section we develop a two period model of consumption and current account balance following [8]. The economy consists of identical consumers who live for two periods. Their preferences are characterized by a quasi concave utility function $U(C_1, C_2)$ where C_1 and C_2 are the levels of consumption in periods 1 and 2. The consumers maximize their utility subject to a lifetime resource constraint given by,

$$C_1 + \frac{C_2}{1+r} = R, \quad (1)$$

where R = Lifetime Wealth of households + Firms' Value + Value of oil, as follows,

$$R = W + V + N^D. \quad (2)$$

Let us consider each component of the resource constraint:

$$W = (w_1 L_1 - t_1) + \frac{(w_2 L_2 - t_2)}{1+r} \quad (3)$$

where w_1 , w_2 , are the wage rates, L_1 and L_2 are the levels of labor supply, t_1 and t_2 are the taxes in periods 1 and 2, and r is the underlying interest rate.

$$V = (Y_1 - I - w_1 L_1 - q_1 N_1) + \frac{(Y_2 - w_2 L_2 - q_2 N_2)}{1+r}, \quad (4)$$

where Y_1 and Y_2 are real GDP, I is real investments carried out by the firms, N_1 , N_2 are the usage of oil and q_1 and q_2 are the world oil prices in periods 1 and 2. Finally,

$$N^D = q_1 N_1^D + \frac{q_2 N_2^D}{1+r}, \quad (5)$$

where N_1^D and N_2^D are the levels of domestic oil production in periods 1 and 2.

Note that governments taxes and expenditures are governed by the familiar intertemporal budget constraint for the government:

$$G_1 + \frac{G_2}{1+r} = T_1 + \frac{T_2}{1+r}. \quad (6)$$

Now, substituting (3) – (6) in (1) and collecting terms we get,

$$\begin{aligned} W + V + N^D &= (Y_1 - G_1 - I + q_1(N_1^D - N_1)) + \left(\frac{Y_2 - G_2 + q_2(N_2^D - N_2)}{1+r} \right) \\ &= Z_1 + \frac{Z_2}{1+r}, \end{aligned} \quad (7)$$

$$\begin{aligned} \text{where } Z_1 &= Y_1 - G_1 - I + q_1(N_1^D - N_1), \\ Z_2 &= Y_2 - G_2 + q_2(N_2^D - N_2). \end{aligned} \quad (8)$$

Thus, the optimization problem of the consumers is given by:

$$\begin{aligned} \text{Maximize} & \quad U(C_1, C_2) \\ \text{Subject to} & \quad C_1 + \frac{C_2}{1+r} = Z_1 + \frac{Z_2}{1+r}. \end{aligned} \quad (9)$$

Now, (8) yields the fundamental characterization of the Current Account Balance (CAB).

Note,

$$\begin{aligned}
 Z_1 - C_1 &= (Y_1 - C_1 - G_1 - I_1) + q_1 (N_1^D - N_1) \\
 &= \text{Net exports of goods and services} \\
 &\quad + \text{Net export from oil} \\
 &= \text{CAB}_1
 \end{aligned}
 \tag{10}$$

But, by virtue of (9),

$$\begin{aligned}
 (Z_1 - C_1) &= - \frac{(Z_2 - C_2)}{1+r} \\
 \text{or } \text{CAB}_1 &= - \text{CAB}_2(1+r)^{-1}
 \end{aligned}
 \tag{11}$$

Because of (11), in our discussion we can simply focus on Current Account Balance in period 1.

2.1 Shocks to the Economy and Current Account Balance

The closed form solutions for capital account balance and the related comparative static effects are somewhat messy. So we use graphical analysis instead to show how the capital account balance is affected by shocks and changes in economic variables. For our discussion we consider an oil importing country that has a current account deficit. Fig. 2 shows a standard graph for intertemporal utility maximization, where the budget line is BL₁. The endowment point and the equilibrium points are A₁ and E₁ respectively. Since C₁ exceeds Z₁, we can conclude that the country has a deficit in its current account balance.

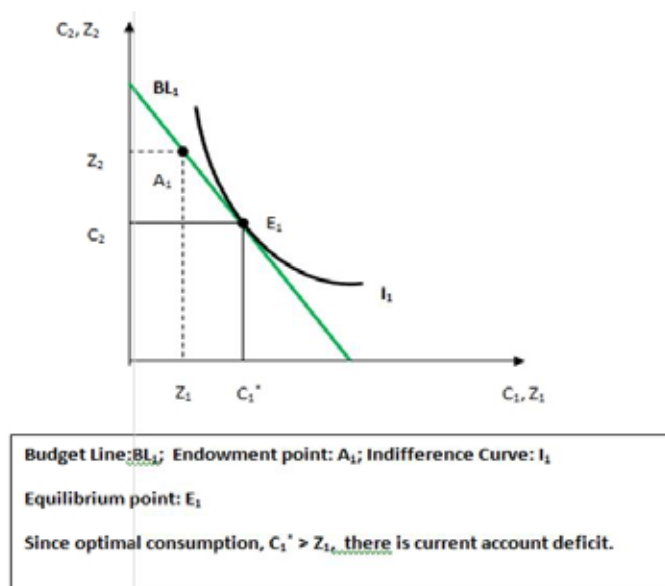


Fig. 2. Determination of current account balance

Using the above graph we can determine the effects on current account balance of various shocks to the economy, such as a reduction in GDP, increase in price of oil or increase in government spending. Consider Fig. 3. Initially, as in Fig. 2, the country has current account deficit. The initial budget line is BL1. The initial endowment point and equilibrium point are E1 and E2 respectively. A reduction in current GDP, Y_1 or an increase in price of oil q_1 , for an oil importing country, lowers Z_1 and shifts the intertemporal budget line from BL1 to the left to BL2. If the shock is temporary the endowment point shifts horizontally to A2. The new equilibrium is at E2. Current consumption falls but due to the consumption smoothing motive, it falls by a smaller amount than the decline in Z_1 . As a result, the current account deficit (in period 1) increases.

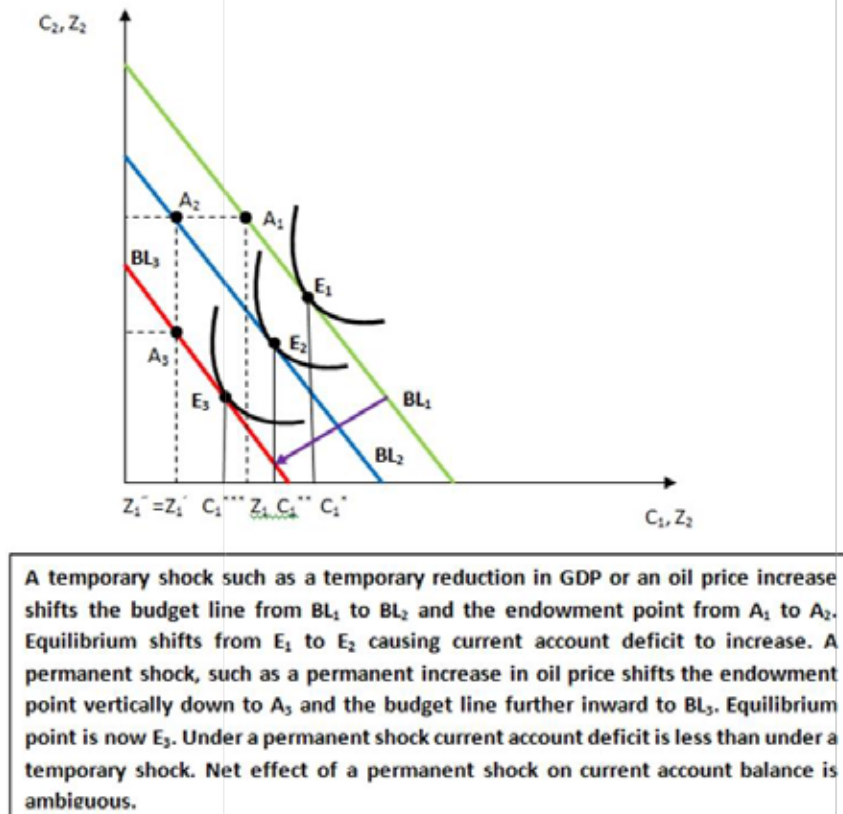


Fig. 3. Effects of temporary and permanent shocks on current account balance

Now, if the shock is permanent such as a permanent increase in oil price, since q_2 also rises by the same amount, the budget line shifts further to BL3 with the endowment point shifting vertically down to A3. The new equilibrium is at E3. Compared to the temporary shock, the current account deficit improves. The net effect on current account balance is ambiguous.

Fig. 4 is used to illustrate the effect of a temporary increase in Government spending G_1 . The increase in G_1 is assumed to be paid for by a corresponding future spending cut – i.e., reduction in G_2 , so that the Government budget constraint (6) continues to hold. As a result, the budget line does not shift but the endowment point shifts up from A_1 to A_4 . Consequently, the current account deficit increases.

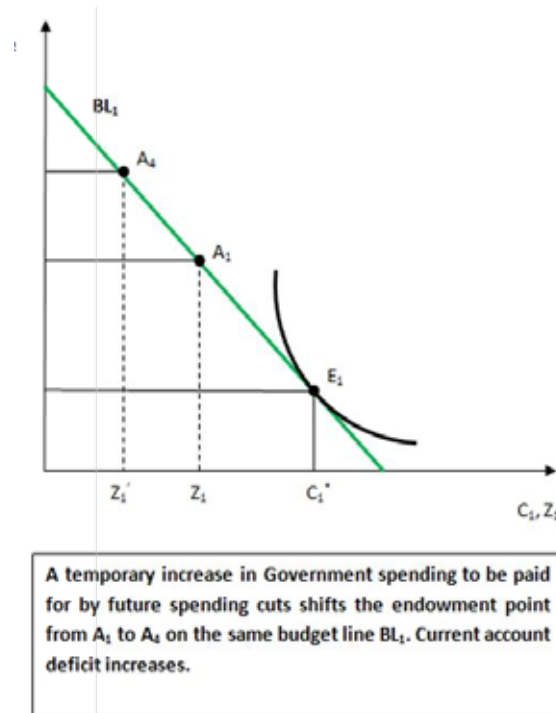


Fig. 4. Effects of temporary increase in government spending on current account balance

At this point, we should note that in this model a temporary slump is caused by an adverse shock such as an adverse productivity shock or an increase in price of oil. The temporary reduction in Y_1 or Z_1 causes current account deficit to increase. Conversely, temporary increase in Y_1 or Z_1 caused by a favorable productivity shock or a reduction in price of oil can reduce the current account deficit. These results are different from the conventional macroeconomic prediction that a boom (slump) causes current account deficit to increase (decrease) by increasing (decreasing) demand for imports. However, the current model can also accommodate the conventional macroeconomic prediction. For example, if GDP increases due to the multiplier effects associated with the increases in G , there may be competing effects on the current

account deficit and for such demand induced increase in income, current account deficit may actually increase.

The above graphical framework can be used to demonstrate the effect of interest rate on current account deficit. If the interest rate falls, the budget line becomes flatter but still passes through the same endowment point. The current consumption for a country that has a current account deficit, falls and as a result the current account deficit increases.

We summarize the basic results of the model in Result 1, below.

Result 1: Consider an oil importing country that has a current account deficit. The amount of the current account deficit increases if (i) there is a temporary slump that reduces GDP; (ii) there is a temporary increase in price of oil; in case of a permanent increase in price of oil, the effect on current account deficit is ambiguous, (iii) there is a temporary increase in government spending to be paid for by future spending cut and (iv) if interest rate falls.

2.2 Current Account Balance under Uncertainty

In this section we briefly discuss the effect of uncertainty on current account balance. The framework is very similar to the previous section. However we assume that the households maximize expected utility from consumption, where the utility function exhibits constant absolute risk aversion. The consumers are exposed to risk from various sources, such as the risk associated with future price of oil or political instability or the risk of a slump. We further assume that the risk is captured by a random variable λ , which enters the budget constraint (9) additively. Because of the structure of our model, the source of uncertainty does not affect the main result.

The households' optimization problem can be formulated as follows:

The households maximize:

$$U(C_1) + \beta EU(C_2) \quad (12)$$

$$\text{Subject to} \quad C_1 + \frac{C_2}{1+r} = Z_1 + \frac{Z_2}{1+r} + \lambda, \quad (9')$$

where λ is the additive random variable that captures risk and β the utility discount factor.

The following result summarizes the effect on current account balance of an increase in riskiness associated with λ . For details see, [9].

Result 2: An increase in the risk as captured by a mean preserving spread of lowers current consumption and thus improves the current account balance.

3. EMPIRICAL RESULTS

In this section we estimate U.S. current account balance using the monthly data from 1999:01 to 2011:12. The data source is *economagic.com*. We also run a related regression on the U.S. spot exchange rate by using data from 1999:01 to 2010:12.

3.1 Current Account Balance Regression

In this regression of current account balance (CAB) we first use the explanatory variables as suggested by the intertemporal model developed in section 2.1: GDP (Y), Government Expenditure (G), Price of oil (p_{oil}), and interest rate on ten-year U.S. government bond (i). All the variables are expressed as natural logs except interest rates. In addition we include two variables to capture risks: the TED spread, the three-month LIBOR minus the three-month T-Bill rate (TED) as a measurement of credit risk and the price of gold (p_{Gold}) as an indicator of a general investment risk. The use of price of gold as an indicator of investment risk is perhaps unusual, but can be easily explained. During the time period used in the data set, price of gold almost consistently increased since investors preferred gold over other risky financial assets. Finally, we also consider the spot exchange rate (s) as a determinant of current account balance, a variable that was left out of our single good intertemporal model of section 2.

The regression equation is given by:

$$ca_t = \beta_0 + \beta_1 TE_t + \beta_2 p_{oil,t} + \beta_3 p_{gold,t} + \beta_4 s_t + \beta_5 i_t + \beta_6 y_t + \beta_7 g_t + \varepsilon_t. \quad (13)$$

The estimation results are presented in Table 1. As column 2 of Table 1 indicates both risk variables: TED and PGold are significant and that they have a positive effect on the current account balance. These effects are consistent

with the results of the analytical model. As noted in section 2, an increase in price of oil has a negative effect on current account balance, but the effect is statistically insignificant. The spot exchange rate also has a negative but insignificant effect on the current account balance. As explained in the intertemporal model, increase in interest rate has a positive and statistically significant effect on current account balance. Besides our explanation of the impact of the increase in interest rate one can also make the traditional argument that by virtue of the interest rate parity, an increase in the interest rate is due to the expected depreciation of the dollar which improves the current account balance. Finally, both GDP and Government spending have significant effects on current account balance. However, the negative effect of GDP and the positive effect spending are in contrast with the results of our basic model. They underscore the importance of the demand side effects of the macroeconomic shocks.

However, the regression has a low D-W statistic of 0.456 suggesting that the error term is serially correlated. We now re-estimate equation 13 with the same explanatory variables but adding three MA processes: MA (1), MA (2), and MA (3). As the values of column 2 indicate none of the qualitative results of the previous regression changes but the D-W statistic improves to 1.786. Also, a cointegration test for eq. (13) shows that a stationary linear combination exists for the time series (Table 3). This cointegrating equation can be interpreted as a long-run equilibrium relationship among these variables, as Engle and Granger have developed in their theory of non-stationary time series analysis [10]. Further, two other tests, a Q-statistics and a serial correlation LM test (Breusch-Godfrey Lagrange multiplier test) were performed to test for autocorrelation and partial autocorrelation of the residuals together with the Ljung-Box Q-statistics for high-order serial correlation [11]. The results show that there is no first-order serial correlation, but there is serial correlation of higher order.

3.2 The Spot Exchange Rate

We finally run a related regression of spot exchange rate [s_t (\$/€)]. We use similar explanatory variables as in equation (13) with the exception of

the risk variables, TED and pGold, lag values of the p_{oil} to test its dynamic effect, GDP, and Government spending, g .

We however include a national debt variable (in natural log), nd . We also include two dummy variables to capture the effects if Iraqi war and the European debt crisis: war dummy, WD , with values of zero (0) before 2003:03 and one (1) afterward, and European debt crisis dummy, $EDCD$, with values of zero (0) before 2009:10 and one (1) after.

Table 1. U.S. Current account balance regression [eq. (13)]

Variables	ca_1	ca_2
α_0	16.911*** (1.500)	12.959*** (1.969)
TED_t	0.041*** (0.005)	0.016** (0.006)
P_{oil_t}	-0.013 (0.014)	-0.019 (0.015)
P_{Gold_t}	0.204*** (0.017)	0.119*** (0.022)
s_t	-0.020 (0.028)	-0.004 (0.046)
i_t	0.018*** (0.005)	0.010* (0.006)
y_t	-2.383*** (0.219)	-1.957** (0.284)
g_t	0.513*** (0.096)	0.583*** (0.119)
$MA(1)$	-	0.980*** (0.088)
$MA(2)$	-	0.750*** (0.108)
$MA(3)$	-	0.365*** (0.085)
R^2	0.876	0.951
SSR	0.120	0.047
$D-W$	0.456	1.786
F	149.762	282.160
N	156	156

Note: ca_t = current account balance, $TED_t = TED$ spread ($= i_{LIBOR} - i_{RF}$), p_{oil_t} = price of oil, p_{gold_t} = price of gold, s_t = spot exchange rate ($\$/\epsilon$), i_t = interest rate on ten year U.S. government bond, y_t = GDP, g_t = Government spending, MA = moving average process, R_2 = R-squared, SSR = sum of squared residuals, $D-W$ = Durbin-Watson statistic, F = F-statistic, N = number of observations, (*), (**), and (***) = significant at the 10%, 5%, and 1% level, standard errors in parentheses.

All variables except TED spread and interest rate are in natural log.

Data Source: Economagic.com.

Data from 1999:01 to 2011:12.

The regression equation is given by:

$$s_t = \alpha_0 + \sum_{j=0}^n \alpha_j p_{oil_{t-j}} + \alpha_2 nd_t + \alpha_3 ca_t + \alpha_4 WD + \alpha_5 ED CD + \varepsilon_t \quad (14)$$

The initial regression results are reported in Table 2, column 1. But as in the case of the current account balance regression, the D-W statistic is low (0.265) suggesting that the error term is serially correlated. We now re-estimate equation 14 with the same explanatory variables, but adding two MA processes: MA (1) and MA (2). The new regression results are reported in column 2. The D-W statistic improves to 1.729. In addition, a cointegration test for eq. (14) shows that a stationary linear combination exists for the time series (Table 3). This cointegrating equation can be interpreted as a long-run equilibrium relationship among these variables. Finally, the two other tests, a Q-statistics and a serial correlation LM test (Breusch-Godfrey test) were performed to test for autocorrelation and partial autocorrelation of the residuals for high-order serial correlation. The results show that there is no first-order serial correlation, but there is serial correlation of higher order, too.

Table 2. U.S. Spot exchange rate regression [eq. (14)]

Variables	s_t	s_t	s_t	s_t
α_0	0.897 (0.566)	-2.662*** (0.612)	-0.391 (0.595)	-0.636*** (0.102)
P_{oil_t}	0.111*** (0.020)	0.130*** (0.021)	0.200*** (0.049)	0.126*** (0.023)
$P_{oil_{t-1}}$	-	-	-0.012 (0.069)	0.023 (0.020)
$P_{oil_{t-2}}$	-	-	-0.105** (0.048)	0.028 (0.023)
nd_t	-0.129** (0.066)	0.252*** (0.072)	0.027 (0.070)	0.001 (0.001)
ca_t	0.686*** (0.132)	-0.116 (0.149)	0.608*** (0.119)	0.029 (0.158)
WD	0.264*** (0.026)	0.058** (0.025)	0.236*** (0.025)	0.062** (0.024)
$EDCD$	-	-0.026* (0.026)	-0.083*** (0.025)	-0.025 (0.026)
$MA(1)$	-	1.257*** (0.076)	-	1.309*** (0.077)
$MA(2)$	-	1.048*** (0.100)	-	1.211*** (0.110)
R^2	0.849	0.969	0.875	0.972
SSR	0.614	0.126	0.557	0.125
$D-W$	0.265	1.729	0.326	1.936
F	190.552	513.154	148.176	455.652
N	141	141	156	156

Note: See, Table 1; = spot exchange rate (\$/€) = price of oil, = ln national debt, = current account balance, = war dummy, = European debt crisis dummy, (*), (**), and (***) = significant at the 10%, 5%, and 1% level, standard errors in parentheses. All variables are in natural log.

Source: Economagic.com. Data from 1999:01 to 2010:12.

The results of column 2 in Table 2 show that, as expected, national debt and price of oil have statistically significant positive effects on the spot rate causing dollar to depreciate. The Iraqi war (WD) has a significant negative effect on the value of the U.S. dollar (spot rate was increasing). The European debt crisis (EDCD) has a significant negative effect on euro and consequently lowers the spot rate and causes the dollar to appreciate. Current account balance has a statistically insignificant effect. [The details of exchange rate dynamics are discussed in [9].

Table 3. Cointegration tests of the multi-variables models

Eq. (13); Variables: $ca, TED, p_{oil}, p_{Gold}, s, i, y, g$						
(Maximum lag in VAR=2)						
Null	Alternative	Eigenvalue	Trace Test Statistics	Critical Value 95%	Maximum Eigenvalue Test Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.574	257.790 ^{***}	159.530	130.379 ^{***}	52.363
$r \leq 1$	$r > 1$	0.224	127.412 ^{**}	125.615	38.864	46.231
$r \leq 2$	$r > 2$	0.183	88.548	95.754	31.076	40.078
$r \leq 3$	$r > 3$	0.127	57.539	69.819	20.720	33.877
$r \leq 4$	$r > 4$	0.104	36.819	47.856	16.726	27.584
$r \leq 5$	$r > 5$	0.075	20.093	29.797	11.988	21.132
$r \leq 6$	$r > 6$	0.039	8.107	15.495	6.113	14.264
$r \leq 7$	$r > 7$	0.013	1.994	3.841	1.994	3.841

Note: See Table 1; Trace test indicates 2 cointegrating equations at the 5% level. Maximum eigenvalue test indicates 1 cointegrating equation at the 5% level.

Eq. (14); Variables: $s, p_{oil}, nd, ca, WD, EDCD$						
(Maximum lag in VAR=2)						
Null	Alternative	Eigenvalue	Trace Test Statistics	Critical Value 95%	Maximum Eigenvalue Test Statistics	Critical Values 95%
$r = 0$	$r > 0$	0.202	102.765 ^{**}	95.754	34.550	40.078
$r \leq 1$	$r > 1$	0.183	68.214 [*]	69.819	30.947	33.877
$r \leq 2$	$r > 2$	0.108	37.267	47.856	17.487	27.584
$r \leq 3$	$r > 3$	0.086	19.780	29.797	13.795	21.132
$r \leq 4$	$r > 4$	0.033	5.985	15.495	5.180	14.265
$r \leq 5$	$r > 5$	0.005	0.805	3.841	0.805	3.841

Note: See Table 2; Trace test indicates 1 cointegrating equation at the 5% level and 1 cointegrating equation at the 10% level. Maximum eigenvalue test indicates no cointegration at the 5% level. Source: See Table 1 and 2.

4. CONCLUDING REMARKS

The objective of this analysis is to determine the exchange rate dynamics based on shocks on the economy and on current account, due to oil prices, debts, and risk, between the U.S. dollar and the euro. Lately, the U.S. dollar was losing value with respect the euro and other major currencies of the world and we want to see if this depreciation depends on economic shocks and economic fundamentals or it is just speculation from individuals and countries, which hold

large amounts of foreign assets denominated in different currencies or due to the current global financial crisis, recessions, instability, and the risk that the U.S. might freeze the foreign funds invested in its assets. The preliminary conclusion from this ex post analysis is, here, that, international investors are investing in countries with higher return, lower risk, and safety. This increase in demand for these assets, increases the demand for currency in that country and its currency is appreciated⁵, the oil prices, the high risk and the enormous debts are affecting negatively the currency. Before 2001, people were invested in the U.S. and Japan, so the U.S. dollar and the Japanese yen were appreciated. After 2001, they invested in Euro-zone and the U.K. and the dollar and yen lost their value. Of course, due to high risk (wars and creeping ones, political conflicts, and a unique financial crisis) and low returns, many speculators have invested in euros and other currencies, instead in dollars denominated assets. Since November 2009, we have seen a change in this trend because of the Euro-zone debt problems. The current account is affected by risk and high debts, too.

Lastly, in this paper we have used the insights of an intertemporal model of consumption to analyze the recent behavior of the current account balance in the U.S. We have examined the roles of risk, price of gold, price of oil, TED spread, as well as interest rate, GDP and government spending. We have also analyzed the behavior of spot rate. In future papers we plan to use this framework to run a cross-country analysis of current account balance where we plan to include both the OECD and the developing countries.

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⁵ Here, the causality goes from $i_{AAA} \uparrow \xrightarrow{3.236} S \downarrow (\$ \uparrow)$ and $(\rho_{i,S} = -0.809)$.

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Scaling Up of Stocking Density of Tiger Shrimp (Penaeus monodon) Under Improved Farming System in Khulna Region of Bangladesh

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1. INTRODUCTION

Shrimp farming is a century-old practice in many Asian countries. It is one of the most exportable frozen products of Bangladesh [1]. The culture of shrimp received maximum importance due to its high value in the world market as well as its unique taste; high nutritive value making it's a quick profit item in the country. Until a decade ago, this commodity was generally considered a secondary crop in traditional fish farming practices. Shrimp fry trapped in salt beds, coastal paddy fields or brackish water fishponds were allowed to grow to marketable size and harvested as secondary crop. However, in recent years when higher income are derived from the harvest of shrimp than the principal crop, many farmers have converted their rice fields, salt beds and fishponds into shrimp farms [2].

In Bangladesh the shrimp farming mostly concentrated in the southern region and about 80% of the areas are in Khulna region that covers more than 145 thousand hectares of land. Most of the culture techniques are done through extensive method where production never goes above 120 kg/ha/year [3]. In the traditional farming system, the ponds are stocked with fry either collected from the

wild or concentrated through tidal water entering the ponds [4]. Subsequently yield is very low because of inefficient control of predators and competitors, full dependence on natural food, inadequate pond depth and water quality management. Some improvements of the traditional farming systems have been made in the past years. Stocking density of shrimp can be increased through better management practices. As a result, pond yield has correspondingly increased. However, expansion of the shrimp farming industry is still restricted due to the lack of suitable culture technology and disease problems in Bangladesh.

The success in the mass production of shrimp can be achieved to 4–5 tons/ha through improved pond culture techniques, water quality management and artificial feeding. Shrimp farming has now developed into an important export-oriented food industry especially in South Asian countries. The perception of an unlimited market demand, high export price, generation of employment and increase in foreign exchange earnings may have encouraged many countries in the region rich in aquatic resources to place high emphasis on the development of the shrimp culture industry. However till now optimization of stocking density in shrimp farming in Bangladesh is the triggering factor for maximizing the survival rate and boost up production. Stocking density also related to the culture system and environmental condition of the agro-ecological conditions. Most of the research findings are concentrated on the extensive farming system and pond dynamics of shrimp farms in Bangladesh [5-7]. Some of the research works on stocking density and total production by Shofiquzzoha and Ahmed [8], Apud et al. [9], Islam et al. [10], Islam and Alam [11], Nuruzzaman et al. [12], were showed that in all cases the stocking density were within the 5 pcs/m² and the production were not more than 760 kg/ha, that is much lower compare to the neighboring countries [3]. Information on improved farming system compare to the present conventional system with higher stocking density is still lacking. However, there is little research on the improved farming system in the farm scale. That is why the present experiment was carried out for scaling up of stocking density of black tiger shrimp (*P. monodon*) under improved shrimp farming system in Khulna region of Bangladesh.

2. MATERIALS AND METHODS

The experiment was carried out in the farm station of Gazi fish culture ltd. at Koilashgong, Dakop upazilla of Khulan, Bangladesh from March to July 2011. Nine

ponds were selected for three treatments with three replications. All ponds were prepared according to the general pond preparation system. Black soil of the pond was eliminated and pond bottom was allowed to sun dry. The average pH was calculated and required amount of lime was applied to maintain the optimum pH. The ponds were fenced by net to prevent entering other species. PCR tested post larvae at 15 days old (PL15) average weight 0.05 g were stocked in each pond maintaining three different stocking densities i.e. 8 pcs/m² in Treatment 1 (T1), 15 pcs/m² in Treatment 2 (T2) and 22 pcs/m² in Treatment 3 (T3). The experiment was set up according to the completely randomized design (CRD) protocol.

Ponds were filled with water by filtration with small mesh size filter net. The initial water levels in the ponds were maintained at 60 cm level. After filling the pond, crab net was fixed along the pond perimeter. Ponds were bleached with bleach containing 30% chlorine at the rate of 60 ppm [13]. Inorganic fertilizers were applied weekly for producing natural food in the culture ponds at a rate of 28 kg N/ha/week and 7 kg P/ha/week [14]. Different types of chemicals and minerals such as dolomite, sodamix, nutrilake and A-soil were applied to the pond in the three days interval during the pond preparation. After three weeks the ponds were ready for stocking and the seeds were acclimatized to the pond environment. After acclimatization seeds were released slowly to the ponds water.

Commercial shrimp feed were applied in all the treatments (Table 1). Blind feeding was done for first 30 days. Later the feeding was adjusted based on the check tray observation and body weight sampling. Four check trays were installed in each pond for monitoring the shrimp health conditions and feed intake. The feed ration was divided into 4 times a day as 25%, 20%, 30% and 25% in the morning at 6.00 a.m., 11.00 a.m., 6.00 p.m. and 10.00 p.m. respectively. The ingredients of the feed include Fish meal, Cod liver oil, Shrimp/prawn meal, Squid meal, Wheat flour, Binder, Soybean meal, Broken rice, Phospholipid, Cholesterol, Vitamins and Minerals, Di calcium phosphate etc.

Table 1. Composition of commercial feed applied during the culture period

Composition	Percentage
Moisture	11 (maximum)
Crude Protein	38 (minimum)
Fat	5 (minimum)
Fiber	4 (maximum)

Additional water exchange was not done for the first 60 days. After that 12 cm of water was added regularly in every 15 days interval till harvesting and water level was maintained around one meter in all the ponds. Commercial probiotics were collected from local market. Based on the water quality parameters and health conditions of shrimp, probiotics were applied in all the treatments during the culture period (Table 2). Sampling was done in the pond every week during early hours of the day with cast net for checking the healthiness and growth rates. The water quality parameters of the culture pond were regularly monitored. Monthly water sample were collected for analysis. The water level was measured by using a handmade wooden scale with cm marking. The water salinity of the pond was measured by using a hand refractometer (Erma-Japan). The pH, alkalinity, total ammonia nitrogen (TAN) of the pond water was recorded by using pH test kit, alkalinity kit and ammonia test kit respectively (Advance Pharma, Thailand). Water temperature was measured by using a standard centigrade thermometer. The dissolved oxygen (DO) was estimated by DO test kit (Advance Pharma, Thailand). Transparency was observed in terms of light penetration by using Secchi disc.

Economic analysis was done considering all variable costs to the expenditure and respective shrimp sales of the treatment to the gross return. One way ANOVA was done to observe the differences in growth, survival rate, production, FCR values and economic return among different treatments.

Table 2. Name of probiotics used during the experimental period

Name of probiotics	Bacterial Composition	Concentration	Doses
Super P S	Rhodobacter sp, Rhodococcus sp	$\pm 10^9$ CFU/ml	20 Lt/ha
Super Biotic	Bacillus sp		5 Kg/ ha
Mutagen	Enzyme compound		10 g/kg Feed
Zymetin	Enzyme compound		5 g/kg Feed
Pro-w	Bacillus subtilis, Bacillus licheniformis	5×10^{10} CFU/g	250 g/ha
Pro-2	Bacillus subtilis, Bacillus licheniformis, Bacillus pumilus	2×10^{10} CFU/g	10 g/kg Feed

3. RESULTS AND DISCUSSION

Salinity was found between 10-18 ppt during the culture period. The average pH was fluctuated within the range of 7.7 to 9.4 in different treatments (Table 3). DO remained within the suitable limit and DO was recorded maximum 8.5 mg/l and minimum 3.5 mg/l. The temperature of the water was ranged between 27 to 34°C during entire culture period. Transparency ranges from 25 to 55 cm

during the culture period. Total ammonia nitrogen (TAN) was 0.1 to 0.5 mg/l in culture period. The highest was observed in the T3. Most of the time the unionized ammonia level in three treatments were between 0.002 to 0.004. However with increasing the pH and temperature sometimes it was increased. The water quality parameter in different treatments did not show any significant difference among the treatments.

Table 3. Water quality parameters in different treatments during the experiment

Parameters	Treatment 1 (T1)	Treatment 2 (T2)	Treatment 3 (T3)
Salinity (ppt)	10-17	12-18	11-17
pH	7.8-9.2	7.7-9.1	7.9-9.4
Temperature (°C)	27-34	27-34	27-34
Transparency (cm)	26-50	27-54	20-35
Dissolved Oxygen (mg/l)	3.5-8.5	4.0-8.0	3.5-8.5
Total ammonia Nitrogen (TAN) (mg/l)	0.1-0.25	0.1-0.2	0.1-0.5
Un-ionized ammonia (mg/l)	0.004-0.151	0.0024-0.098	0.0039-0.302
Total alkalinity (mg/l)	120-135	125-130	110-130

The growth rates and production data of *P. monodon* are shown in Table 4 and 5. Shrimps were cultured for 144 days. The harvesting size of shrimp varied from 29.0±1.5 g to 38.5±0.5 g. The lowest was observed in T3 that was significantly lower than T1 and T2 ($P<0.05$). Daily weight gain of shrimp was significantly different among treatments. Treatment 3 showed lowest value than other treatments and the value was 0.20±0.00 g/day ($P<0.05$). The highest survival was found in T2 (82±4). The survival rate was found lowest in T3 (68±2) that was significantly lower than T1 and T2 ($P<0.05$) (Table 4). The average production in different treatments showed significant difference ($P<0.05$). Stocking density 15 pcs/m² and 22 pcs/m² exhibited the highest production of 4635.1±128 kg/ha/crop and 4328.7±138.2b kg/ha/crop respectively, and lowest was observed in lowest stocking density of 8 pcs/m² (2431.3±35.2 kg/ha/crop) in T1 (Fig. 1).

Total amount of feed used in different treatments were significantly different among the treatments as the number of PL was different in three treatments ($P<0.05$). The highest amount of feed was used in T3 (3963.7±77.3 kg). FCR in T3 was significantly different than T1 and T2 ($P<0.05$). Highest FCR value was observed in T3 and the value was 1.83±0.03. However, there was no significant difference among the FCR value between T1 and T2 (Table 4).

Table 4. Production performance of *Penaeus monodon* under different stocking densities

Parameters	Treatment 1 (T1)	Treatment 2 (T2)	Treatment 3 (T3)
Stocking size (g)	0.05±0.0	0.05±0.00	0.05±0.00
Initial biomass (kg)	2	3.75	5.5
Harvesting size (g)	38.5±0.5 ^a	37.6±0.74 ^a	29.0±1.53 ^b
Daily weight gain (g/day)	0.26±0.00 ^a	0.26±0.00 ^a	0.20±0.00 ^b
Production (kg/ha/crop)	2431.3±35.2 ^a	4635.1±128.4 ^b	4328.7±138.2 ^b
Survival	79±2 ^a	82±4 ^a	68±2 ^b
FCR	1.433±0.03 ^a	1.513±0.02 ^a	1.833±0.03 ^b

Table 5. Economic analysis of *Penaeus monodon* farming under different stocking densities

Parameters	Treatment 1 (T1)	Treatment 2 (T2)	Treatment 3 (T3)
Feed used (kg)	1741.0±21.7 ^a	3508.7±131.3 ^b	3963.7±77.3 ^c
Feed cost (tk)	144503.0±1801.3 ^a	291219.3±10901.6 ^b	328984.3±6412.4 ^c
Probiotics cost (tk)	17333.3±1453.0 ^a	89333.3±6984.1 ^b	88333.3±4409.6 ^b
Chemical cost (tk)	12333.3±1453.0 ^a	32666.7±1453.0 ^b	49333.3±3480.1 ^c
Total Cost (tk)	304169.7±4030.2 ^a	560719.3333±15817.9 ^b	631651.0±7662.5 ^c
Net profit (tk)	650535.0±16679.7 ^a	1242844.6±16576.4 ^b	707766.0±54557.7 ^a
Profit percent	213.7±7.7 ^a	221.8±3.5 ^{ab}	111.3±7.5 ^c

The cost of feed was also significantly different among the treatments. The highest feed cost was observed in T3 (328984.3±6412.4 tk) and lowest was in (144503.0±1801.3 tk) (Table 5). For the prevention and control of diseases probiotics and chemicals were used in all the treatments. The cost of the probiotics in T1 was significantly different than T2 and T3 (P<0.05). The cost of probiotics was lowest in T1 than other treatments. On the other hand the costs of chemicals were significantly different between each treatment. The highest cost was observed in T3 (49333.3±3480.1 tk) and lowest was observed in T1 (12333.3±1453.0 tk) (Fig. 2).

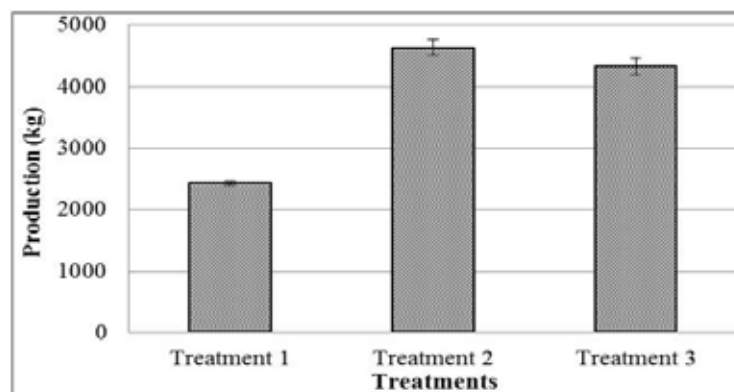


Fig. 1. Production of *P. monodon* in different treatments during the experiment

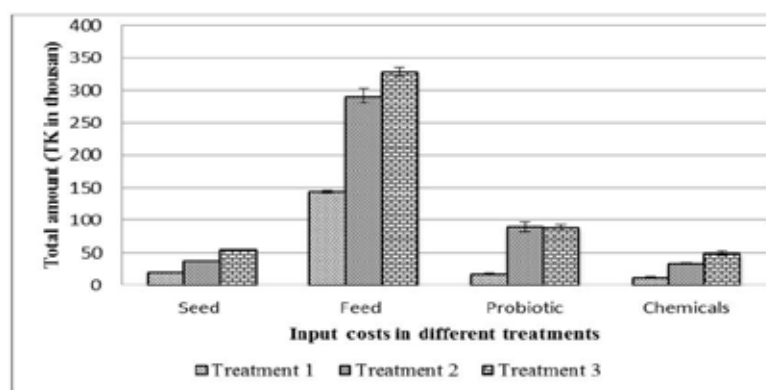


Fig. 2. Major expenses during the experimental period in different treatments

The farming of the black tiger shrimp has been increasing in Bangladesh due to high demand and price in the international market. But there are lot of obstacles in shrimp farming to makes it as a sustainable aquaculture business. To make shrimp farming sustainable, stocking density of post larvae in a pond is determined in accordance with the production capacity of the pond and the culture system, which included the soil and water quality, food availability and seasonal variations, target production. Moreover, farmers experience is also essential. In the present study the production of *P. monodon* was found better in the stocked density of 15 and 22 pcs/ m², that is similar to the statements of Ramanathan et al. [15]. They also found that stocking density between 10-20 pcs/m² was ideal for successful shrimp farms and for the nursery of shrimp Khan *et al.* [16] suggested the stocking density of 100 pcs/m².

All the common water quality parameters were within the range for shrimp. Salinity, pH, Temperature, Dissolve oxygen were within the limit according to Boyd [17-18]. Sometimes with increasing the pH and temperature the unionized ammonia was increased specially in the T 3, It might be due to the large amount of feed used. In such situation proper aeration and probiotics were used to control it. Probiotics might also helpful in controlling the toxic ammonia. Feed is one of the essential inputs in shrimp production and increase profits. Feed management is very important, as feed consumption cannot be directly observed. Excess nutrients which may affect pond water quality and increase cost of farming [19]. In the present experiment the total amount of feed given to the different treatments was 1741.0±21.7 kg, 3508.7±131.3 kg, 3963.7±77.3 kg in T1, T2 and T3 respectively. The FCR value was higher in T3 (1.8) compare to other treatments. Lowest FCR value was found in T1 (1.4). Paul [20] reported that the average food conversion

ratios of shrimp were varying 1.5 to 1.75. Cheekait [21] observed the food conversion ranges were varying from 1.50 to 1.55 when microencapsulated diets were used. Saha et al. [22] observed that the food conversion ratios of 1.31 to 1.58 in low saline ponds and 1.35 and 1.68 in high saline ponds. In the experiment the FCR value of T1 and T2 were within the recommended limit.

The survival rate was 79 ± 2 , 82 ± 4 , 68 ± 2 , in the T1, T2 and T3 respectively. The lowest survival rate was found in highest stocking density and this might be due to the cannibalism, higher level of ammonia and other water quality parameters as in this treatment highest amount of feed were applied. Due to the lack of facility it was not possible to analyze the Nitrate-nitrogen and Nitrite-nitrogen. Krantz and Norris [23] stated that survival rates of 60 to 80% are to be expected for *P. monodon* under suitable rearing conditions. Reddy [24] got 76% survival during the culture of shrimp. The author suggested that 70-80% survival is possible if the ideal conditions are maintained for *P. monodon*. In the present study the average body weight of the shrimps were calculated as 38.5 ± 0.5 g, 37.6 ± 0.74 g and 29.0 ± 1.53 g in T1, T2 and T3 respectively. The average body weight of tiger prawn 35.2 g was found by Reddy [24] that is similar to the present experiment.

In normal practice of shrimp culture in south western region of Bangladesh farmers are using extensive culture system without any supplemental feed. In this experiment we used higher stocking density than the normal practice with commercial feed, probiotics and proper management system. It was found that the production of shrimp was 4635.1 ± 128 kg/ha/crop with stocking density 15 pcs/m². The production of shrimp in the stocking density of 22 pcs/m² was 4328.7 ± 138.2 kg/ha/crop where as in the lowest stocking density (8 pcs/m²) it was 2431.3 ± 35.2 kg/ha/crop. But there was no significant difference among the production shrimp in T2 and T3. In T1 the harvesting size was highest and lowest was in T3. However due to the lowest stocking density in T1 the production was lowest in the treatment.

Treatment two showed best production performance and this might be due to the optimum stocking density for this improved aquaculture practice. However due to the lower survival in T3, the final production was lower the treatment. In all the treatments probiotics and chemicals were used for the prevention of diseases and maintain water quality parameters. Islam and Alam [11] reported that production of shrimp culture for 120 days with stocking density 5 pcs/m², 7 pcs/m², 9 pcs/m²

was 759.14 kg/ha, 670.77 kg/ha and 701.24 kg/ha respectively. In another experiment by Apud et al. [9] showed that production of shrimp was 340 kg/ha with stocking density 4 to 5 pcs/m² for 125 days with supplemental feed and improved water exchange system. However, in these experiments the stocking densities were lower than the present experiment. None of these experiments used probiotics for prevention and control of diseases. The average production of shrimp found in the present study in all the treatments were much more higher than those reported in the above mentioned authors for the shrimp culture in the south-western region of Bangladesh. This might be due to the use of PCR testes post larvae (PL), proper management techniques, use of probiotics, control of water quality parameters and prevention of diseases in appropriate time.

Though there was no significant difference between the total production of shrimp in T2 and T3, but total cost was higher in T3 than T2. That is why the net profit was significantly higher in T2 compare to other treatments. This might be due to the higher cost of seed, feed, chemicals for the highest stocking density and lower harvesting size of shrimp in T3. This indicated that stocking density of 15 pcs/m² is best suitable for improved shrimp farming system that will give better profit to the shrimp farmers as well as will increase the shrimp production in the country.

4. CONCLUSION

With the improvement of culture technology, management system and higher market price of shrimp, it is needed to increase production from the limited resources. Considering the improvement of shrimp culture in neighboring countries and infrastructural facilities and environmental condition in the agro-ecological conditions of the south-western region of Bangladesh, it could be concluded the stocking density of 15 pcs/m² is the best stocking density for improved shrimp farming system to boost up the production of shrimp many folds than the present farming culture system. However, further research could be done on environmental stress within the prescribed stocking density.

ETHICAL APPROVAL

All authors hereby declare that "Principles of laboratory animal care" (NIH publication No. 85-23, revised 1985) were followed, as well as specific national laws

where applicable. All experiments have been examined and approved by the appropriate ethics committee.

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COMPETING INTERESTS

Authors declare that no competing interests exist.

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The Effect of Change Management on Operational Excellence in Electrical and Electronics Industry: Evidence from Malaysia

1. INTRODUCTION

The rapidly changing landscape in the globalized market has put new demands on organizations. In order to stay ahead of competition, companies need to re-invent itself by injecting new ideas and strategies to achieve business excellence. Excellence can be achieved by meeting or exceeding the expectations of all stakeholders. Furthermore, pursuing excellence keeps companies on right track to achieve their goals and mission. More important, companies today face incredible pressure to continually improve the products quality while simultaneously reducing cost, remain flexible, to meet short lead time delivery, everlasting legal, environmental and social requirements. The ability to achieve these goals depends to a large extent on how the managing its resources against the ongoing changing environment [1].

Recent studies on operational excellence focused on industrial context such as security [2], oil and gas [3], and university [4]. On a contextualized perspective, the Electrical and Electronics Industry is crucial to be revealed particularly on the soft issues which have been neglected in many ways by the previous studies. This is in line with [5] stressed the failure of system implementation such as ERP is because of the lack of attention to the soft issues. Hence, the latest development on the management of change and operational excellence has evolved. The focus is on the enhancing of the customer value and ensures the sustainability (for example, [5,6]. [6] stated the departure from the status quo to a desirable state in accordance to the challenges and opportunities faced by the companies. Furthermore, the alignment is necessary in the hard and soft factors with the company strategy.

To guide organizations on their journey towards excellence, investigations have largely focused on the identification of critical variables that might better explain how organizational change can be managed to the best effect [7,8]. Therefore, this study will provide an insight in understanding the contemporary influential systems that affect business excellence, particularly excellence in operations. The influential systems may serve as pre-conditions for any companies before embarking on the management of organizational change. The influential systems could be categorized either a 'soft' or a 'hard' [9]. [9] recognised the important of soft dimension in terms of skills, staff, style, system and shared values along with structure and strategy of hard dimension. Furthermore, [10] described hard system have precise objectives that can be expressed in mathematical terms while soft systems are used in relation to human activities where there is unlikely to be agreement about the precise objectives of the system.

In discussing the operational excellence, most of the researchers and practitioners like to relate it with manufacturers. The fact is, manufacturing operation is one of the prime strategic functions in any business. Manufacturing operation whether achieves its competitive position and strategic potential or not solely depends on how it runs its business [11]. Additionally, as manufacturing firms encounter global competition and the pressure to become global, there is a demand for firm's ability to manage its organizational resources with the desire to attain operational excellence at global level.

When review the development in the world business market such as the issues of globalization, fierce competition and technology advancements, [12] suggested that manufacturing organisations in Malaysia need to have an ability to adjust and change to survive the challenging business environment. Organizations need to have a new set of capabilities to ensure their survival and growth in the market. Managers in a firm need to build its own internal competencies to deal with organization issues, change and strategizing. Even through E&E manufacturing sector is an important contributor to Malaysia's economic with manufacturing output, exports and employment, however, Malaysian E&E industry faces significant challenges in maintaining growth with growing competition from Taiwan, Singapore, China and other Asian countries. The E&E's share of Malaysia's exports has gradually declined from 59 percent in 2000 to 41 percent in 2009 [13]. Therefore, Malaysia E&E's organizations need to have a new set of capabilities to

ensure their survival and growth in the market. Managers in a firm need to build their own internal competencies to deal with organization at issues, changes and strategies.

Operational management and performance have been an issue in both academia and industry for over three decades. The literature on operational excellence is growing, but Malaysian manufacturing industry is often lacking in these discussions. In Malaysia, studies of business or organizational performance were focus mainly in Small Medium Enterprises (SMEs) and little research solely in Electrical and Electronics (E&E) manufacturing. Among the studies in Malaysia manufacturing industry included Total Quality Management (TQM) practices [14,15] and best practices [11,16]. Therefore, present study attempts to understand further of Malaysia electrical and electronics firms managing change pertaining to operational excellence. In fact, the electrical & electronics (E&E) industry is the leading sector in Malaysia's manufacturing sector, contributing significantly to the country's manufacturing output (26.94%), exports (48.7%) and employment (32.5%) [17]. Due to that, the finding of this study is important and may contribute to the country economic.

2. LITERATURE REVIEW AND THEORITICAL FRAMEWORK

2.1 Resource-based View (RBV)

The RBV is the dominant theory being used in the empirical literature on organization's internal resources or capabilities and performance. The RBV theory emphasized the use of its internal resource and its developing capability within the firm as a source of competitive advantage. Numerous of its capabilities and resources on which competitive advantage are based, live entirely in its operational function [18]. The RBV deals with the competitive environment facing the organization but takes an '*inside-out*' approach. Its starting point is the organization's *internal* environment. Thus, its internal capabilities determine the strategic choice it makes in competing in its external environment. For example, build up a high performance team for a company to remain competitive and long term success in both economic and social aspects.

On the operational excellence, RBV is found appropriate, presenting internal resources as a crucial element to gaining a sustained competitive advantage and superior performance that is the operational excellence [19,20]. The current study

corresponds to the soft factors in E&E to the operational excellence. The core competencies explain the companies' competitive success based on their competencies [21].

The resource-based view (RBV) highlights the firm as a unique collection of resources [22,23], but emphasizes that not all resources possess the potential to provide the firm with a sustained competitive advantage [24]. Previous literature on the RBV has frequently focused on resources as a stable concept that can be identified at a point in time and will endure over time [25]. RBV focus on strategic context, presenting resources and capabilities as essential to gaining a sustained competitive advantage and superior performance [20].

Furthermore, RBV points to intangible resources as the main drivers of the sustainability of performance differences across firms. In fact, such assets that are scarce, specialized and difficult to trade, imitate, or appropriate are viewed as intangible [19]. A variety of definitions have been offered when refer to these resources [26]. Therefore, the argument established in this study is focus on the managing firm's resources as determinants for operational excellence. The changes of the firm internal resource were identified through the operational excellence indicators.

2.2 Operational Excellence

According to [27], assessment of excellence is the process of evaluating an organization against a model for continuous improvement in order to highlight what has been achieved and what needs improving. European Foundation for Quality Management [28] defines excellence as "outstanding practice in managing the organization and achieving results". [29] argued that operational excellence is not just a matter of cost reduction and quality improvement, but also being smart about how to handle people and resources. It requires solid change management capability and strong leadership to become operational excellence. Operational excellence is also very much dependent on employees' empowerment, ownership and a culture of continuous improvement. Its adoption and introduction usually confronts a company with the need to change the way its employees think and act.

[30] conducted an investigation the use of business excellence in Asian organizations. Organizations in the manufacturing sector accounted for more than 40 percent of the total survey population. Even through organizations believe that

deploy business excellence is important in helping them reach key objectives but the Asian region still suffers from some barriers including lack of development of a business excellence culture, a lack of resources and a failure to fully train the staff in business excellence. This study has examined the deployment of business excellence in five Asian countries (Japan, India, China, Thailand and Singapore) would be a gap undertake future study on other Asian counties which maybe at different stages of business excellence maturity.

[31] analyzed the success rate factors of company in achieving the excellence of business subjects in the Slovak Republic. The results showed that success rate factors do not lie in monetary values but in the overall functioning of the company. In other words, in de facto non-economical factors which reflect the level of innovations, employee's satisfaction, customer's satisfaction and social responsibility. Therefore, identification of correct factors of success rate serves more and more for the needs of looking for correct decision of organization. In view of this, non-economical factors of success rate, also known as non- monetary factors are substantiated for the needs of a business company. On the other hand, [32] analyzed the meaning of sustainability and its relation to excellence in an era of management transformation, integration and evolution. They found that sustainability and excellence are two interrelated concepts. These two interrelated concepts have contributed in shifting the national, corporate and sometimes individual mentality to include the world and the society. The rapid enlargement and intensity of environmental and social consequences of the dominant global model push organizations towards an adoption of sustainability challenges and maintain their competitiveness through excellence.

[33] identified important challenges to sustaining business excellence amongst award winning companies in Australia. The challenges included strategy, leadership support, people, process, data and information and customers. [33] also suggested future research could consider different stages in the process of pursuing business excellence, for example, implementation, development, maturity and sustainability. In recent study, [34] examined factors that lead to sustained excellence whether they are "evergreen" or stayed the same over time. The eight factors included organizational design, process, strategy, technology, leadership, individuals and roles, culture, and external orientation. The finding shown that nearly 90 percent of the factors that create excellence found in studies done in and before

1995 are also found in studies done after 1995. Although the characteristics of factors may shift from time to time, however, those factor found to seem qualify as "evergreen of excellence" that are always crucial for creating and maintaining a high performance organization. In this respect, the research into factors that create excellence, as found in the earlier or recent literature, are constant over time.

In this study, results from application of operational excellence are focused operational performance and organizational sustainable performance. Operational performance reflects the performance of internal operations of a company in terms of quality improvements, flexibility improvement, delivery improvement, productivity improvement, cost and waste reduction. The organizational sustainable performance indicator measures in present study are environment performance and social performance, while the financial measures such as sales growth, profit growth, return on equity (ROE), return on assets (ROA) and gearing [35] will be ignored. In fact, many E&E manufacturing firms in Malaysia are owned by foreign investors and may listed in the their home country, thus the respondents may not be privy to the information and data related to financial performance. Although performance can be measured either as financial performance or as operational performance, operational priorities are more relevant than financial goals at the plant level [36]. It is therefore the discussed performance indicators (quality, time, flexibility, cost and sustainability) will be used to measure firm performance in achieving operational excellence. More specific, the dependent variable, operational excellence will be operationalized by quality, flexibility, speed, cost, social and environmental in present study. Moreover, managing people, technology, leadership, strategy, structure, culture and employees' involvement to change are important variables affect the operational excellence.

2.3 Evolution of Excellence

During the last 30 years, both definition and sustainability of excellence evaluations have undergone repeated changes. [37] have synthesized 'excellence' into five main stages and defining each excellence stage in details in literature. The synthetic conclusion of excellence is shown in Fig. 1.

Stage	Synthesized	Time	Explanations
Excellence 1.0	"Soft is important"	The early 1980s	Peters and Waterman (1982) reminded the world of professional managers that 'hard is soft'. In order to obtain hard results organizations need to take into account the soft side of the firm. Hard factors: system; structure; strategy; Soft factors: shared values; skills; style; staff.
Excellence 2.0	"Change"	1987	<i>Thriving on Chaos</i> (Peters, 1987). A new type of excellence is required: "Excellence firm don't believe in excellence – only in constant improvement and constant change".
Excellence 3.0	"Learning"	1990	<i>The Fifth Discipline</i> of Peter Senge (1990). Senge's analysis is at the base of a renewed interest for the concept of "learning organization".
Excellence 4.0	"Excellence models"	1990s	Increasing interest in "Excellence model" can be seen during the 1990s. Firms use these models to guide their efforts towards becoming "excellent" organizations.
Excellence 5.0	"Integrated development"	2000s	Difference schools of thought (e.g. social-technical, social-economic school) try to merge different approaches in order to better respond to management and organizational challenges, or the changing management paradigm.

Fig. 1. Synthetic Conclusion of Excellence

Source: Adapted from Hermal and Pujol (2003)

[37] further explain that the series of excellence stages proposed are only tentative and could certainly be disposed in many different ways. They just hope that the different points addressed are at the base of production debate. In authors view, operational excellence via best practices in business organizations seems to be a natural evolution going forward. As present, the term of *operational excellence* is widely used approaches to measure the business excellence either by the corporations themselves, management consultants, academicians, government authorities, etc. Furthermore, the very definition of "operational excellence" has been continuously modified to accommodate for the context of rapid changes in the global business environment.

2.4 Change Management

Due to the fact that the future and success of every organization depends on how well manager handle change [38], therefore, discussion on this research is assessing the relationship between change management and operational excellence. In addition, the integration of soft systems to predict operational excellence may not have a profound understanding by both academic and practitioners. This paper focuses on the soft systems in the E&E industry.

In the past organizational changes processes, many organizational only focus their efforts on hard factors. However, [9] argued that most successful companies work hard at the soft factors. Indeed, the soft factors can make or break a successful change process simply because we cannot impose hard systems on the organization without considering the effect on people [10]. With this approach, the researcher attempt to integrate the 'soft' elements under the Management of Change (MOC). Based on literature review, three soft elements were identified in this study were included leadership style, human resource and organizational culture.

2.4.1 Leadership style

Leadership is the other key component of successful change. Leadership is the first criterion of the European Foundation for Quality Management (EFQM) Excellence Model, a model of organizational excellence which is used by more than 30,000 organizations across Europe [39]. While change management depends on leadership to be enacted, specifically, the leadership style that is primarily concern with the capabilities required enacts change successfully [40,41]. Recent study by [42] further addressed the importance of success in enacting change is a crucial issue faced by today's organizational leaders of today. Indeed, most of the research on the leadership paradigms has focussed on its relationship to followers [43,44]; the success of TQM programs [45]; organizational outcomes such team performance [46,47] and financial performance [41]. Based on researchers' knowledge, there were limited literatures done on leadership styles and its impact on operational excellence in manufacturing industry, especially in the Malaysian setting.

Leadership has been recognized as a major factor on organization success and this has been empirically validated throughout many fields. However, a

leadership style in the context of change management and its impact on operational excellence in manufacturing industry has not been as widely researched. Moreover, a transformational style of leadership is perceived can produce positive organizational change and create exceptional performance than transactional and laissez-faire leadership [40,48,49]. In the present study, we are interested in examining the positive impact of transformational leadership style on operational excellence. Hence, the researchers offer the following statement of hypotheses:

H1: The inclination towards the transformational leadership style leads to achieving operational excellence.

2.4.2 Human resource

Any change program would revolve around people, changing their mind set, behaviour and motivational level. Human resource has always been central to organizations, to-day it has taken on an even more central role in building a firm's competitive advantage. Success increasingly depends on "people-embodied know-how". Thus, includes the knowledge, skills, and abilities imbedded in an organization's member. [38] argued that Human Resource is an intellectual asset, the sum total of the knowledge, skills and competencies that an organization processes and channelizes for sustained organizational excellence. Excellence is surpassing on outstanding achievement, achievable by the use of Human resource strategies and practices as tool.

[50] suggested the future role of the Human resource function should focus on helping their organization to learn how to build a capability to change. In authors view, the human resource practices are Human resource tools use by organization to achieve excellence. It helps to develop human capabilities and organizational competencies to achieve success. However, very little attention has been paid to address the impact of managing human resource change on operational excellence. The universal use of Human resource practices such as recruitment and selection, training and development, performance appraisal and compensation and benefits [38,51,52,53] could be explored in present study to predict operational excellence. New knowledge generate from this study could inform theory building efforts in the Human resource field, particularly as it related to human resource- based view to meaningful organization outcomes and in due

course excellence. Therefore, we hypothesize that human resource practices lead to positive impact to operational excellence.

H2: Effectiveness of human resource practices leads to an impact on achievement of operational excellence.

2.4.3 Organizational culture

Operational excellence is an enterprise culture that improves the way a corporation delivers products and services to its customers. Operational excellence calls for more than subject matter expertise and a talented internal team. It requires a deep commitment and a culture of change. Changing to a culture of continuous improvement usually requires a paradigm shift. This change requires taking risks, opening up the firm culture and a great capacity to learn [54]. [55] suggested that a link between corporate culture traits such as consistency, mission, involvement, and adaptability and business performance exists. These four different aspects of culture can be stressed by different functions. Its *consistency* and *mission* either tend to encourage or promote stability. However, the *involvement* and *adaptability* allow for change. Furthermore, consistency and involvement see culture as focusing viewpoint on internal dynamic of the organization. It mission and adaptability see culture as a way of life in addressing the relation between the organization and its external environment.

The present study embraces on managing change and focus on internal organization, therefore, the *involvement trait* (Internal Focus) is the best dimension to evaluate its effecting desired change within organization [55,56]. This trait is measured by the three indices namely empowerment, team orientation and capability development. In addition, [57] found empirical support for the involvement view of culture, higher levels of employee participation were correlated with better organizational performance. Whilst organizational culture has been researched worldwide, little research has been done in Malaysia, with its unique culture and concentrated business environment. This leads to the following hypothesis:

H3: Higher levels of individual involvement cultural trait leads to an impact on operational excellence

Overall, literatures indicate that firm managing change is vital in ensuring competitive advantage to the firms [58]. In essence, effective approaches in organizational change will involve not only one system but also have to understand

other relevant systems of entire organization. Moreover, change management and these soft systems have not being integrated in any research which develop new knowledge in the study of operational excellence. Integrating change management maturity with associated soft systems in order to remain competitive, is absent in most Operational Excellence initiatives.

2.5 Hypotheses and the Research Model

Based on the previous literature, three hypotheses were proposed. The relationship among the various factors discussed in this literature is depicted in a framework as shown by Fig. 2 below. Based on the literated syntheses, the authors develops a linkage that the change management systems are likely to have impact on operational excellence of the organization only in situations where change management practices are implemented.

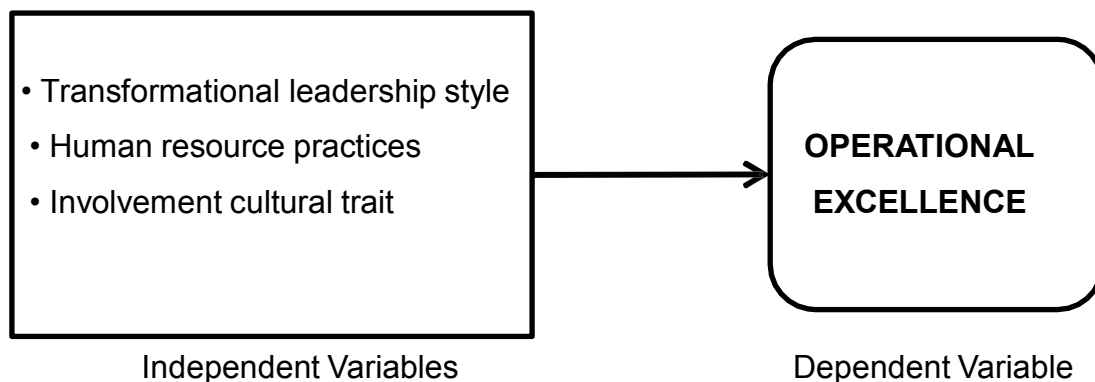


Fig. 2. Theoretical framework

3. RESEARCH METHODOLOGY

3.1 Population and Sample Size

The nature of the problem in this study determines that it leans more towards a causal. The main goal of causal research is to identify cause-and-effect relationship among variable [59]. The literature review was carried-out in sufficient details to provide the understanding on the change management and operational excellence. The researchers also investigated how the previous studies done in order to study the relationship of both change management and operational excellence. Therefore, the researchers believed that it is appropriate to consider the manager who involved in the manufacturing operations to give inputs on the subject matter. In this context, samples of the population are drawn from the FMM-

MATRADE Industry Directory Electrical and Electronics Malaysia 2007/08 [60] and Federation of Malaysian Manufacturers (FMM) Industry Directory 2012 of Malaysian Manufacturers [61]. The sampling frame of this study is the manufacturing companies from electrical and electronics industry situated in Malaysia. By using systematic random sampling method, 321 firms were identified from population of 1952 firms. All questionnaires were distributed to the respondents using postal mail. The unit of analysis for this study was organizational where one respondent represent one organization. Between February 2013 and June 2013, a total of 121 usable questionnaires were obtained which yielding a response rate of 37.7 percent. Therefore, the response rate was normal and acceptable as compared with past studies in Malaysia.

3.2 Instrument Development and Measurement

The survey questionnaire was developed based on early studies [35,55,57,62,63,64,65,66]. The Table 1 summarizes the reliability test of the measures. The results showed that all the Cronbach's Alphas measures were above the lower limit of acceptance ($\alpha > .70$). Therefore, all the measures were highly reliable [67].

Table 1. Summary of variable measurement

Variables Names	Cronbach's Alpha	N of Items	Authors
Operational excellence	.942	23	Laugen et al. (2005); 31* Hubbard (2009); Kuruppuarachchi & Perera (2010).
Transformational leadership style	.915	12	Bass & Avolio (1992).
Human resource practices	.843	12	Snell & Dean (1992)
Involvement cultural trait	.772	9	Denison et al. (2003); You, et al. (2010).

In a Likert scale, each respondent will be asked to indicate the extent of each statement on a five-point. The options given in the questionnaires for Section A are "strongly disagree (1)"; "disagree (2)"; "Neutral (3)"; "agree (4)" and finally "strongly agree (5)". For Section B, respondents are requested to rank their answers to 5-points Likert-type interval scale, ranging from 1 for "worst in industry (1)"; 2 for "bad in industry"; 3 for "average in industry"; 4 for "good in industry" and 5 for "best in

industry". Thus, researchers were able to solicit answers about the given statement through a set of response keys.

3.3 Respondent's Profile

3.3.1 Profile of the respondent companies

The E&E industry is further breakdown to four sub-sectors which included (1) consumer electronics (2) electronic components (3) industry electronics and (4) electrical products [16]. As presented in Table 2, the majority of the manufacturing firms that responded to the survey were under the electronic component sector which comprised 43.8 percent of the number of respondents, followed by those in industrial electronics (24.8%), consumer electronics (15.7%) and electrical products (15.7%).

Table 2. Respondents by sub-sector

Sub-sector	Frequ	P	Valid	Cumulative
Electronic	53	4	43.8	43.8
Industrial	30	2	24.8	68.6
Consumer	19	1	15.7	84.3
Electrical	19	1	15.7	100.0
Total	121	1	100.0	

3.3.2 Profile of the respondents

For ease of understanding is a tabulation of the profiles of the respondents as per Table 3. In terms of gender, the majority of the respondents were male which comprised of 71.9 percent as compared to their counterparts at 28.1 percent. Generally, 45.5 percent of the respondents are from the age between 36 and 45 followed by age above 46 (34.7%), then age between 18 and 35 with a response if 19.8 percent. This showed that majority of the questionnaire were answered by the middle and senior management from manufacturing companies. Most of the respondents (33.1%) have less than 5 year's tenure employment to their current companies. In contrast, 31.4 percent of the respondents have more than 16 years attaching to their current companies. The remaining respondents were between 6 to 10 years are 21.5 percent and between 11 to 15 years are 4.0 percent respectively. Almost half of the questionnaires are answered by the managers (44.6%). Other respondents, which represent 19.0 percent of senior executive or

senior engineer, 5.8 percent of section head and assistant manager respectively, 14.0 percent of senior manager, 6.6 percent of directors, 4.1 percent of director and of professional. The professional group includes Consultants and Advisors. The results imply that majority of the E&E manufacturing companies have followed the requirements as stated in the cover letter which attached with the questionnaire.

Table 3. Profile of the respondents

Characteristics		Frequency (n = 121)	Percent (Total 100%)
Gender:	Male	87	71.9
	Female	34	28.1
Age:	Between 18 to 35 years	24	19.8
	Between 36 to 45 years	55	45.5
	Above 46 years	42	34.7
Number of years working in this company:	Less than 5 years	40	33.1
	Between 6 to 10 years	26	21.5
	Between 11 to 15 years	17	14.0
	More than 16 years	38	31.4
Position held:	Senior Executive I Senior Engineer	23	19.0
	Section head	7	5.8
	Assistant Manager	7	5.8
	Manager	54	44.6
	Senior manager	17	14.0
	Director	8	6.6
	Professional	5	4.1

3.4 Factor Analysis

The factor analysis was based on principal component analysis (PCA) with Varimax rotation for all components. In determining the factorability of the dimensions, the Bartlett's test of Sphericity had to be significant and the Kaiser-Meyer-Olkin (KMO) Measure of sampling adequacy had to be more than 0.50 in order to be acceptable [67]. The following Table 4 shows the results of all variables. The Kaiser-Meyer-Olkin (KMO) measures of sampling adequacy from 0.692 to 0.906 which all above 0.5 acceptable level [68]. All results indicate that factor analysis can be conducted on the data [62,69]. Moreover, there is a sufficient correlation among the analyzed items when Bartlett's test was significant (Sig.0.000).

Table 4. KMO and Bartlett's test

		OPX	TLS	HRP	ICT
Kaiser-Meyer-Olkin Adequacy	Measure of Sampling	.881	.906	.797	.692

Bartlett's Test of Sphericity	Approx. Chi-Square	1590.599	757.645	555.269	410.166
	Df	190	66	66	36
	Sig.	.000	.000	.000	.000

OPX=Operational excellence; TLS= Transformational leadership style; HRP= Human resource practices; ICT=Involvement cultural trait

3.5 Data Analysis

The data analysis tools such as Statistical Package for Social Science (SPSS) software will be used to process the data obtained from this survey. Responses on all parts of the questionnaire will be analyzed using frequency, means, standard deviations, reliability, and inter correlations to calculate different characteristics of the data. Factor and reliability analyses to test the goodness of measures, descriptive statistics to describe the characteristic of respondents and correlation analysis to describe the inter correlation among the variables. Moreover, multiple regression analysis was used to achieve the objective with testing the hypothesis.

4. RESULTS AND DISCUSSION

4.1 Descriptive Analysis

The means and standard deviations of each variable were shown in Table 5. The results of Pearson's correlation test for independent variables and dependent variable was shown in Table 6. This result revealed that all the independent variables and dependent variable were positive and significant at a level of 99 percent. The strength of relationship varies from lowest at 0.561 and to the highest at 0.639. These findings support the notion that change management systems as predictor variables had a positive correlation and linear with operational excellence. On the other hand, the correlation was also further evidence of validity and reliability of the measurement scales used in this study.

Table 5. Means and standard deviations

	N	Mean	Std. Deviation
Transformational leadership style	121	3.6515	.56765
Human resource practices	121	3.7576	.48233
Involvement cultural trait	121	3.7530	.41857
Operational excellence	121	3.7373	.48899

Table 6. Pearson's correlation test for independent variables and dependent variable

	Transformational leadership style	Human resource practices	Involvement cultural trait	Operational excellence
Transformational leadership style	1			
Human resource practices	.586**	1		
Involvement cultural trait	.561**	.586**	1	
Operational excellence	.616**	.639**	.563**	1

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

4.2 Testing of Hypotheses

In order to measure the combined effect of all the soft systems in the change management towards operational excellence, the analysis of multiple regressions was performed on the variables in question. Refer to Table 7, results from the analysis of multiple regression show that among soft systems of change management which were proposed to have a significant relationship with operational excellence, all of them namely transformational leadership, human resource practices and involvement cultural trait were significantly supported.

Table 7. Results of multiple regression analysis of change management and operational excellence

Variable	Coefficient			Model Summary
	B	T	Sig.	
Transformational leadership	.296	4.160	.000*	R square: .505
Human resource practices	.323	3.832	.000*	Adjusted R square: .493
Involvement cultural trait	.211	2.101	.038*	F: 39.839, P < .000 df1: 3, df2: 117 Durbin-Watson: 1.996

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed)

All the soft systems were found to have positive and significant ($p < 0.05$) relationship toward operational excellence. This statistical result suggested that a human resource practices, with Beta value of .323 has the strongest effect (most

important) on operational excellence in this study, follow by transformational leadership style (important), with Beta value of .296. Organizational culture has least important, with Beta value of .211 to produce sufficient support of significance in its relationship towards operational excellence.

In *Model Summary* at Table 7, the adjusted R Square (.505), which is explained the change management (composite independent variables) accounted 50.5 percent of the variance (R squared) in operational excellence (dependent variable). According to [70], R Square between the range of 1.0 to 5.9 percent is consider as small size, follow by the moderate range between 5.9 to 13.8 and range which is above 13.8 percent is consider large. In the result of multiple regression analysis, the R Square, .505 means 50.5 percent consider large effect. Therefore, the results explain that is 50.5 percent of the variance (R Square) in operational excellence has been significantly explained by the three independent variables under change management.

4.3 Discussions

This paper is focused on linking between the change management to operational excellence within E&E companies of Malaysia. Furthermore, the paper organises the burgeoning change management literature soft systems, which are transformational leadership, human resource and organizational culture. The purpose of this study is to give an increased understanding of the operational excellence in Malaysian manufacturing industry and its implication on activities concerning organisation and managing change.

The respondents were top managers and those identified as responsible in running the companies which closely linked to manufacturing operations including General Manager, Operation Manager, Factory Manager, Production Manager, Engineering Manager, Manufacturing Manager, Planning Manager, Materials Manager, Lean Manager and Project Manager (involve in Change Management or Continuous Improvement programs). So this study cannot be used to represent the operational of others industry because the effect of change management to operational excellence could be different.

Responding to the hypotheses, this study found all three soft systems of change management have effect on the achievement of the company's operational excellence. In respond to the findings, *transformational leadership style, human*

resource practices and *involvement cultural trait* were found to have an effect on the achievement of operational excellence for Malaysian E&E manufacturing companies. The hypotheses were positive and significant and thereby confirmed.

This study has provided evidence that transformational leadership style have a significant positive effect on operational excellence. The hypothesis, H₁ accepted is not surprising because strong theoretical and practical support transformational leadership is enacting change successful. Present study also concur with the findings of past study by [48,49] who claimed that the transformational leadership style can produce positive organizational change and create exceptional performance. Furthermore, transformational leadership is directly correlation to long-term high performance [71], therefore, towards business sustainability.

This study adds another perspective into the earlier findings conducted in Malaysia, [41] found that the transformational type of leaders will give impact to company performance if best practices management takes place. Under these argument, transformational leader who promote the adoption of best practices leads to superior performance. This finding is consistent with the results from prior studies [11,16,62,72] on companies that adopted best practices showed better operation performance. In this study, the effect of transformational leadership style on achieving operational excellence is supported. In other word, lower and middle management of Malaysian E&E manufacturing companies perceived their top management use transformational leadership style in pursuing excellence.

The statistical result also revealed that the human resource practices have effect on operational excellence of Malaysia E&E manufacturing companies in this study. Therefore, the hypothesis, H₂ is fully supported. This finding is consistent with earlier studies by [38] who argue human resource is an intellectual asset that channelizes for sustained organizational excellence and has a positive effect on the firm's performance [73]. This study also support past studies that the human resource practices included recruitment and selection, training and development, performance appraisal and compensation and benefits, are human resource tools use by organization to achieve excellence [38,51,52,53].

The aforementioned results have also provided the required empirical support that influence of human resource practices indicating positive and significant relationship on organizational performance in the area of research for the past 25 years [74]. The finding of present study provides empirical evidence again on the

role of human resource practices on the achievement of operational excellence. Obviously, the human resource has taken into account as a crucial factor in E&E organizations to develop internal capabilities for better fit with changing environment.

The result indicates that the involvement cultural trait, H3 does significantly have impact in achieving operational excellence. The involvement cultural trait comprises of empowerment, team orientation and capability development did played a major role in the effectiveness of operational excellence in E&E firms. This finding appears to be consistent with previous study that argued involvement as the most important dimension of culture for firms whose focus was employee satisfaction and overall performance [75]. Past studies by [76] stated that organizational culture is a key foundation for the high-performance work practices and employee involvement such as teamwork, capability development and empowerment positively influence outcomes measures. For example, high performing firms motivate their employees to achieve superior results by making decisions at the lower level. In addition, high performing firms have organizational structure based on teams, therefore they encourage teamwork. Moreover, these firms continually invest in improving their employees' skills. Hence, the high levels of employee involvement in the company's activities did play an important and integrated role in achieving operational performance outcomes.

The success of organization lies on how well the employees are empowered to take decisions through building their capabilities and harnessing their skills. Indeed, an organization with a high level of employee involvement will develop the employees' capability at all levels and create a sense of ownership, responsibility and loyalty toward their organization. Another plausible reason of significant relationship between involvement cultural trait and operational excellence was in the way the culture trait was measured. Past research showed that internally focus traits involvement is generally better predictors of operating performance measures such as quality, flexibility, employee satisfaction [57,77] and change [56]. The finding of present study pointed to high involvement of employees as relatively important influential culture traits in determining operational excellence in the context of the Malaysia E&E industry.

Furthermore, present study supports resource-based view (RBV) theories. The RBV on inimitable recourses and dynamic capabilities suggest that organizational should have their own competence according to knowledge

resources. These competencies must be rare and unique. Moreover, researchers also found many of resources and capabilities on which competitive advantage is based reside in the operations function [18]. Firstly, RBV may assist operations reach up to the leadership of excellence. Secondly, RBV helps to providing clear rules to develop and train human resource and retain talents in a systematic manner. Thirdly, the involvement cultural trait that is originated from organizational culture is unique and hard to imitate by any rival firms. Thus, the argument established in this study was transformational leadership style, human resource practices and involvement cultural trait.

5. CONCLUSION, LIMITATIONS AND FUTURE RESEARCH

5.1 Summary of Finding

This study is on the relationship among the change management and operational excellence. The multiple regression results revealed that the transformational leadership style, human resource practices and involvement cultural trait statistically significantly and positive relation with the achievement of operational excellence. Approaches to theory uses, this study utilize resource-based view.

5.2 Limitation and Directions for Future Research

The conclusions drawn from present study should be interpreted in a limited way, which would potentially represent opportunities for further exploration in future research. First, this study is a cross sectional study, as it is carried out once and represents the issue at a specific time. Therefore, future study may look into a longitudinal study in order to expand the findings that are pre-changes and post-changes. Second, this study used the Electrical and Electronics (E&E) manufacturing firms that have high foreign ownership but also many restrictions in responding to the study. It is suggested that using Malaysian local owned firms like small-medium enterprise (SME) or small-medium industry (SMI) may add more insight. In addition, future study in service industry will add richness to the area of interest. Third, this study had proven the important of few change management systems in affecting the achievement of operational excellence. In contrast, further studies could focus on others systems or dimensions which have been excluded in this study. Fourth, future study can also investigate the change management due to

external environment. Perhaps it will be able to provide a new insight on how firm react to external force and also improve the operational performance.

5.3 Implication and Conclusion

An evident in the data analysis findings above, this study has provided several contributions to practice, methodology and theory. The practical implications for E&E manufacturing organization is success in change initiatives depends on proper integration of transformational leadership style, human resource practices and involvement cultural trait. Hence, management is advised to establish policy, systems and process that integrate three soft systems in their planning and strategic direction. On the other hand, the finding is hoped to provide the managers with the insight in order to assist them to identify the appropriate operational excellence model based on organizational needs. As for methodology contribution, this study was add-on sustainability performance metrics (non-economic measure) on top of the conventional performance metrics (economic measure) in a composite performance index by averaging scores across the six performance indicators. Since sustainability is very important aspects of today business environment [35,78], therefore, this methodology can be validated in future research to measure operational excellence or business excellence. The new measurement method in this study could fill up the perceived performance gaps by merging both economic and non-economic measures. From the theoretical perspective, it is discovered the originality in terms of the model to reflects a growing interest in extending operational management paradigms to emerging in developing country context, particularly on the knowledge on the insight of change management and operational excellence. In contrast to most previous studies identified each of system separately, this paper will be among the first few studies that examine the soft systems of change management to predict operational excellence. The integration of soft systems in this study has developed new knowledge that could assist theory building efforts particularly in the operation management field and organizational change management. The researcher might use the findings for further research.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Hedging the LIBOR Interest Rate Risk in the MSFI 9 Hedge Accounting Framework

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Abstract: The new Hedge Accounting framework in the International Financial Reporting Standard 9 implies the need to examine the techniques for hedging, for the hedge ratio estimation and the hedge effectiveness measurement. This paper examines the hedge effectiveness of hedging the interest risk for the three month LIBOR with the Eurodollar Futures as traded on the CME, using two methods for hedge effectiveness measurement (the Standard Deviation Analysis and the Coefficient Variation Analysis). Furthermore, three quantitative methods for the hedge ratio estimation have been used (the Ordinary Least Squares Regression Method, the Bivariate Vector Autoregression Method and the Vector Error-Correction Method) and the effectiveness of the hedge ratios has been tested on the day the hedging started and three consecutive reporting periods. There is no evidence of a combination of methods for hedge ratio estimation and hedge effectiveness measurement that is highly effective at the date of hedge start and in the three following reporting periods.

Keywords: Hedging, LIBOR, Interest Rate Risk, MSFI 9, Futures.

Zaštita od kamatnog rizika LIBOR-a u sklopu Računovodstva zaštite sukladno MSFI-u 9

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Sažetak: Donošenjem novog okvira Računovodstva instrumenata zaštite u sklopu Međunarodnog standarda financijskog izvješćivanja 9 došlo je do potrebe za preispitivanjem tehnika zaštite od rizika kao i modela za određivanje omjera zaštite i modela za mjerenje učinkovitosti zaštite. Ovaj rad ispituje učinkovitost zaštite od promjene kamatnog rizika za tromjesečnu LIBOR referentnu kamatnu stopu uz zaštitu futuresom Eurodolara kojim se trguje na robnoj burzi u Chicagu, korištenjem dviju

metoda mjerenja učinkovitosti zaštite (Analiza koeficijenta varijacije i Analiza standardne devijacije). Korištene su tri kvantitativne metode za određivanje omjera zaštite (Regresije pomoću metode najmanjih kvadrata, metode bivarijantne vektorske autoregresije i Metode vektorske korekcije pogreške) te je ispitana učinkovitost sviju metoda na datum uspostave zaštite i na tri izvještajna razdoblja koja slijede nakon tog datuma. Niti jedna kombinacija metode određivanja omjera zaštite i metode mjerenja učinkovitosti zaštite nije dovela do vremenski stabilno i ujedno značajnog smanjenja rizika.

Ključne riječi: Financijski instrumenti zaštite, Hedging, LIBOR, Kamatni rizik, IFRS 9, Futures.

Uvod

Računovodstvo zaštite jedna je od gorućih tema suvremenog računovodstva. S obzirom na nove stavove u odnosu na zaštitu (engl. *hedging*), koji su rezultat poučaka gospodarske krize nastale 2008. godine, a koji se ogledaju u donošenju novog okvira računovodstva zaštite u sklopu MSFI-a 9, neophodno je nanovo sagledati zaštitu i računovodstvo zaštite na razini cjelokupnog ekonomskog sustava. Kamatni rizik predstavlja jedan od osnovnih rizika. U radu se testira kako je u okviru računovodstva zaštite moguće izloženost kamatnom riziku LIBOR-a zaštititi korištenjem futuresa na LIBOR. U ovom radu ispitat će se udovoljavanje uvjetima računovodstva zaštite (MSFI 9) i neutralizacije rizika (engl. *offset*) u slučaju kada se od kamatnog rizika štiti zaštićeni instrument (engl. *hedged instrument*) s kamatnom stopom u LIBOR-u s instrumentom zaštite (engl. *hedging instrument*) futuresom na LIBOR. Po uspostavi zaštite provest će se ispitivanje ponašanja zaštite u tri izvještajna perioda koja sljede nakon datuma uspostave zaštite.

RAČUNOVODSTVO ZAŠTITE I ZAŠTITA OD RIZIKA

Formalni kriteriji primjene računovodstva zaštite

Kao što navodi Mrša (2014: 184), „cilj je računovodstva instrumenata zaštite prikazati u financijskim izvještajima učinke aktivnosti upravljanja rizicima kada se u tim aktivnostima koriste financijski instrumenti za kontrolu izloženosti određenim rizicima“. MSFI 9 detaljno propisuje kriterije koje mora zadovoljiti računovodstvo zaštite (vidi MSFI 9), a ovdje iznosimo samo neke:

1. odnos zaštite sastoji se od dozvoljenog instrumenta zaštite i instrumenta kojeg se štiti (što je potrebno dokumentirati);

2. odnos zaštite udovoljava svim zahtjevima za učinkovitu zaštitu: postoji suštinski ekonomski odnos instrumenta zaštite i šticećenog instrumenta; kreditni rizik nema dominantnu ulogu u promjeni vrijednosti koja je posljedica ekonomskog odnosa; količina instrumenata zaštite i instrumenata koje se štiti odgovara ekonomskoj zaštiti.

KVANTITATIVNE METODE U POSTUPKU ZAŠTITE

Kvantitativne metode za određivanje omjera zaštite

Postoje razne kvantitativne metode za određivanje omjera zaštite¹. Optimalni omjer zaštite (engl. *Methods for Estimation of the Optimal Hedge Ratio*) odredit će se u ovom radu putem primjene podataka u okviru sljedećih modela (Lien i Luo, 1993; Umoetok, 2012; Ye i Chen, 2006): Regresija pomoću metode najmanjih kvadrata² (engl. *Ordinary Least Squares Regression Method – OLS*); Metoda bivarijatne vektorske autoregresije (engl. *Bivariate Vector AutoRegression Method – VAR*); Metoda vektorske korekcije pogreške (engl. *Vector Error-Correction Method – VECM*).

Istraživanja su pokazala da nerijetko primjena jednostavnijih metoda (kao npr. OLS) može imati jednake ili čak bolje performanse od složenih metoda poput GARCH-a (usp. Myers, 1991; Miffre, 2001; Ye i Chen, 2006). U nastavku rada primijenit će sve gore navedene metode, kako bi se određenje optimalne metode određivanja omjera zaštite izvršilo na što pouzdaniji način. Metoda multivarijatne poopćene autoregresijske uvjetne heteroskedastičnosti (GARCH) neće se primijeniti jer GARCH omjer zaštite varira kroz vrijeme (engl. *time-varying*), što ne udovoljava zahtjevima računovodstva zaštite³ (više u Lien i Tse 2002).

Regresija pomoću metode najmanjih kvadrata (OLS)

Metoda najmanjih kvadrata (engl. *Least Squares Method*), odnosno obična metoda najmanjih kvadrata (engl. *Ordinary Least Squares - OLS*), uvedena je kao postupak određivanja optimalnog omjera zaštite u radu Ederingtona (1979) i

¹ Za opširniji popis metoda vidi Chen et al. (2003).

² Metoda se naziva i *metodom najmanjeg kvadratnog odstupanja*, no u radu će se koristiti prijevod *regresija pomoću metode najmanjih kvadrata* (u skraćenom obliku *metoda najmanjih kvadrata*) koji je preuzet iz rječnika Državnog zavoda za statistiku, http://www.dzs.hr/app/rss/rjecnik_izlist.aspx (10.01.2015.)

³ Harmonizaciju GARCH postupaka i zahtjeva suvremenog računovodstva smatra se mogućnošću za buduća znanstvena istraživanja.

primijenjena u kasnijim radovima drugih autora (usp. Ederington, 1979; Fan et al., 2014; Lien et al., 2002; Malliaris i Urrutia, 1991; Ripple i Moosa, 2007; Umoetok, 2012):

$$r_{st} = \alpha + \beta r_{ft} + \varepsilon_t \quad (1)$$

gdje ε_t predstavlja koeficijent pogreške, r_{st} i r_{ft} predstavljaju preračunate promjene spot i futures cijena, dok β predstavlja faktor koji iskazuje optimalni omjer zaštite odnosno h^* . Definirajući h^* u teorijskom smislu, naslanjajući se na zaključke Hatemi-J i Roca (2006), Fan et al. (2014) definira optimalni odnos zaštite kao onaj u kojem je količina spot i futures instrumenata takva da ne dolazi do promjene zaštićenog portfelja, formalno prikazano kao:

$$V_h = Q_s S - Q_f F$$

$$\Delta V_h = Q_s \Delta S - Q_f \Delta F \quad (2)$$

gdje je V_h vrijednost zaštićenog portfelja, Q_s i Q_f predstavljaju količine spot i futures instrumenta, S i F predstavljaju cijene spot i futures pozicije instrumenta. Iz čega ukoliko je:

$$\Delta V_h = 0 \quad (3)$$

i ukoliko je:

$$\frac{Q_f}{Q_s} = \frac{\Delta S}{\Delta F} \quad (4)$$

proizlazi da je:

$$h = \frac{Q_f}{Q_s} = \frac{\Delta S}{\Delta F} \quad (5)$$

gdje je h omjer zaštite. Metodom najmanjih kvadrata izračunava se omjer zaštite koji postiže portfelj s minimalnom varijancom te se posredno dokazuje kako je β jednak h (više u Umoetok, 2012).

U jednadžbi (1) koeficijenti r_{st} i r_{ft} predstavljaju promjenu spot i futures cijene. Promjenu je moguće izražavati kao razliku ili kao diferenciju promjene cijena. Uobičajen je postupak u kojem se promjene izgladuju primjenom logaritmiranja,

dvostrukog logaritmiranja, linesa i sl. Primjerice Alexander i Barbosa (2007) i Ye i Chen (2006) izračunavaju r_{st} i r_{ft} na sljedeći način:

$$r_{st} = \log\left(\frac{S_t}{S_{t-1}}\right)$$

$$r_{ft} = \log\left(\frac{F_t}{F_{t-1}}\right) \quad (6)$$

gdje su S_t i F_t pripadajuće spot i futures cijene u vremenu. Umoetok (2012), kako bi izračunao koeficijente r_{st} i r_{ft} , koristi razliku prirodnih logaritama:

$$r_{st} = \ln(S_t) - \ln(S_{t-1})$$

$$r_{ft} = \ln(F_t) - \ln(F_{t-1}) \quad (7)$$

Metoda bivarijatne vektorske autoregresije (VAR)

Glavni nedostatak regresijskog postupka korištenjem metode najmanjih kvadrata, kako tvrdi Herbst (1989), je da se isti ne bavi problemom serijske korelacije među rezidualnima endogenih varijabli, što su u ovom slučaju serije povrata. Bivarijatni VAR model rješava problem s kojim se suočavaju serijske korelacije modeliranjem različitih endogenih varijabli koristeći bivarijatnu VAR strukturu (Umoetok 2012; Yang i Allen 2004), pri čemu se koristi sljedeća formula:

$$\Delta s_t = \alpha_s + \sum_{i=1}^m \beta_{si} \Delta s_{t-i} + \sum_{i=1}^m \gamma_{si} \Delta f_{t-i} + \varepsilon_{st}$$

$$\Delta f_t = \alpha_f + \sum_{i=1}^m \beta_{fi} \Delta s_{t-i} + \sum_{i=1}^m \gamma_{fi} \Delta f_{t-i} + \varepsilon_{ft} \quad (8)$$

gdje Δs_t i Δf_t predstavljaju promjenu razine vrijednosti spot i futures cijena (ukoliko se provodi usporedba nekoliko metoda potrebno je dosljedno primijeniti pristup izračuna promjena), α_s i α_f su konstantni članovi u jednadžbi, β_{si} , β_{fi} , γ_{si} i γ_{fi} su parametri, dok su ε_{st} i ε_{ft} neovisni jednako distribuirani slučajni vektori.

Optimalna duljina lag-a, odnosno m , određuje se ponavljajući model koristeći različite lag-ove i odabirom optimalne duljine na temelju kombinacije kriterija (Liew, 2004; Schwartz, 1978 u Umoetok, 2012). Postoje i drugi načini izračunavanja optimalnog m , pa tako Ye i Chen (2006) predlažu korištenje ARMA (p, q) testa. Nakon što se odredi optimalni lag, vremenski niz reziduala procjenjuje se i koristi za dobivanje optimalnog omjera zaštite, koji minimizira varijancu (Hamldar i Mehrara, 2014: 84):

$$h = \frac{\sigma_{sf}}{\sigma_{ff}} \quad (9)$$

gdje je $\sigma_{sf} = cov(\varepsilon_{st}, \varepsilon_{ft})$ i $\sigma_{ff} = var(\varepsilon_{ft})$. Nedostatak VAR modela je što ne uzima u obzir integraciju između spot i futures cijena u dugom roku.

Metoda vektorske korekcije pogreške (VECM)

Yang i Allen (2004) ističu nedostatak VAR postupka jer ne uzima u obzir kointegraciju. Kointegracija predstavlja vremenski ovisnu varijaciju varijance dviju vremenskih serija (Umoetok, 2012). Yang i Allen (2004) ističu kako mnogi autori (Ghosh, 1993a; Lien, 1996; Lien i Luo, 1994) dolaze do zaključka da je problem kointegracije moguće riješiti dodavanjem korektivnog člana u jednadžbu VAR-a, čime se vodi računa o dugoročnoj ravnoteži kretanja spot i futures vrijednosti. Doležal (2011: 34) navodi: "kao osnovni alat kojim se proučava dugoročan odnos, odnosno postojanje kointegracije između korištenih varijabli, kao i odnos spomenutih varijabli u kratkom roku, koristi se vektorski model korekcije pogreške (VECM)⁴. Samo određivanje kointegracijskih relacija temelji se na Johansenovoj proceduri. Ona se temelji na određivanju ranga matrice Π koristeći svojstvene vrijednosti pa se u stvari mora odrediti broj svojstvenih vrijednosti različit od nule kako bi se dobio traženi broj kointegracijskih vektora (Johansen, 1988; Johansen i Juselius, 1990)". Izvedba VECM-a:

$$\Delta S_t = \alpha_s + \sum_{i=1}^m \beta_{si} \Delta S_{t-i} + \sum_{i=1}^m \gamma_{si} \Delta f_{t-i} + \lambda_s Z_{t-1} + \varepsilon_{st}$$

⁴ Više o Metodi vektorske korekcije pogreške (engl. *Vector Error Correction Model – VECM*) na: <http://www.learneconometrics.com/class/5263/notes/Vector%20Error%20Correction%20Models.pdf> (pristupljeno 11.10.2014.).

$$\Delta f_t = \alpha_f + \sum_{i=1}^m \beta_{fi} \Delta s_{t-i} + \sum_{i=1}^m \gamma_{fi} \Delta f_{t-i} + \lambda_f Z_{t-1} + \varepsilon_{ft} \quad (10)$$

gdje Δs_t i Δf_t predstavljaju promjenu razine vrijednosti spot i futures cijena (ukoliko se provodi usporedba nekoliko metoda, potrebno je dosljedno primijeniti pristup izračuna promjena), α_s i Δf_t su konstantni članovi u jednadžbi, β_{si} , β_{fi} , γ_{si} i γ_{fi} su parametri, ε_{st} i ε_{ft} su neovisni jednako distribuirani slučajni vektori, λ_s i λ_f su parametri prilagodbe, dok je Z_{t-1} korektivni član koji mjeri kako se odnosna varijabla prilagođava devijaciji prethodnog perioda u odnosu na dugoročnu ravnotežu i izražava se izrazom:

$$Z_{t-1} = S_{t-1} - C - \alpha F_{t-1} \quad (11)$$

gdje je α kointegracijski vektor, a C je konstanta.

Omjer zaštite izračunava se uvrštavanjem reziduala ε_{st} i ε_{ft} u jednadžbu 9.

Metodologija korištena u ovome radu oslanja se na uvriježene metodologije na kojima se temelji prethodna istraženost u okviru relevantnijih radova (vidi npr. Alexander i Borbosa, 2007; Bonga-Bonga i Umoetok, 2015; Umoetok, 2012; Yang i Allen, 2004), kod kojih autori određuju omjer zaštite korištenjem nekoliko metoda te zatim uspoređuju učinkovitost zaštite koju se postiže korištenjem pojedine metode određivanja omjera zaštite. Oslanjajući se na prethodnu istraženost i vodeći računa o preporuci primjene VECM modela kada su varijable nestacionarne i integrirane, i u ovome radu nastojalo se pružiti usporedni prikaz učinkovitosti pojedinih metoda za određivanje omjera zaštite te na taj način dodatno doprinijeti istraženosti fenomena određivanja omjera zaštite.

Kvantitativne metode za određivanje efikasnosti zaštite

Visokoučinkovita zaštita u svojoj suštini učinkovito pokriva promjenu fer vrijednosti ili novčanog tijeka šticećenog instrumenta. Primjerice ukoliko se vrijednost šticećenog instrumenta poveća za 100, tada će vrijednost instrumenta zaštite pasti u od prilike istom rasponu. Finnerty i Grant (2002) navode kako je taj raspon stvar subjektivne procjene. Finnerty i Grant (2002) tvrde kao je prihvatljivi raspon učinkovitosti od 80% do 125%, međutim, sukladno zahtjevima suvremenog računovodstva, svaki subjekt samostalno određuje kriterije za visokoučinkovitu zaštitu.

Analiza standardne devijacije

Ederington (1979) postavlja temeljnu metodologiju za mjerenje učinkovitosti zaštite koja se koristi u mnogim kasnijim istraživanjima (Awang et al., 2014; Floros i Vougas, 2006; Umoetok, 2012; Yang i Allen, 2004; Ye i Chen, 2006). Smanjenje volatilnosti je mjera koja izražava učinak zaštite. Standardna devijacija jedna je od mjera kojom se izražava volatilnost te, ukoliko je standardna devijacija zaštićenog portfelja manja od standardne devijacije nezaštićenog portfelja, radi se o smanjenju volatilnosti. Povrati zaštićenog i nezaštićenog portfelja izražavaju se kao (Umoetok, 2012: 43):

$$r_{Ut} = r_{st}$$

$$r_{Ht} = r_{st} - \Delta S_{t-i} + h^* * r_{ft} \quad (12)$$

gdje je r_{Ut} povrat na nezaštićeni portfelj koji se sastoji isključivo od instrumenata koji se štite, h^* je optimalan omjer zaštite, r_{st} i r_{ft} su definirani u jednadžbi (6) i (7), r_{Ht} je povrat na zaštićeni portfelj koji se sastoji od instrumenata zaštite i šticećenog instrumenata (Umoetok, 2012: 43). Nastavno, moguće je izvesti varijancu zaštićenog i nezaštićenog portfelja (Kroner i Sultan, 1993):

$$\sigma_U^2 = \sigma_S^2$$

$$\sigma_H^2 = \sigma_S^2 - 2h^* * \sigma_{sf} + h^{*2} * \sigma_f^2 \quad (13)$$

gdje su σ_U^2 i σ_H^2 varijance zaštićenog i nezaštićenog portfelja dok su σ_S^2 , σ_f^2 i σ_{sf} varijance i kovarijanca spot i futures povrata. Prema Ederingtonu (1979) smanjenje volatilnosti mjera je o stupnju rizika koji je uklonjen iz portfelja i izražava se sljedećim izrazom:

$$\tau = \frac{\sigma_U - \sigma_H}{\sigma_U} \quad (14)$$

Analiza koeficijenta varijacije

Učinkovitost zaštite može se mjeriti i usporedbom koeficijenta varijacije zaštićenog portfelja s koeficijentom varijacije drugog zaštićenog portfelja (Jianru i Jinghua, 2011 u Umoetok, 2012). Izražava se kao omjer standardne devijacije i očekivanog povrata, odnosno izražava količinu rizika koji se poduzima za jedinicu povrata i može se izraziti sljedećom jednadžbom:

$$\tau = \frac{\sigma_H}{r_H} \quad (15)$$

Određivanje omjera zaštite na primjeru LIBOR-a

U ovom se poglavlju određuje optimalan omjer zaštite futuresa i spot cijene LIBOR-a primjenom triju kvantitativnih metoda za određivanje omjera zaštite. Kako MSFI 9 zahtjeva stabilan omjer zaštite protekom vremena u ovom su radu korišteni isključivo pristupi koji su stabilni protekom vremena (engl. *Non time varying*). Korišteni su podatci spot cijena tromjesečnog LIBOR-a na USD⁵ i podatci futuresa Eurodolara kojim se trguje na robnoj burzi u Chicagu i koji imaju kao odnosnu varijablu tromjesečni LIBOR na USD⁶. Futures ugovor obnavlja se na prvi dan mjeseca isporuke te se primjenjuje vremenski ponderirana metoda na način da se u zadnjih pet dana do obnove postupno zamjenjuje 20% starog futuresa s novim futuresom. Podatci obuhvaćaju i ekstremna kretanja na tržištu tijekom i nakon financijske krize. Razdoblje na temelju kojeg se procjenjuje omjer zaštite teče od 01.01.2007. do 30.06.2013., a razdoblja na kojima se testira dobiveni omjer zaštite jesu:

Test 1 od 01.10.2012. do 30.09.2013.

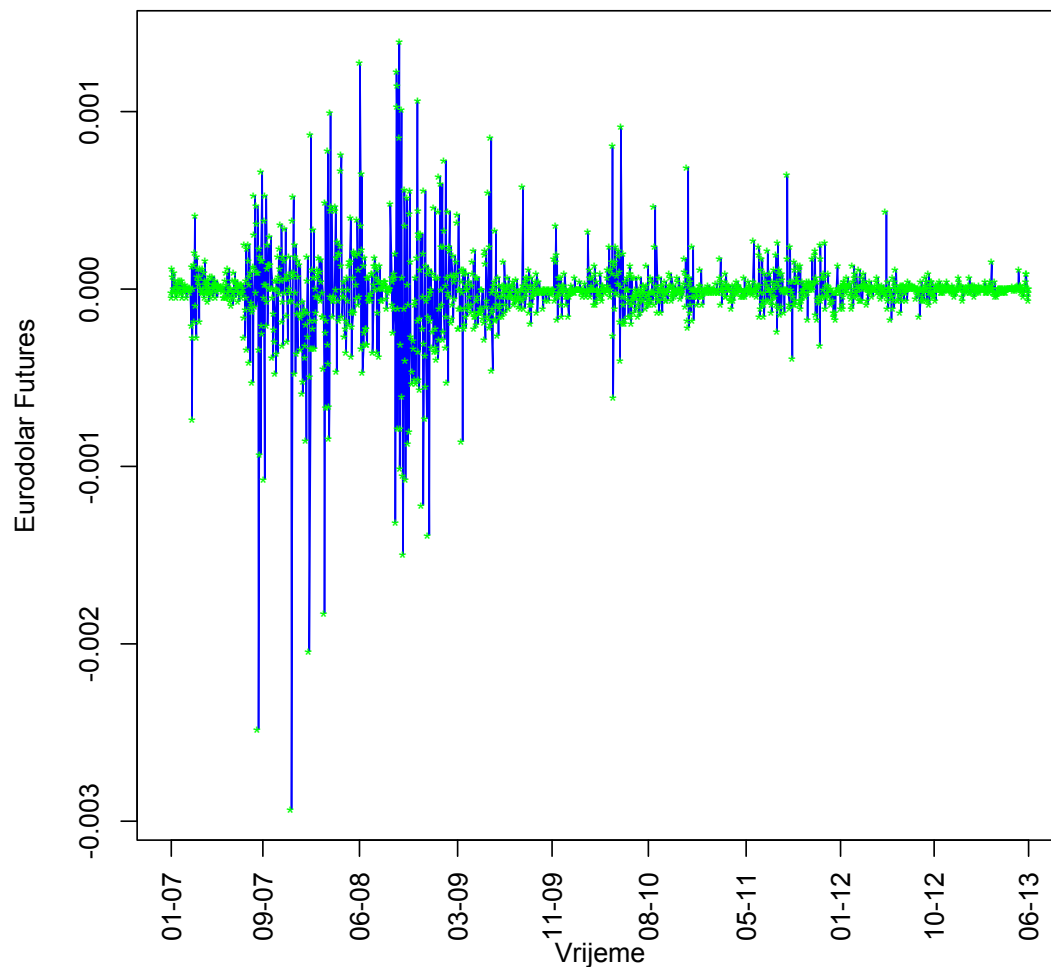
Test 2 od 01.01.2013. do 31.12.2013.

Test 3 od 01.04.2013. do 31.03.2014.

U nastavku su slike koje prikazuju futurese LIBOR-a u ovisnosti o datumu (vidi sliku 1) i spot cijene LIBOR-a u ovisnosti o datumu (vidi sliku 2).

⁵ www.quandl.com/data/FRED/USD3MTD156N

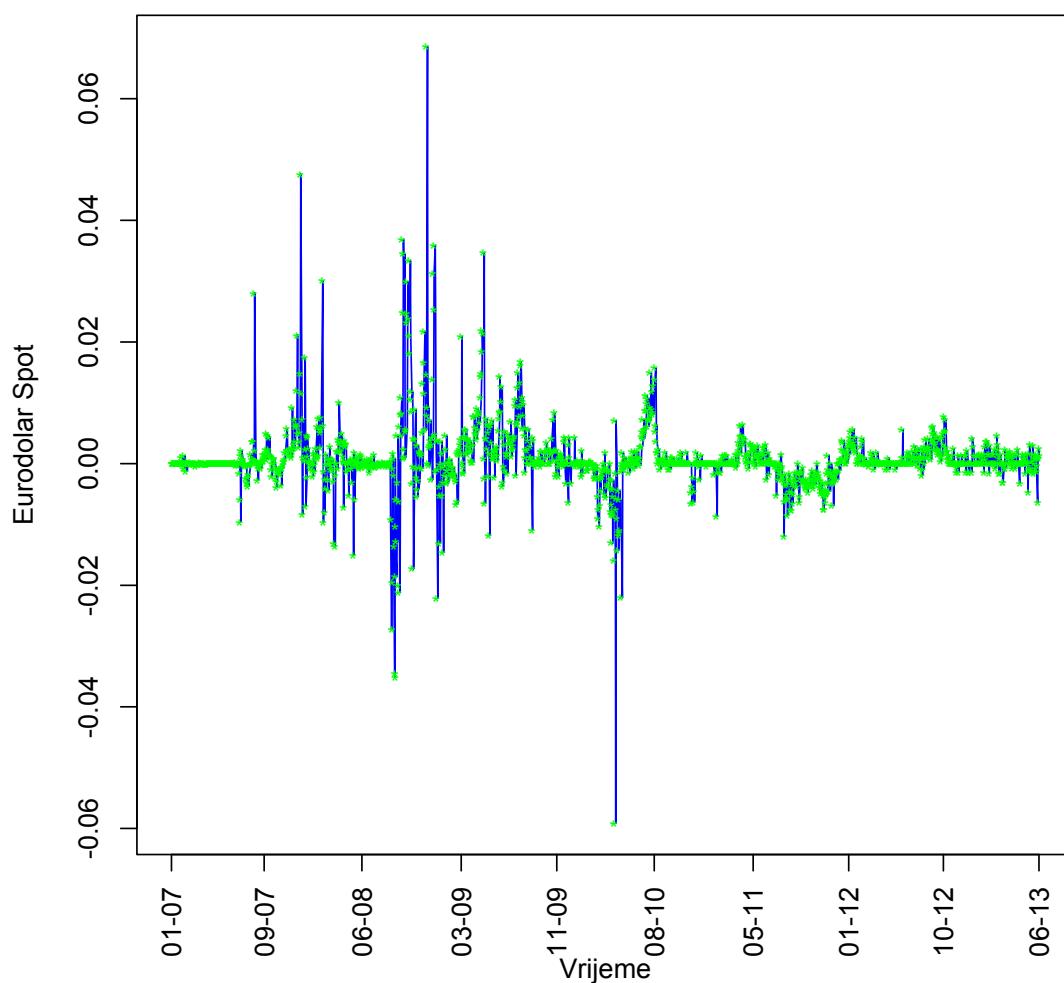
⁶ www.quandl.com/data/SCF/CME_ED1_FW

Slika 1. Prikaz futuresa LIBOR-a u ovisnosti o datumu

Izvor: Autorov izračun

Promatrajući prethodne grafove futuresa i spot cijena LIBOR-a prikazane u ovisnosti o poretku, odnosno datumu, primjećuje se da su te dvije varijable korelirane. Također, može se primijetiti da se podatci grupiraju oko 0 bez prevelikih odstupanja (varijance), što ukazuje na moguću stacionarnost, osim razdoblja pred kraj 2008. godine i početkom 2009. godine, kada je financijska kriza utjecala na kretanje podataka.

Slika 2. Prikaz spota LIBOR-a u ovisnosti o datumu



Izvor: Autorov izračun

Početna analiza futuresa i spot cijena LIBOR-a

Osnovna obilježja podataka futuresa LIBOR-a navedena su u tablici 1 koja objedinjuje i prikazuje pet osnovnih statistika: minimum, donji kvartil, medijan, očekivanje, gornji kvartil, maksimum.

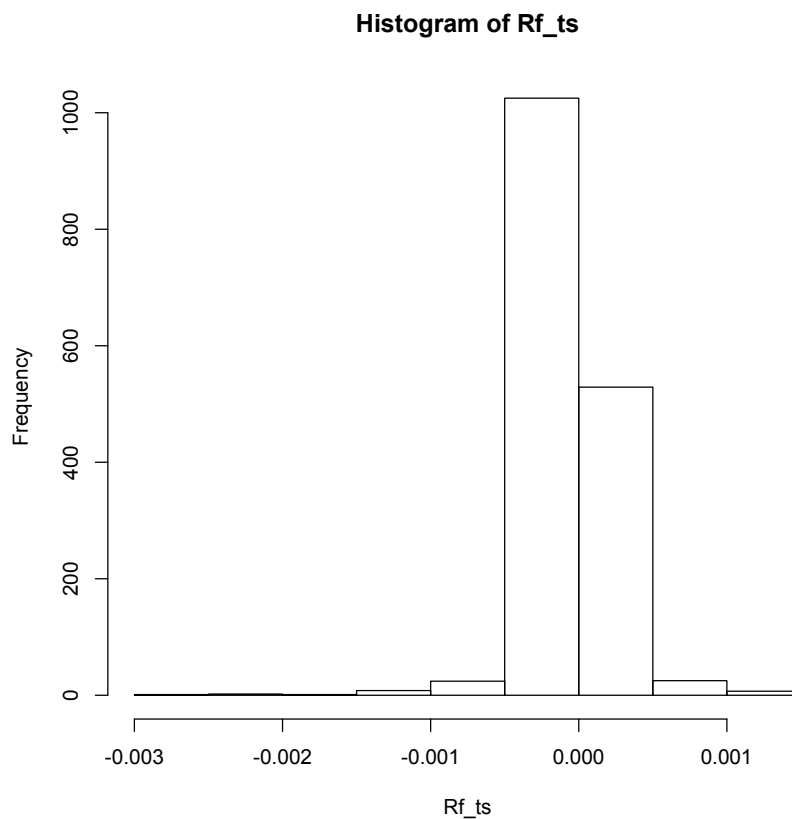
Tablica 1. Osnovna statistička obilježja futuresa LIBOR-a.

minimum	donji kvartil	medijan	očekivanje	gornji kvartil	maksimum
-2.93390e-03	-4.47116e-05	0.00000e+00	-1.37784e-05	2.29424e-05	1.39580e-03

Izvor: Autorov izračun

Iz tablice 1 je vidljivo da su srednje vrijednosti, medijan i očekivanje, oko 0 i podatci nemaju velikih odstupanja sudeći po minimumu i maksimumu te se stoga pretpostavlja da je varijanca mala.

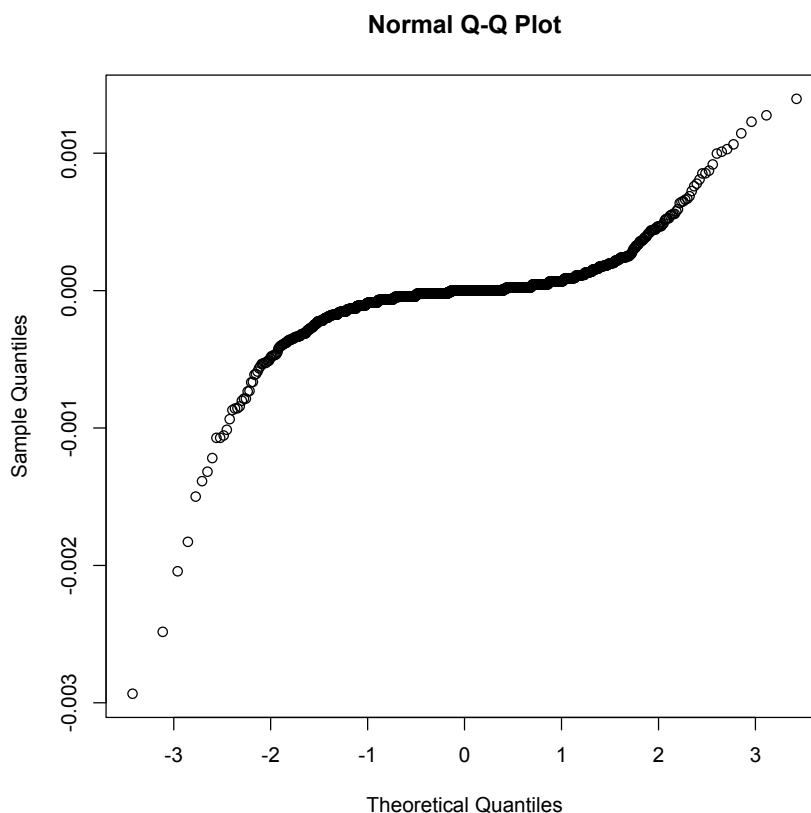
Slika 3. Histogram futuresa LIBOR-a



Izvor: Autorov izračun

Histogram futuresa LIBOR-a prikazuje osnovne informacije o skupu podataka, kao što su središnje mjesto, širina razmaka te oblik. Histogram se koristi za procjenu trenutne situacije sustava i za proučavanje mogućih poboljšanja. Histogramov oblik i statističke informacije pomažu u odlučivanju kako bi se poboljšao sustav. Ako je sustav stabilan, moguće je napraviti predviđanja o budućim performansama sustava. Iz histograma futuresa LIBOR-a vidi se da je sustav podataka stabilan te da se većina podataka nalazi oko medijana, odnosno sredine, no zbog asimetričnosti odbacuje se pretpostavka prema kojoj podatci prate normalnu distribuciju.

Slika 4. Q-Q graf futuresa LIBOR-a



Izvor: Autorov izračun

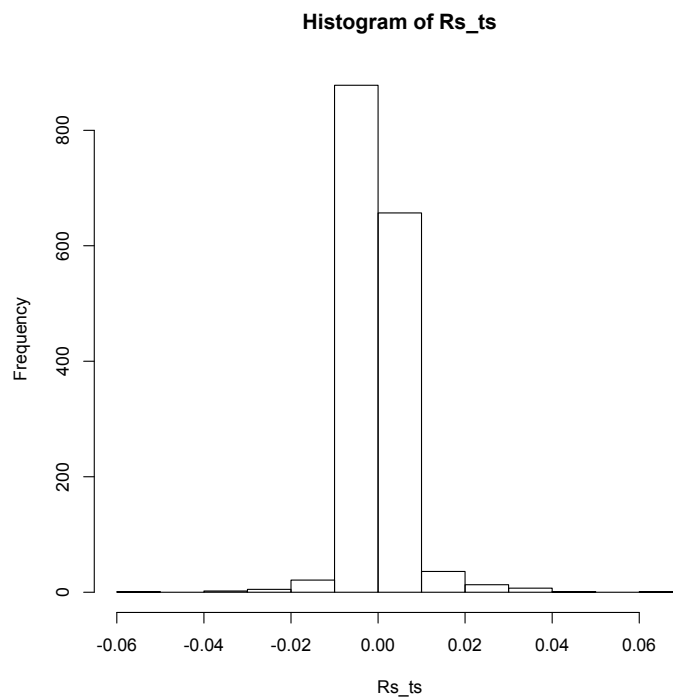
Iz Q-Q grafa futuresa LIBOR-a vidljivo je da empirijski podatci ne prate pretpostavku teorijske normalne distribucije te dolazi do značajne raspršenosti na krajevima grafa. Na isti način potrebno je promatrati spot cijene LIBOR-a. Osnovna obilježja spot cijena prikazana su u tablici 2, koja sadrži pet osnovnih statistika.

Tablica 2. Osnovna obilježja spot cijena LIBOR-a.

minimum	donji kvartil	medijan	očekivanje	gornji kvartil	maksimum
-0.05918040	-0.00031310	0.000000000	0.00079707	0.00169169	0.06861510

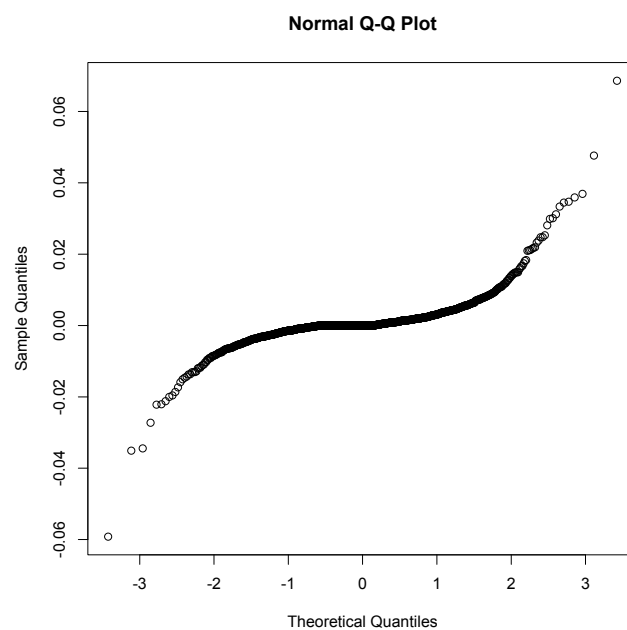
Izvor: Autorov izračun

Iz tablice je vidljivo da su srednje vrijednosti, medijan i očekivanje, oko 0 i podatci nemaju velikih odstupanja. Histogram prati Gaussovu raspodjelu te se smatra da podatci dolaze iz normalne distribucije.

Slika 5. Histogram spot cijena LIBOR-a

Izvor: Autorov izračun

Iz histograma spot cijena LIBOR-a vidljivo je da je sustav podataka stabilan te da se većina podataka nalazi oko medijana, odnosno sredine. Histogram ujedno prati Gaussovu distribuciju te se smatra da podatci dolaze iz normalne distribucije.

Slika 6. Q-Q graf spot cijena LIBOR-a

Izvor: Autorov izračun

Iz Q-Q grafa spot cijena LIBOR-a vidljivo je da empirijski podatci prate pretpostavku teorijske normalne distribucije, osim par outliera pri krajevima grafa koji su posljedica većih odstupanja krajem 2008. godine i početkom 2009. godine.

Test stacionarnosti na primjeru LIBOR-a

Proveden je test stacionarnosti podataka kako bi se osigurale ispravne pretpostavke modela. Vremenski ovisne vjerojatnosne distribucije za povrate mogu dovesti do pristrane procjene optimalnog omjera zaštite kod nekih metoda. Prije nastavka analize potrebno je provjeriti stacionarnost podataka. Sljedeća tablica (2) prikazuje rezultate ADF i KPSS testa:

Tablica 3. Rezultati ADF i KPSS testa za LIBOR.

Varijabla	ADF testna statistika	ADF p- vrijednost	KPSS testna statistika - Level	KPSS testna statistika - trend
R _f	-31.1089	0,01	0.02376	0.1
R _s	-16.1199	0,01	0.04946	0.01835

Izvor: Autorov izračun

Stacionarnost se analizira raznim statističkim testovima, a najčešće se koristi Augmented Dickey- Fuller Unit Root test, prošireni Dickey-Fullerov test jediničnog korijena, koji testira hipoteze:

H₀: postoji jedinični korijen

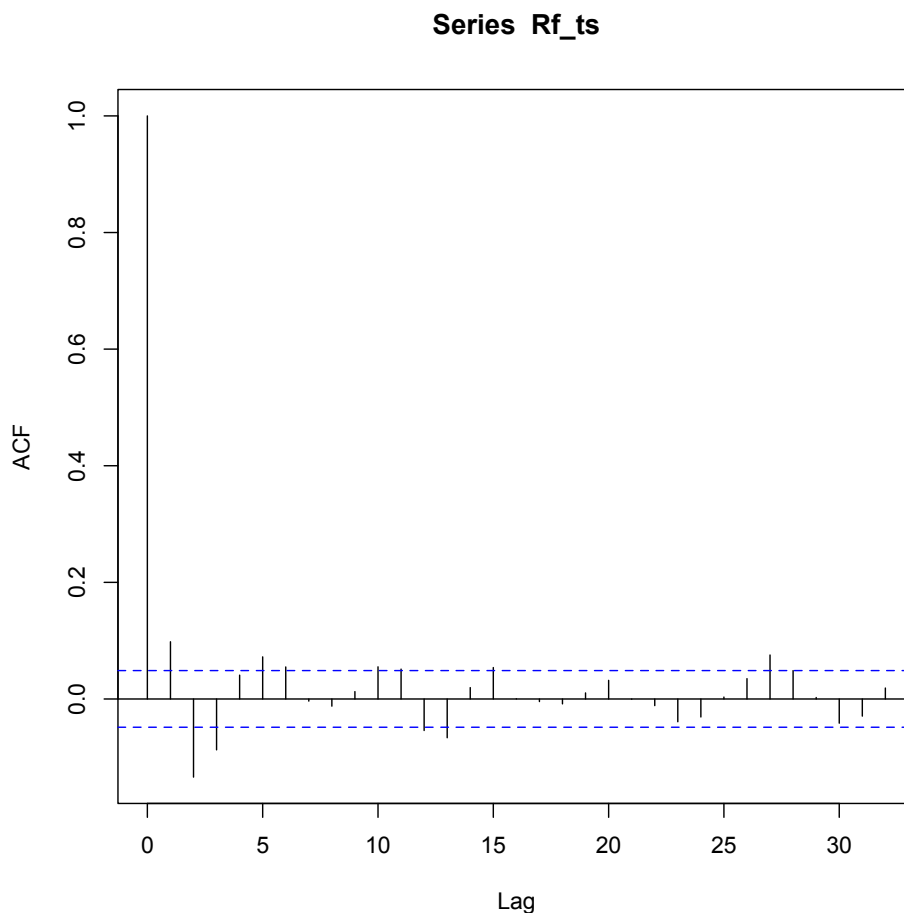
H₁: ne postoji jedinični korijen

Postojanje jediničnog korijena implicira da je niz nestacionaran. Međutim, nepostojanje jediničnog korijena ne znači nužno da je niz stacionaran. U tom slučaju može se reći da eventualna nestacionarnost ne proizlazi iz jediničnog korijena karakterističnog polinoma već ima neki drugi uzrok, primjerice nekakav trend. Tako AR(1) proces s koeficijentom manjim od 1 po apsolutnoj vrijednosti uz dodani linearni trend nema jedinični korijen, ali nije stacionaran. Odnosno, osnovno ograničenje ADF testa jest da je snaga testa mala, tj. ako su podaci stacionarni s autoregresionim parametrom koji je blizak vrijednosti 1, onda se primjenom ADF testa u najvećem broju slučajeva dobiva rezultat da postoji jedinični korijen. Dakle, ADF test samo odgovara na pitanje ima li smisla dalje diferencirati s ciljem postizanja stacionarnosti. Budući da su obje p-vrijednosti manje od 0,05 odbacuje se H₀ hipoteza u korist H₁, dakle odbacuje se pretpostavka da postoji jedinični korijen. Paralelna upotreba ADF i KPSS

testa povećava pouzdanost statističkog zaključivanja, odnosno rješava gore navedeni problem. KPSS test testira nul hipotezu da je promatrana vremenska serija stacionarna oko determinističkog trenda. KPSS test zapravo služi kao dopuna ADF testiranju stacionarnosti. S obzirom na to da p-vrijednosti nisu sve veće od 0,05, ne prihvaća se nul hipoteza u sva četiri slučaja. KPSS test pada na Levelu što nam ukazuje na moguće probleme prilikom modeliranja. Grafički se može vidjeti je li vremenski niz stacionaran ACF grafom, odnosno autokorelacijskom funkcijom.

Ukoliko su podatci većinom ispod isprekidane linije onda je vremenski niz stacionaran (prva linija ide uvijek do 1). Gore navedeni ACF graf futuresa LIBOR-a potvrđuje zaključak koji je dobiven testom: futures LIBOR-a stacionaran je vremenski niz. U nastavku na slici 8 prikazan je ACF graf spot cijena LIBOR-a kako bi se analizirala stacionarnost podataka za LIBOR. Graf potvrđuje zaključak koji je dobiven prethodnim testovima, dakle spot cijene LIBOR-a nisu stacionaran vremenski niz.

Slika 7. ACF graf futuresa LIBOR-a

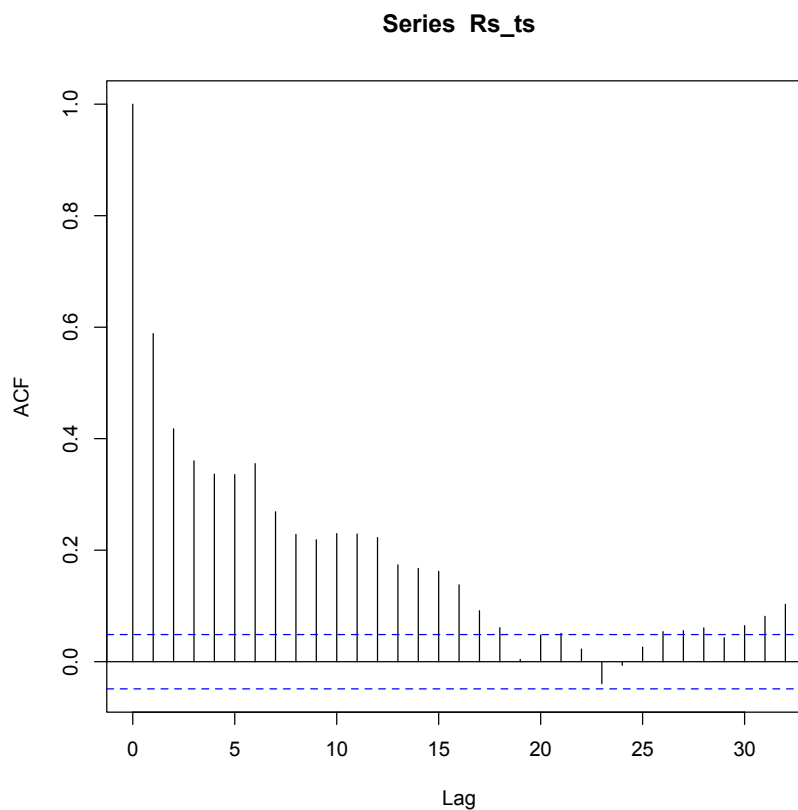


Izvor: Autorov izračun

Test kointegriranosti na primjeru LIBOR-a

Budući da je vremenska serija futuresa spot cijena LIBOR-a izvedena jedna iz druge, može postojati kointegracijska veza između njih. Uvjet za postojanje kointegracije je da obje pojave sadrže trend, odnosno da su integrirane s istim redom integracije. Na temelju analize integriranosti i kointegriranosti varijabli može se definirati odgovarajući VAR ili VECM model. Ako postoji kointegrirana povezanost varijabli, analiza vremenskih nizova nestacionarnih varijabli može dovesti do valjanih ekonomskih zaključaka. Za testiranje kointegriranosti koristi se Johansenov test. Radi se o postupku za ispitivanje kointegriranosti nekoliko vremenskih nizova. Ovaj test dopušta više od jednog kointegracijskog odnosa, zato je u praksi općenito primjenljiviji od Engle-Granger testa koji se temelji na (proširenom) Dickey-Fuller testu za jedinični korijen reziduala iz jednog (procjenjenog) kointegracijski odnosa. Test ima hipoteze $r=0$ i $r=1$. Ako je $r=0$ varijable nisu kointegrirane. Odbacuje se nul hipoteza o nepostojanju kointegriranosti te se ne može prihvatiti hipotezu o postojanju kointegracije jer su u oba slučaja testne statistike veće od kritične vrijednosti.

Slika 8. ACF graf spot cijena LIBOR-a



Izvor: Autorov izračun

Tablica 4. Rezultati Johansenovog testa za LIBOR

H_0	H_1	Max eigenvalue	Test statistics	5 %
$r = 0$	$r \leq 1$	0.30768620	595.33	14.90
$r = 1$	$r \leq 2$	0.09837544	167.66	8.18

Izvor: Autorov izračun

Metoda jedne jednadžbe procjenjene korištenjem metode najmanjih kvadrata na primjeru LIBOR-a

Prva metoda za procjenu optimalnog omjera zaštite je metoda jedne jednadžbe procjenjene korištenjem metode najmanjih kvadrata (OLS) kontinuirano složenih povrata futuresa i spot cijena LIBOR-a. Koeficijent regresije predstavlja vrijednost optimalnog omjera zaštite.

Tablica 5. Izlazne vrijednosti metode jedne jednadžbe procjenjene korištenjem metode najmanjih kvadrata na primjeru LIBOR-a

	koeficijent	standardna greška	p vrijednost
Alfa	0.000777	0.000141	<0,001
Beta	-1.456545	0.596566	0,0147
R^2	0.003666		

Izvor: Autorov izračun

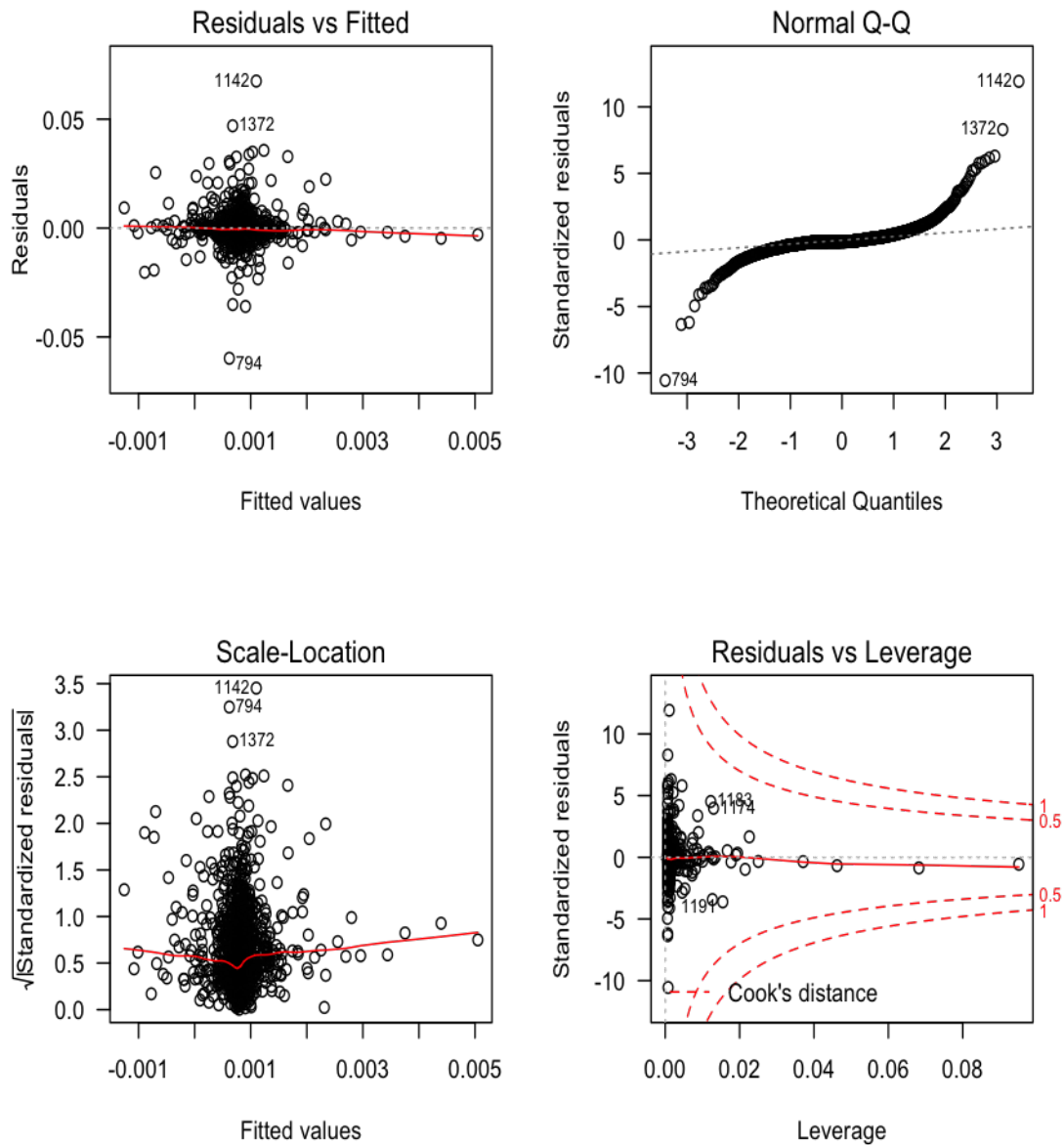
U tablici 5 vidljivo je da je koeficijent regresije statistički značajan ($p < 0.05$), negativan i da je R^2 poprilično nizak (0,37%), što navodi na zaključak da ovaj model nije prikladan za određivanje omjera zaštite. Omjer zaštite je -1.456545. Sljedeća tablica (6) pokazuje rezultate Box-Pierce testa reziduala koji testira prisutnost serijske korelacije. Box-Pierce test reziduala ukazuje na prisutnost serijske korelacije, naime sve su p-vrijednosti male.

Tablica 6. Rezultati Box-Pierce testa reziduala iz metode jedne jednadžbe procjenjene metodom najmanjih kvadrata za LIBOR

Lag	X^2	p - vrijednost
1	550.5519	<0,001
5	1370.498	<0,001
20	2240.126	<0,001

Izvor: Autorov izračun

Slika 9. Grafovi reziduala OLS metode za LIBOR
 $\text{lm}(\text{Rs_vektor} \sim \text{Rf_vektor})$



Izvor: Autorov izračun

Primjena metode bivarijatne vektorske autoregresije (VAR) na primjeru LIBOR-a

Glavni nedostatak metode jedne jednadžbe procjenjene koristeći metodu najmanjih kvadrata, kako tvrdi Herbst (1989), jest da se ne bavi problemom serijske korelacije među rezidualnima endogenih varijabli, što su u ovom slučaju serije povrata. Bivarijatni VAR model rješava problem s kojim se suočavaju serijske korelacije

modeliranjem različitih endogenih varijabli koristeći bivarijatnu VAR strukturu (Umoetok, 2012). Optimalna duljina LAG-a, odnosno m , određuje se ponavljajući model koristeći različite LAG-ove i odabirom optimalne duljine na temelju kombinacije kriterija. Odabran je LAG vrijednosti 2. Nakon što se odredi optimalni LAG, vremenski niz reziduala procjenjuje se i koristi za dobivanje optimalnog omjera zaštite. Procjena optimalnog omjera zaštite u ovom slučaju definirana je kao omjer koji daje minimalnu varijancu, odnosno minimalnu varijancu omjera zaštite. Model pretpostavlja da su sve varijable endogene. U postupku određivanja omjera zaštite pretpostavlja se kako su svi povrati endogene varijable. Sljedeća tablica (7) sadrži procjenjene parametre modela za optimalnu dužinu LAG-a (u zagradi se nalaze vrijednosti varijance).

Tablica 7. Procjenjeni parametri modela za optimalnu dužinu LAG-a za LIBOR

	R_s	R_f
beta ₁	9.253e-01 (4.851e-01)	1.003e-01 (2.461e-02)
beta ₂	5.242e-01 (2.466e-02)	-3.973e-03 (1.251e-03)
gama ₁	-1.555e+00 (4.826e-01)	-1.496e-01 (2.448e-02)
gama ₂	1.083e-01 (2.482e-02)	-1.408e-03 (1.259e-03)
alfa	2.752e-05 (2.267e-04)	8.301e-06 (1.150e-05)

Izvor: Autorov izračun

Reziduali VAR modela, a ne procijenjeni parametri, važni su podatci potrebni za procjenu optimalnog omjera zaštite. U sljedećoj tablici (8) prikazani su podatci potrebni za izračun optimalnoga omjera zaštite novčanog tijeka:

Tablica 8. Reziduali VAR modela i omjer zaštite procjenjen VAR metodom za LIBOR

Statistika	vrijednost
sigma_sf	4.279e-09
sigma_f ²	5.329e-08
h*	0.08029649

Izvor: Autorov izračun

Primjena metode vektorske korekcije pogreške (VECM) na primjeru LIBOR-a

VECM metoda je sljedeća metoda koja se primjenjuje za procjenu optimalnog omjera zaštite. Ova metoda dodaje ispravak grešaka (engl. *adds error correction*) VAR metodi. U sljedećoj tablici (9) nalaze se procjenjeni parametri VECM metoda zajedno s varijancama.

Tablica 9. Procjenjeni parametri i varijance VECM metode za LIBOR

	R_s	R_f
beta ₁	1.8337 (0.6843)	0.2126 (0.0331)
beta ₂	-0.3651 (0.0243)	-0.0004 (0.0012)
gama ₁	0.7566 (0.5127)	0.0713 (0.0248)
gama ₂	-0.2372 (0.0242)	-0.0007 (0.0012)

Izvor: Autorov izračun

Slično kao i kod VAR metode, reziduali VECM metode koriste se za procjenu optimalnog modela zaštite.

Tablica 10. Reziduali VECM modela i omjer zaštite procjenjen VECM modelom za LIBOR

Statistika	vrijednost
sigma_sf	0.02129959

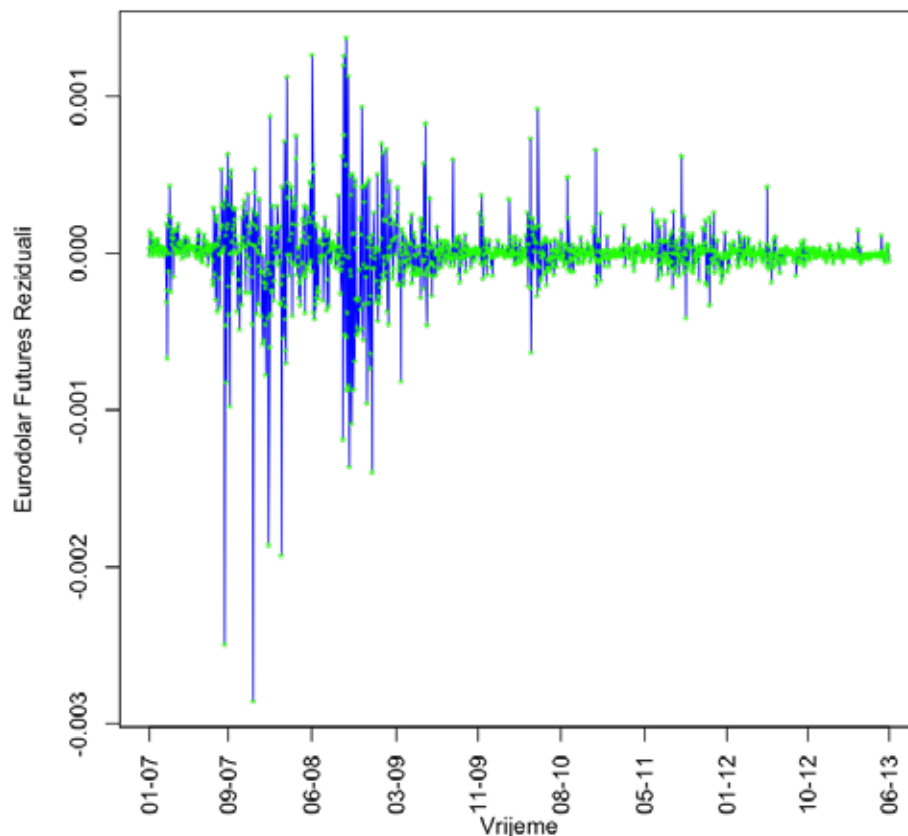
σ^2	1.00
h^*	0.02129959

Izvor: Autorov izračun

Sljedeća dva grafa (vidi slike 10 i 11) prikazuju rezidualne buduće i spot cijene LIBOR-a VAR modela. Prije samog testiranja uvjetne heteroskedastičnosti iz grafova se da naslutiti da obje serije podataka prikazuju vremensku ovisnost volatilnosti ili ARCH efekte.

Za testiranje prisutnosti uvjetne heteroskedastičnosti koristi se White test. White test je statistički test koji utvrđuje je li varijanca reziduala varijabilna u modelu regresije konstantna što je uvjet za homoskedastičnost. Dakle, nulta hipoteza White testa jest homoskedastičnost, a alternativna je heteroskedastičnost. Kako se vidi iz sljedeće tablice (11), p-vrijednost jako je mala pa se može odbaciti nulta hipoteza u korist alternative.

Slika 10. Reziduali futuresa LIBOR-a



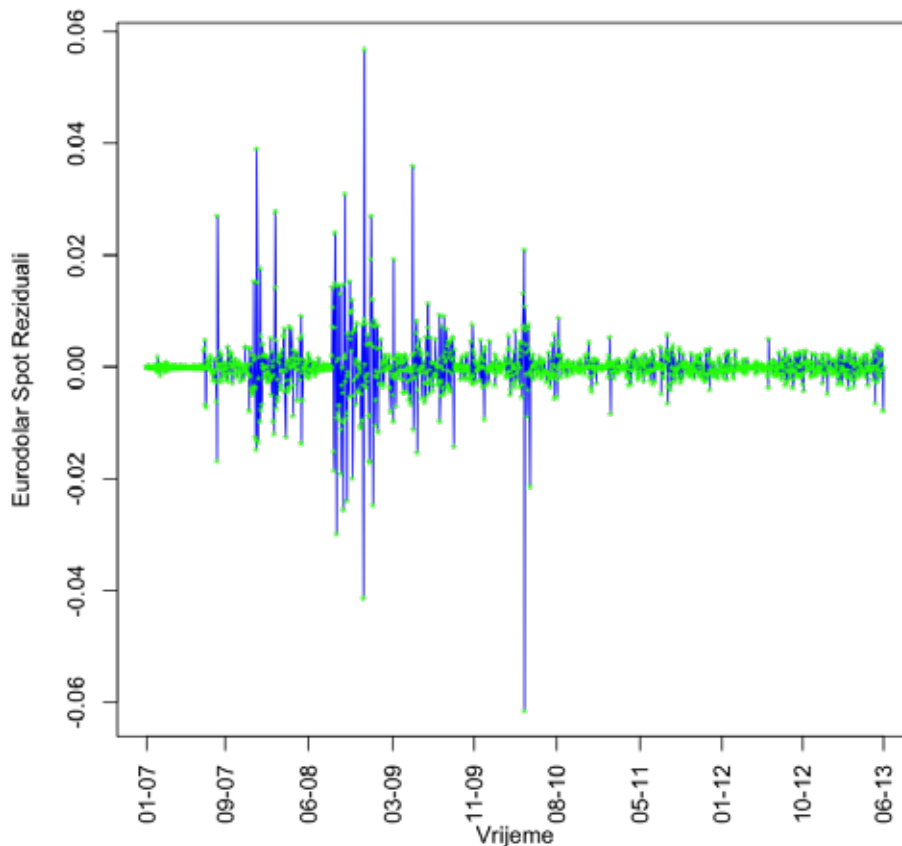
Izvor: Autorov izračun

Tablica 11. Rezultati White testa za LIBOR

Tip White testa	statistika	broj stupnjeva slobode	p-vrijednost
No cross terms	347.8441	30	0.0000

Izvor: Autorov izračun

Prilikom modeliranja LIBOR-a dobiveni omjeri zaštite samo u jednom od slučajeva dovode do smanjenja rizičnosti, odnosno samo jedan od omjera zaštite dovodi do učinkovite zaštite novčanog tijeka. Smatra se kako je upravo navedeno posljedica nepostojanja stacionarnosti, odnosno kako na temelju prošlog ponašanja rizika nije moguće modelirati omjer zaštite koji dovodi do smanjenja rizika primjenom više metoda mjerenja. Ukoliko su varijable nestacionarne a kointegrirane, moguće je modelirati omjer zaštite te je kod LIBOR-a postignut omjer zaštite koji dovodi do smanjenja rizičnosti jedino uz mjeru analize varijance.

Slika 11. Reziduali spot cijena LIBOR-a

Izvor: Autorov izračun

Određivanje učinkovitosti zaštite na primjeru LIBOR-a

Primjena Analize standardne devijacije na primjeru LIBOR-a

U tablici (12) prikazuje se smanjenje varijance u odnosu o metodi koja je korištena kako bi se odredila učinkovitost zaštite na primjeru LIBOR-a.

Tablica 12. Rezultati Analize standardne devijacije na primjeru LIBOR-a

Metoda	h*	smanjenje
OLS	-1.456545	0.1835%
VAR	0.08029649	-0.0208%
VECM	0.02129959	-540.031%

Izvor: Autorov izračun

Prema podacima iz tablice proizlazi da je OLS metoda najbolja metoda određivanja učinkovitosti zaštite novčanog tijeka na primjeru LIBOR-a. Usporedba je provedena na temelju podataka na kojima je oblikovan model.

Primjena Analize koeficijenta varijacije na primjeru LIBOR-a

Druga metoda koje se primjenjuje za uspoređivanje učinkovitosti zaštite je Analiza koeficijenta varijacije. U sljedećoj tablici (13) prikazani su koeficijenti varijacije raznih modela zaštite za podatke koji su služili za procjenu modela (*in-sample* podatci).

Tablica 13. Rezultati analize koeficijenta varijacije na primjeru na primjeru LIBOR-a

Metoda	h*	koeficijent
OLS	-1.456545	NaN
VAR	0.08029649	-324613.6%
VECM	0.02129959	Inf

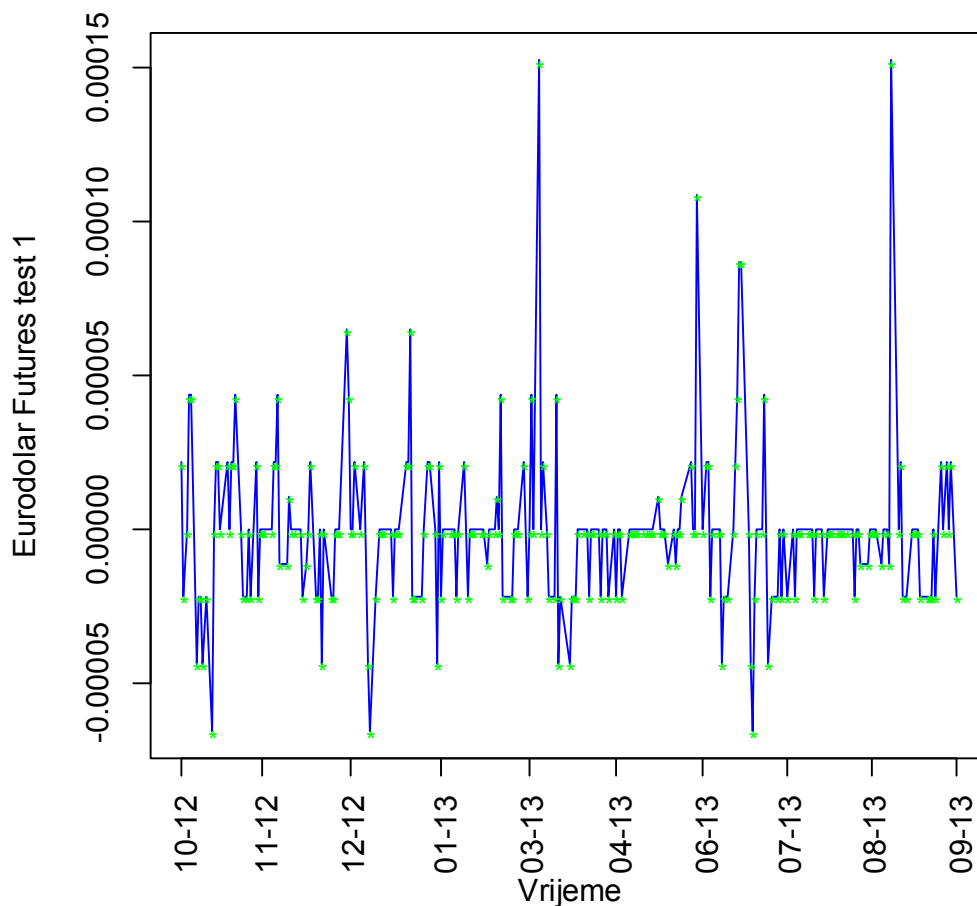
Izvor: Autorov izračun

Prema rezultatima za *in-sample* podatke jedino je VECM koeficijent značajan te se stoga VECM metoda smatra učinkovitom. Budući da su preostali koeficijenti negativni ili jako blizu 0, isti nisu smisleni.

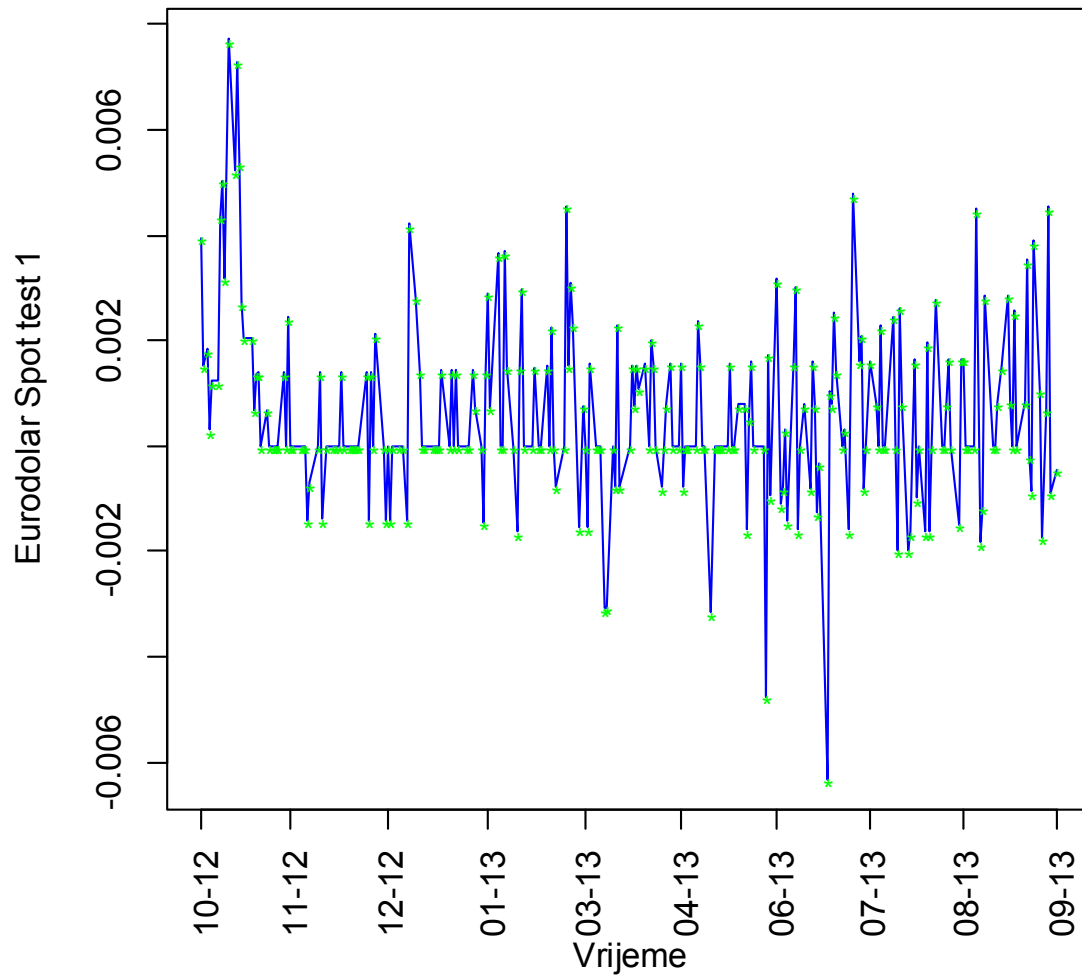
Simulacija ponašanja zaštite nakon započete zaštite na primjeru LIBOR-a

Na *in-sample* podacima za LIBOR ustanovljeno je kako je najbolja kombinacija metode određivanja omjera i metoda zaštite OLS metoda uz mjeru metode Analize standardne devijacije. Kroz pojedina razdoblja prikazat će se odabrana metoda određivanja omjera zaštite, ali i ostale metode, kako bi se analiziralo ponašanje pojedinih metoda kroz vrijeme. Metoda mjerenja učinkovitosti za potrebe računovodstva zaštite je uvijek metoda Analize koeficijenta varijacije. Sljedeći grafovi (slike od 12 do 17) prikazuju *out-of-sample* podatke.

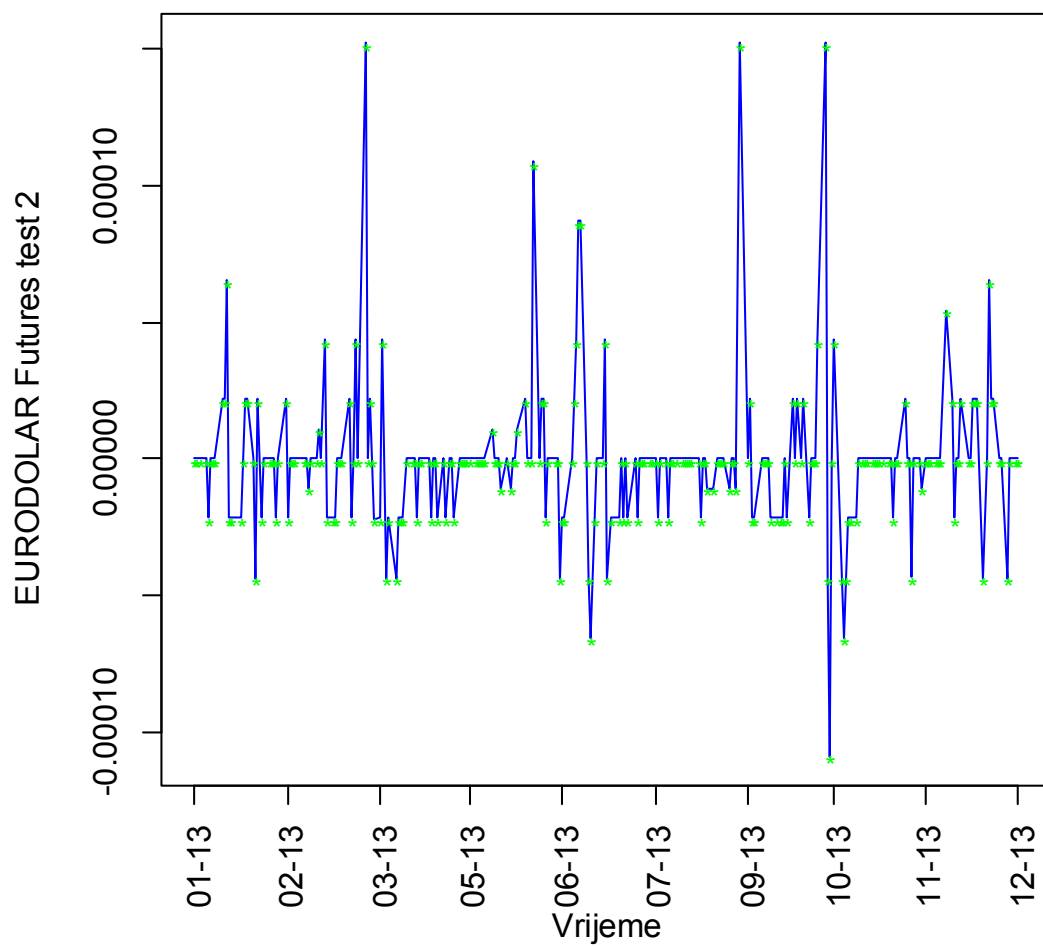
Slika 12. Prikaz *out-of-sample* podataka za futures LIBOR-a u Testu 1



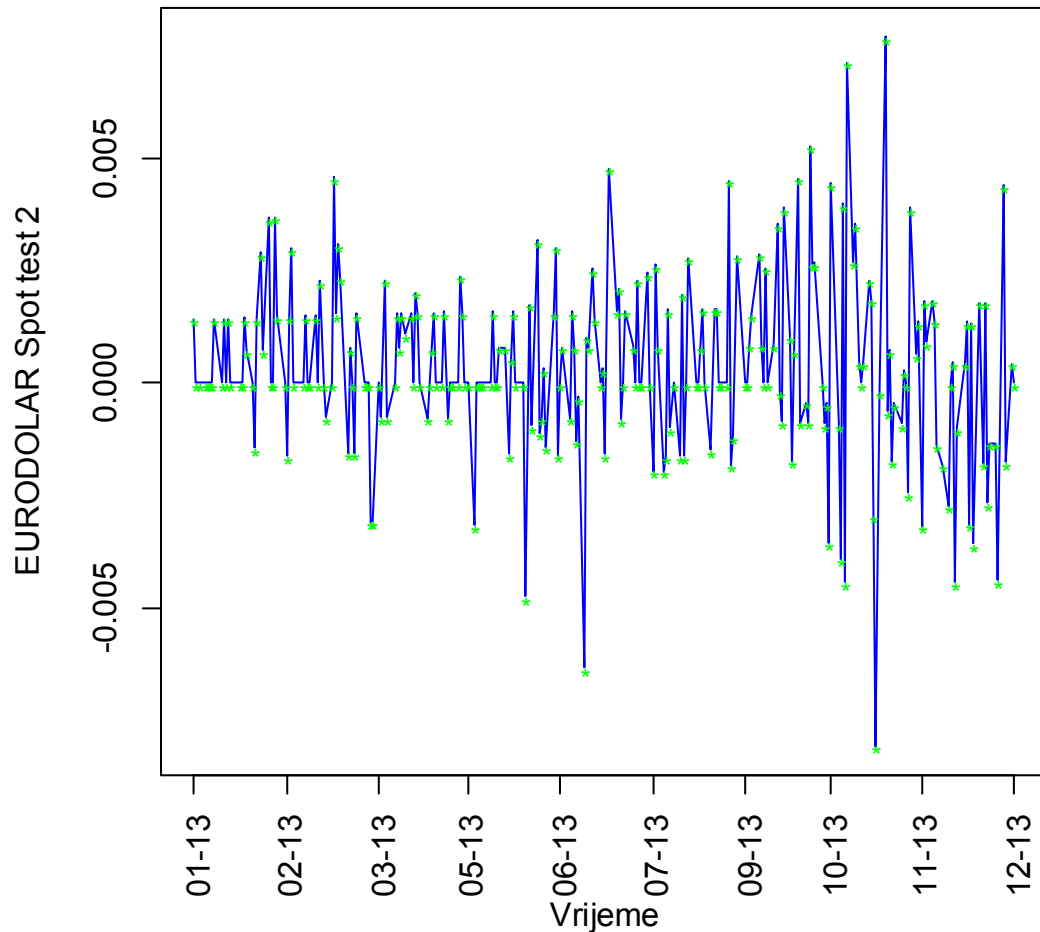
Izvor: Autorov izračun

Slika 13. Prikaz *out-of-sample* podataka za spot LIBOR-a u Testu 1

Izvor: Autorov izračun

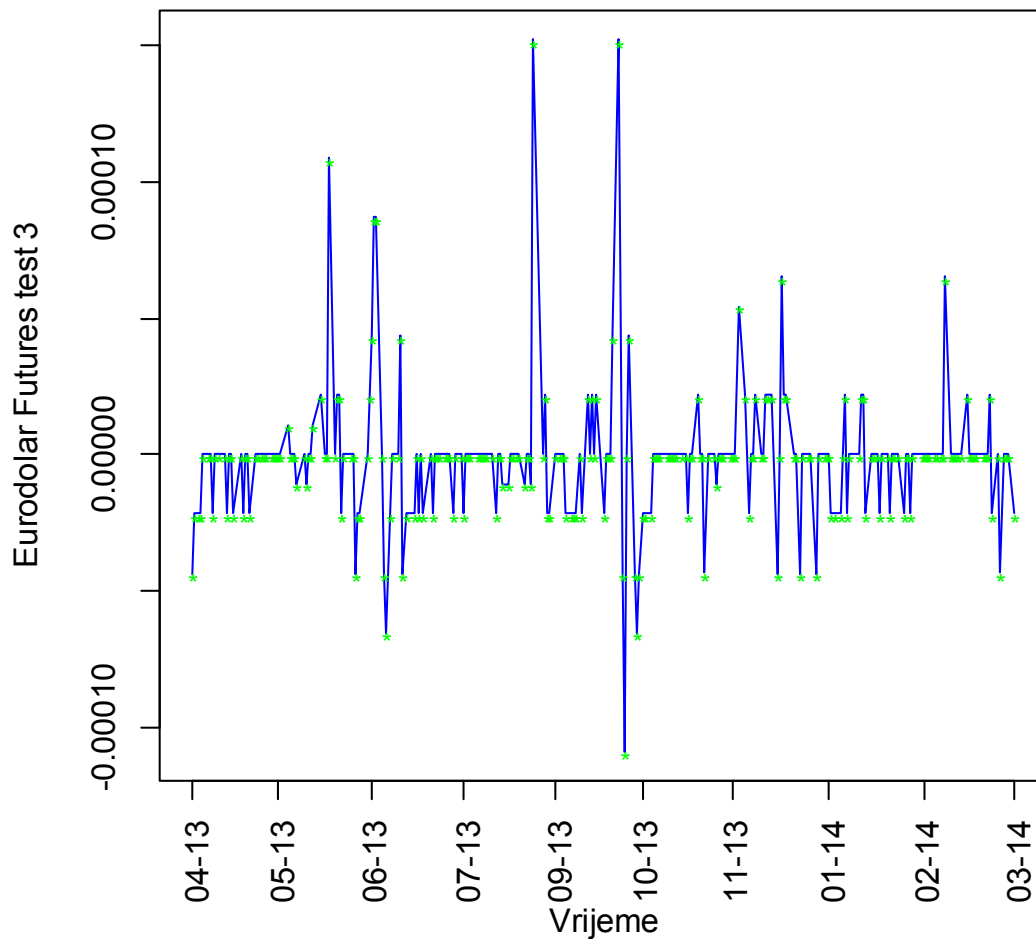
Slika 14. Prikaz *out-of-sample* podataka za futures LIBOR-a u Testu 2

Izvor: Autorov izračun

Slika 15. Prikaz *out-of-sample* podataka za spot LIBOR-a u Testu 2

Izvor: Autorov izračun

Out-of-sample podatci izgledaju jednako kao i *in-sample* podatci budući da se grupiraju oko nule bez prevelikih odstupanja i bez vidljivog trenda ili cikličnosti. Graf izgleda malo oštrije jer ima manje podataka nego u *in-sample* podacima. U sljedećoj tablici (14) prikazano je smanjenje varijance u ovisnosti o korištenoj metodi na *out-of-sample* podacima.

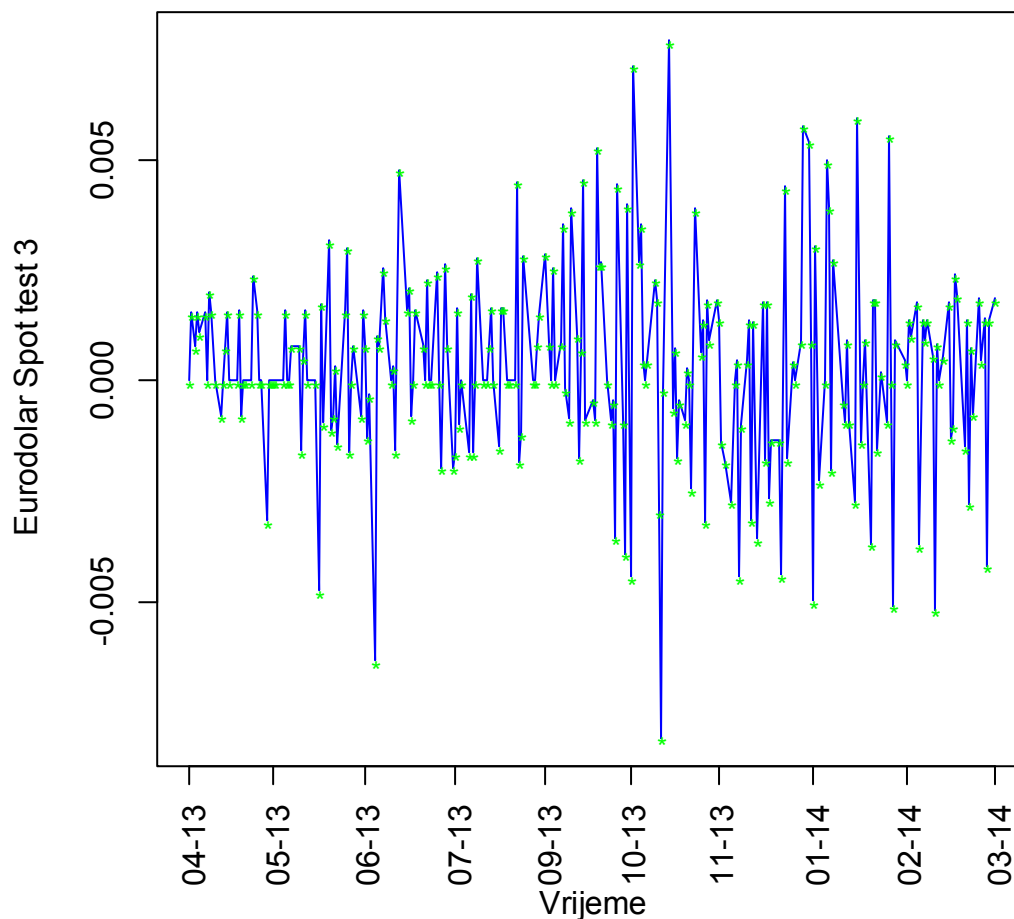
Slika 16. Prikaz *out-of-sample* podataka za futures LIBOR-a u Testu 3

Izvor: Autorov izračun

Tablica 14. Simulacija ponašanja zaštite za LIBOR u Testu 1 uz metodu Analize standardne devijacije kao metodu mjerenja učinkovitosti zaštite

Metoda	h^*	Smanjenje
OLS	-1.456545	0.2273%
VAR	0.08029649	-0.0125%
VECM	0.02129959	-3.320e-03%

Izvor: Autorov izračun

Slika 17. Prikaz *out-of-sample* podataka za spot LIBOR-a u Testu 3

Izvor: Autorov izračun

Vidljivo je kako OLS metoda dovodi do minimalnog smanjenja volatilnosti, dok sve ostale metode određivanja omjera zaštite dovode do negativnih rezultata.

Tablica 15. Simulacija ponašanja zaštite za LIBOR u Testu 2 uz metodu Analize standardne devijacije kao metodu mjerenja učinkovitosti zaštite.

Metoda	h^*	smanjenje
OLS	-1.456545	0.0631%
VAR	0.08029649	-3.475e-03%
VECM	0.02129959	-9.219e-04%

Izvor: Autorov izračun

Iz rezultata prikazanih u prethodnoj tablici vidljivo je da OLS metoda dovodi do minimalnog smanjenja volatilnosti, dok sve ostale metode određivanja omjera zaštite dovode do negativnih rezultata.

Tablica 16. Simulacija ponašanja zaštite za LIBOR u Testu 3 uz metodu Analize standardne devijacije kao metodu mjerenja učinkovitosti zaštite

Metoda	h*	smanjenje
OLS	-1.456545	-0.0167%
VAR	0.08029649	8.902e-05%
VECM	0.02129959	2.442e-04%

Izvor: Autorov izračun

Vidljivo je kako su mjere izuzetno blizu nuli ili su negativne. U nastavku slijedi pregled simulacije uz metodu Analize koeficijenta varijacije kao metode mjerenja učinkovitosti.

Tablica 17. Simulacija ponašanja zaštite za LIBOR u Testu 1 uz metodu Analize koeficijenta varijacije kao metode mjerenja učinkovitosti zaštite.

Metoda	h*	koeficijent
OLS	-1.456545	NaN
VAR	0.08029649	Inf
VECM	0.02129959	-98.79502%

Izvor: Autorov izračun

Prema rezultatima za *out-of-sample* podatke iz Testa 1 razine smanjenja rizičnosti nisu smislene za OLS metodu, međutim VAR metoda daje viši postotak te se smatra najučinkovitijom. Kako je VECM odabrana metoda za određivanje omjera, poduzeće bi na ovaj izvještajni datum stavilo zaštitu u mirovanje ili bi pristupilo postupku rekalkibracije omjera zaštite.

Tablica 18. Simulacija ponašanja zaštite za LIBOR u Testu 2 uz metodu Analize koeficijenta varijacije kao metode mjerenja učinkovitosti zaštite

Metoda	h*	koeficijent
OLS	-1.456545	NaN
VAR	0.08029649	113505.4%
VECM	0.02129959	-45.15%

Izvor: Autorov izračun

Prema rezultatima za *out-of-sample* podatke iz Testa 2, razine smanjenja rizičnosti nisu smislene za OLS metodu. VECM metoda daje vrlo visok postotak te se smatra najučinkovitijom. Kako je VECM odabrana metoda za određivanje omjera, poduzeće bi na ovaj izvještajni datum stavilo zaštitu u mirovanje ili bi pristupilo postupku rekalkibracije omjera zaštite.

Tablica 19. Simulacija ponašanja zaštite za LIBOR u Testu 3 uz metodu Analize koeficijenta varijacije kao metode mjerenja učinkovitosti zaštite

Metoda	h*	koeficijent
OLS	-1.456545	NaN
VAR	0.08029649	-42.81%
VECM	0.02129959	476.56%

Izvor: Autorov izračun

Prema rezultatima za *out-of-sample* podatke iz Testa 3, razine smanjenja rizičnosti nisu smislene za OLS i VAR metodu. VECM metoda daje vrlo visok postotak te se smatra najučinkovitijom. Budući da se zaštita u ovom kvartalu pokazala učinkovitom, poduzeće bi nastavilo s priznavanjem računovodstva zaštite.

Zaključak

Ovaj rad ispituje učinkovitost zaštite od promjene kamatnog rizika za tromjesečnu LIBOR referentnu kamatnu stopu uz zaštitu futuresom Eurodolara kojim se trguje na robnoj burzi u Chicagu, korištenjem dvije metode mjerenja učinkovitosti zaštite (Analiza koeficijenta varijacije i Analiza standardne devijacije). Korištene su tri kvantitativne metode za određivanje omjera zaštite (Regresije pomoću metode najmanjih kvadrata, metode bivarijantne vektorske autoregresije i Metode vektorske korekcije pogreške) te je ispitana učinkovitost sviju metoda na datum uspostave zaštite i na tri izvještajna razdoblja koja slijede nakon tog datuma. Niti jedna kombinacija metode određivanja omjera zaštite i metode mjerenja učinkovitosti zaštite nije dovela do vremenski stabilno i ujedno značajnog smanjenja rizika. Buduća istraživanja su neophodna kako bi se ustanovili razlozi istog i dali prijedlozi za rješavanje navedenog problema.

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Agrophysical Effect of Reclamation Correction of Soil Texture

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Abstract: Showing results correction adverse of soil texture of eroded soil, which is carried out by mechanical crushing. Experimental variants include in soil crushing material in a ball mill and it introduction of microplot in amounts of: 10, 20, 30, 40, 50 and 100 % by weight of the soil. By application the crushed material has changed physical properties of the soil.

Keywords: deflation, agrophysical properties of soil, reclamation correction, dispersive of soils.

Formulation of a scientific challenge

The widespread plowing of dry steppes in the 50s of the 20th century in Buryatia has led to degradation of the soil as a result of deflation. At the moment deflation in the Republic accepted the character of a natural disaster. The total arable area (975 thous. ha), the share of eroded and potentially dangerous falls 650 thous. ha or 66%. Under such conditions, important measures to reduce the dependence of agriculture on climate condition, including by reclamation correction [1].

Purpose and objectives of the article

The purpose of research is to identify patterns of changes in agrophysical indicators of soil fertility under agromelioration correction of soil texture.

The research was conducted on chestnut mealy-carbonate soils, which in the soil cover arable area of the Republic of Buryatia amount to 43,5 % and in some farms up to 70-90% [2].

Chestnut soils of Buryatia have mostly sabulous and sandy texture. The distribution of fractions in the profile is heterogeneous, due to heterogeneity parent rock material. The content of large fractions (1.0-0.01 mm) is high (up to 70%). This is defines the main hydrophysical properties of chestnut soil. Their characteristic feature

is the low minimum water capacity, which in humus-accumulated horizon does not exceed 13-18% of soil volume.

Methods and objects

The studies were conducted in greenhouse trial, where the chestnut soil is crushed in a ball mill, and the crushed material was mixed with the antecedent soil.

Experimental design:

1. Control;
2. Crushed soil 10% by weight;
3. Crushed soil 20% by weight;
4. Crushed soil 30% by weight;
5. Crushed soil 40% by weight;
6. Crushed soil 50% by weight;
7. Crushed soil 100%.

In greenhouse trial has been used vessels with a capacity of 5 dm³. The soil was used from the plow layer of the experimental field of the Buryat Research Institute of Agriculture. The replication is six-fold.

Selection of soil samples from experiment is produced in a layer of 0-20 cm in 4-fold replication. Analyzes conducted in 2-fold replication.

Results and discussion

There are a number of agromeliorative methods of regulation of structural organization of soil, in particular, addition of clay, sanding, application of finished cement dust, sapropel and etc [3, 4].

The disadvantage of above methods of improving the physical properties of soil is the need for production, buy, transportation and soil application of appropriate ameliorants.

Our proposed method of optimizing adverse physical and agrohydrological properties of chestnut soils is the dispersion of soil particles in the long term mechanisms specially designed tractor-drawn [5].

It is known that the dispersion of any mineral increases the total surface and surface energy.

Our experiments found that the content of surface-active fractions of silt and silty fractions is steadily growing with increasing rate of crushed soil, thus there is a marked reduction in the number of sandy fractions. In general, there is an increase in the soil content of physical clay, there is a direct correlation between the increase in

the content of physical clay and application of impalpable flour. The more made crushed soil, the more fine-textured becomes of soil texture. Thus, there is a gradual change of the soil taxon at the level of soil type (Table 1). This is confirmed by the statistical calculations.

For integral characteristics of the soil texture and its changes under artificial crushing used entropy index (calculated by the known formula of Shannon) [6]. It increases from 1,258 to control up to 1,986 bit on the variant with the rate application 50 % crushed soil can be estimate on the complexity of the structural organization of the system and increasing the differentiation of particle size.

Table 1

The change of the soil texture depending on the rate of crushed material

Variant	Number of factions, %							Entropy, bit
	1- 0,25	0,25-0,05	0,05-0,01	0,01-0,005	0,005-0,001	< 0,001	< 0,01	
1	30,2	39,4	16,7	4,8	3,7	5,2	12,7	1,258
2	28,3	36,2	17,1	5,7	6,2	6,4	18,3	1,538
3	27,4	33,5	18,5	7,2	6,8	6,6	20,6	1,587
4	24,2	28,2	20,9	11,1	8,0	7,6	26,7	1,669
5	20,1	26,9	22,3	13,4	8,5	8,8	30,7	1,703
6	17,2	23,2	23,2	16,5	9,9	10,0	36,2	1,986
7	12,2	15,5	25,1	20,2	11,5	12,5	44,2	1,738

1 - antecedent soil, 2 – soil crushed in the rate of 10% by weight, 3 – 20 %, 4 – 30 %, 5 – 40 %, 6 – 50 %, 7-100 %.

With the dispersion are also closely related to the value of the specific surface. It has a functional relationship with absorbability, humus level, number of colloids, the retention force and speed of movement of water. Therefore, quite significant consequence, these key properties of soil can be regulating through the directional change of the specific surface. The specific surface of chestnut soils is not high. In the plow layer, its value is equal to a reading of 53.4 – 55.2 m²/g, but with increasing dispersion value of the specific surface is increases.

Compared with the control, the options with large rate application of crushed soil the difference reaches a significant size. If you compare the antecedent and

crushed soil, the difference equal to 24-27 m²/g, which is comparable to the qualitative changes of the taxon soil.

The total pore space decreases with increasing density of soil (Table 2). An inverse relationship is observed in capillary porosity. So, with increase the rate of impalpable flour is a noticeable increase in pores occupied by water, evidenced by the increase in minimum water capacity. With increasing of capillary porosity happen a decreasing of noncapillary porosity. So, when application 50 % crush soil, its value decreases almost in 2-fold and reaches the lower limit, equal for Panfilov V. of 15 % [5].

Table 2

The change of water-physical soil properties (layer 0-20 cm) depending on the rate of the crushed material

Vari- ant	bd, r/cm ³	pd, r/cm ³	TP, %	CP, %	NCP, %	MHM, %	WP, %	MWC, %	RAM, %
1	1,31	2,47	47,20	14,20	33,00	2,40	3,40	10,80	7,40
2	1,41	2,54	44,50	18,30	26,20	3,30	4,40	13,00	8,60
3	1,45	2,55	43,10	19,90	23,20	3,70	5,20	13,70	8,50
4	1,47	2,56	42,60	20,10	22,50	4,30	5,60	15,00	9,40
5	1,48	2,69	45,00	25,50	19,50	4,80	6,70	17,20	10,50
6	1,52	2,72	44,10	30,30	13,80	5,20	9,10	19,90	10,80
7	1,62	2,72	40,40	35,6	7,50	7,00	11,40	21,90	10,50

1 - antecedent soil, 2 – soil crushed in the rate of 10% by weight, 3 – 20 %, 4 – 30 %, 5 – 40 %, 6 – 50 %, 7 - 100 %.

bd - bulk density; pd - particle density; TP - total porosity; CP - capillary porosity; NCP - noncapillary porosity; MHM – maximum hygroscopic moisture; WP – wilting point; MWC – minimum water capacity; RAM– range of available moisture.

Correspondingly changed agrohydrological properties. With increase in percent crushed of the soil is a gradual increase in the maximum hygroscopic moisture, thus in the control its content was equivalent to 2.1-2.2 %, and if application 50% of the crushed material is 4.0-4.3% on the air dry soil.

With increase of dispersion of the soil increases WP. This lead to increase in volume unavailable moisture, but only so much application fine ameliorant does not

prevent the growth of RAM, because happen a substantial increase of the MWC. When application large rate (40 %) of the crushed material growth pace RAM reduced.

Conclusions

Thus, increase in dispersion is the most radical way to optimize the physical factors fertility of eroded chestnut soils, which cause an increase in the active surface of the solid body, favorably changes the geometry of the pore space and the relation between fluid and air body. By the artificial crushing of soil particles also happen optimization agrohydrological properties of these soils. In addition, increase in dispersion be essential to for improving the erodible resistance of light soil texture of chestnut soils and rational use existing of soil moisture storage.

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Internal Audit - the Third Line of Defense Against Fraud

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Abstract: Internal audit as an independent and objective activity performs certain functions and tasks. The main tasks are related to assessing and improving the effectiveness of risk management processes, control and the governance. The purpose of this study is, based on theoretical backgrounds and case studies, define the role of internal auditing and interpret it using the "Three Lines of Defense in Effective Risk Management and Control" model. The results show that the internal audit has the potential to be part of the general defense against fraud. To realize this potential, the internal audit should be independent and strengthen its own capacity.

Keywords: internal audit, fraud, internal control, the Three lines of defense in effective risk management and internal control model, risk management.

1. INTRODUCTION

Counteracting fraud is a process that requires the implementation of a holistic approach and the integration of the efforts of all staff, including the Board of Directors, Executives, Managers at Different Levels, Experts.

The holistic approach is to cover all critical areas (processes, activities, functions) that are susceptible to fraud. The application of such an approach requires the integration and coordination of structural units, experts. Synchronized actions are also required to achieve a synergistic effect. In this sense, it is very appropriate to use models to combat fraud, including integrated control frameworks. An example of such a model is the "The three lines of defense in effective risk management and control"[1] hereinafter referred to as the "Three lines of defense". It is namely through it that below will be examined the place and role of the internal audit in counteracting fraud.

2. MATERIALS AND METHODS

There have been studies of the literature on the subject and of best practices. For the purposes of analysis documents and studies of the Institute of Internal Auditors (IIA), Association of Certified Fraud Examiners(ACFE), etc. have been used.

Methods: secondary data analysis, comparative-historical method, observation method and the method of system analysis.

3. RESULTS AND DISCUSSION

The "Three lines of defense" model is based on the strict and clear allocation of roles in an organization to ensure the effectiveness of risk management and control system.

Typical of the model is the definition of three groups called "lines" as follows:

- The first line of defense includes employees responsible for risk management. These are operational managers who are the first level of defense and are directly responsible for risk management. Operational management is responsible for maintaining effective internal controls, especially of the current operational controls.

With regard to the fight against fraud, it can be said that this is expected to be the first protective barrier. It is the task of the operational management, knowing the "own" processes, to predict the possible risks, to evaluate them and to establish appropriate controls against them. The results of the study, as reported in the Report to the nations on occupational fraud and abuse, ACFE's 2016 Global Fraud Study, show that the presence of anti-fraud controls was correlated with both lower fraud losses and quicker detection. With controls in place, fraud losses are lower, ranging between 14.3% and 54%, and the time for their detection is shorter (by 33.3% - 50%) compared to the organizations in which these controls are missing [2].

- The second line of defense includes employees/structures that monitor the processes. Their responsibilities are related, for example, to supporting management policies, setting up risk management frameworks, identifying known and emerging issues, identifying the level of risk appetite, assisting management to improve the risk management processes and controls and emerged problems. The second line of defense may include, for example, a structural risk management unit (and/or committee), a structural compliance unit/function/officer. There may even be a number of such structural units/functions/employees charged with compliance with different types of legislation in the fields of safety, security, supply, environmental protection,

quality, etc. in an organization. The second line of defense includes also the financial control, which monitors the financial risks and the financial reporting process.

With a view to counteracting fraud, a dedicated unit (a separate department, function or team) directly involved in the fight against fraud could be organized. It is considered that the establishment of such a department is an effective control measure. According to a study reported in the Report to the nations, when there is a special department, the average loss of fraud declined by 47.9% compared to cases where there was no such department. The study for Eastern Europe and Western/Central Asia shows even greater percentage difference of 84.2%. The study also found another positive effect from the existence of an anti-fraud department, which is that the time to detect fraud is reduced. On a global scale, the difference is a 50% reduction in fraud detection time, in cases where there is a special department. For Eastern Europe and Western/Central Asia this percentage is 25% [2]. All of these data show the undisputed benefits of a department whose activities are aimed at counteracting fraud, but this is not always possible. In such a case, a "second line of defense" would have to counteract fraud through other "actors". For example, the risk management department/function must obligatory include the risk of fraud, something they will do even if there is such a department, but when there is no, probably more attention on methodology, monitoring and reporting should be paid. Another example of assuming anti-fraud functions is some banks where this activity is in the Compliance department. It is also possible and normal for part of the anti-fraud functions to be taken over by the Security Department, as is the case with insurance companies. In any case, it is very important to have a clear definition of the responsibilities.

- The third line of defense includes process-independent employees who provide assurance. These are the internal auditors. The Internal Audit function "provides assurance on the effectiveness of risk management, internal control and governance, including the manner in which the first and second lines of defense achieve risk management and control objectives". [1] It is obvious that the role of internal audit in this case is very interesting. On the one hand, the internal audit function is part of the "defensive front", being its third line of defense, and on the other hand it has the task of assessing the effectiveness of the other two lines.

With regard to the "first line of defense" in the fight against fraud, the internal audit is interested in whether there are risks of fraud predicted, are there controls in place against them and how they work.

With regard to the "second line of defense", the internal audit is interested in what policies, methodologies are being designed are placed at the disposal of the "first line of defense", what monitoring is being carried out, and so on.

With regard to both lines of defense, the internal audit is interested in how they communicate with each other, is there a clear differentiation of the functions, and is there a duplication of functions. For example, in the field of fraud, the human factor is of central importance. It is precisely this thesis that examines and presents Miroslava Peicheva in the book "Knowing fraud is in the favor of managers and human resources auditors" [3]. The internal audit should assess whether the influence of the human factor is foreseen, who is responsible for this and how it is performed, how it is communicated. For example, a study of staff motivation [4] and their satisfaction are mechanisms that are generally applied by the human resources unit. Made in an appropriate way, it can also be used for anti-fraud purposes. Who, however, should do it, who will be reported and to whom the results will be disseminated? Who will analyze and process them? Will there be synchronization with the other policies? All these questions, and others, will have to put the internal audit in order to assess how fraud risk is managed in the "first and in the second line of defense, respectively".

The important role of the internal audit as the third line of defensive in counteracting fraud is confirmed by the study, as reported in the Report to the nations [2]. The results show that internal audit is among the most common controls against fraud, as 73.3% of respondents said they had an internal audit as introduced control against fraud. This puts the internal audit in the third place after the external audit (81,7%) and the Code of Conduct (81.1%). According to the same study, the average loss of fraud is 42% less in companies where there is an internal audit department compared to those where there is not. The study found that internal audit ranks second among the methods for initial detecting of fraud, after alerts and complaints.

Below, will be examined the role of the internal audit in counteracting fraud, resulting from its nature and based on theoretical backgrounds, including the Internal Auditing Standards [5] concerning the nature of its work, its functions, tasks, objectives and approaches.

The role of the internal audit in relation to fraud is determined by its essential characteristics and purpose, as well as by the nature of its work. The internal audit as part of the management and control system has the task of assessing and improving

the effectiveness of risk management processes, control and the governance as a whole.

It can be said that the three main focuses, which are the unique objects of the internal audit, are precisely the risk management, control and the overall governance of the organization. By assessing each of them, the internal audit can assess the relevant processes related to counteracting fraud. For example, it is logical that the assessment of the effectiveness of risk management processes also includes an assessment of fraud risk management. The same applies to the assessment of control, which should include the assessment of the control introduced against the risks of fraud. In assessing governance, the internal audit must necessarily assess the establishment, implementation and effectiveness of ethics-related tasks, programs, and activities in the organization, as well as overseeing risk control and management, communicating the information concerning the risks and control to the relevant units in the organization, and etc.

Expectations for internal audit in its role as a "third line of defense" against fraud are due to many factors that can be attributed to two main groups, namely:

- Factors depending on the environment
- Factors depending on the internal audit unit's own capacity.

The factors that ensure the independence of the internal audit [5] may be referred to the first group of factors, and in particular:

- ✓ the position that the internal audit occupies in the organization
- ✓ approval of the appointment of the Chief Audit Executive (CAE) by the Board and their remuneration
- ✓ approval of the plans, budgets, charter, internal audit policies by the Board
- ✓ reporting to the highest management level, such as the Board
- ✓ direct and unrestricted access to the Board in the case of susceptible issues

The aforementioned factors favor and confirm the independence of the internal audit. Independence is a prerequisite for the internal audit to report freely on the management of fraud risks and material fraud issues. Independence allows the internal audit to boldly enter the "hotspots" without fear of pressure and revanchism, evaluate and report them.

To the second group of factors relating to the capacity of the internal audit unit can be addressed:

- ✓ Competence of internal auditors

In terms of fraud -related competence the standard 1210.A2 [5] reads: Internal auditors must have sufficient knowledge to evaluate the risk of fraud and the manner in which it is managed by the organization, but are not expected to have the expertise of a person whose primary responsibility is detecting and investigating fraud.

This standard outlines two emphases. The first emphasis is placed on the fraud risk assessment and the assessment of its management. And this is the mandatory competence that internal auditors should have in terms of fraud. The second emphasis is that internal auditors are not expected to have the expertise of individuals whose primary duty is the detection and investigation of fraud.

Although no expertise is needed, however, in order to evaluate fraud risk management, internal auditors should be aware of the types of fraud, possible fraud schemes, risk factors for fraud, discerning red flags for fraud, retrieval and analysis of data, etc.

- ✓ objective auditors and others.

Objectivity is a personal quality of the internal auditor, which is determined in the following way:

An unbiased mental attitude that allows internal auditors to perform engagements in such a manner that they believe in their work product and that no quality compromises are made. Objectivity requires that internal auditors do not subordinate their judgment on audit matters to others [5].

- ✓ Appropriate audit methodology

The fraud risk prediction should accompany all audit processes, starting with strategic and annual planning, going through the planning and implementation of individual, specific audit engagements, and ending at reporting on audit work. The audit methodology should be appropriate for the prevention, detection and investigation of fraud (if this is provided for in the Charter).

4. CONCLUSION

Based on all the above data and analyzes, it can be concluded that internal audit has an active role in counteracting fraud.

- ✓ The establishment and effective functioning of the Internal Audit function has a significant role to play in counteracting fraud, especially in the prevention and detection of fraud.

✓ The internal audit must be sufficiently independent in order to be genuinely useful in counteracting fraud. The degree of independence is defined, provided and supported by the management at the highest managerial level.

✓ Internal audit should strengthen and develop its own potential. This can be done in several directions. The first is to provide the necessary expertise in the field of counteracting fraud, both on an individual and on a collective level. The second is by improving the audit methodology, which means that the focus on "frauds" is provided in the audit work. The third direction for enhancing the own potential is also part of the audit methodology, but here it is differentiated separately because of its significance. This direction focuses on the search for and implementation of innovative solutions, the active use of information technology to detect fraud, for example through enhanced use of data retrieval and their proper analysis, application development or specialized software, etc.

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Section 3. Humanities & Social Sciences

Inspiratory and Expiratory Resistances During Exercise

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1. INTRODUCTION

Paradoxical Vocal Fold Motion (PVFM), previously known as Vocal Cord Dysfunction (VCD), is a condition where the vocal folds adduct (close) during inspiration when they should abduct (open), thus decreasing airway patency. Although sporadic case reports have described symptoms suggestive of PVFM in the early literature, the disorder had not gained recognition until the past 15 years. Patients experience breathing difficulty, usually triggered by exercise, and seek medical amelioration [1-2]. They are commonly misdiagnosed as asthmatics, yet they do not respond to asthma therapy. Accurate and timely diagnoses are needed before satisfactory treatments can be developed, but there are presently no standardized methodologies for PVFM assessment [3].

At present, the standard assessment procedure uses a laryngoscope to visualize the vocal cords [4], although other pulmonary function tests have also been used [5-8]. Adduction of the vocal folds is mostly seen during inspiration, but it can continue into expiration as well [9]. However, adduction during expiration alone should not be considered to represent PVFM, because this can be caused by an adaptation to lower airway constriction [9].

Laryngoscopy has not been found to be well tolerated by exercising patients in our clinic. The optical fiber laryngoscope must be positioned deep in the oropharynx for proper visualization, and gagging is common. Although there may be other triggers for the condition, exercise frequently brings on exercise-induced PVFM (EIPVFM) for those susceptible. EIPVFM may subside soon after exercise ceases, so laryngoscopy must be performed within a very short time after exercise

ceases. Whereas other well-trained professionals may be able to administer laryngoscopic measurements during the exercise stage of testing, others, including ourselves, have found it to be nearly impossible to perform during exercise. Thus, we have searched for an alternative means to indicate when EIPVM is likely.

The Airflow Perturbation Device (APD) is an experimental instrument to measure respiratory resistance. It consists of a segmented wheel rotating in the breathing flow pathway [10]. Part of the wheel is open, and part screened, so that, as it rotates, it causes flow to periodically diminish and grow. Measured mouth pressure is also perturbed. The depth of each of these perturbations depends upon two things: resistance of the device and respiratory resistance of the patient. Measuring both mouth pressure and flow easily gives the resistance of the device, so patient respiratory resistance can be obtained noninvasively. Values obtained with the APD are comparable to those measured by impulse oscillometry (IOS), a form of forced oscillation (FO) [11].

The APD is relatively small and easy to use. It requires only about a minute of normal breathing to make its measurement. Of particular interest to PVFM diagnosis, it can separate respiratory resistance during inspiration from that during expiration. Thus, the APD could become a very important noninvasive tool to diagnose PVFM.

However, in order to ascertain the utility of the APD in EIPVFM diagnosis, APD measurements must be compared directly with laryngoscope findings. That produces a physical conflict, because the APD requires a seal with the mouth or nose to measure properly [12], yet the laryngoscope requires access to the throat. One possible means around this conundrum is to measure inspiratory and expiratory resistances immediately before exercise ceases with the APD, and immediately after exercise cessation with the laryngoscope. This procedure could be justified if the APD measured the same resistances immediately before and after exercise stopped. It is the purpose of this study to determine if resistances during inspiration and expiration change or remain the same on either side of the exercise transition. If there is no change, then laryngoscope and APD diagnoses could be directly compared. In addition, measurements of respiratory resistance before, during, and immediately after exercise could be of interest to pulmonologists interested in respiratory mechanics.

2. MATERIALS AND METHODS

Fifteen healthy non-asthmatic male and female subjects aged 18 years or older volunteered for respiratory resistance measurements at rest, during exercise, and at post-exercise rest. All subjects were students at the University of Maryland College Park and the protocol for human testing was approved by the University of Maryland Institutional Review Board. Before each test session, each subject completed a brief Medical History Questionnaire and a Physical Readiness Questionnaire for subject screening purposes. Only subjects presumed fit for exercise were allowed to participate in the test session. All subjects exercised by pedaling on a bicycle ergometer (Life Cycle 9500HR) and respiratory resistance measurements were taken in a seated position while breathing through the APD before, during, and after exercise. They breathed through the mouth only, a nose clip obstructing nasal flow.

The APD used in this study was calibrated for resistance values by comparison with a commercially-available Impulse Oscillometry (IOS) system (Care Fusion Master Screen; San Diego, CA) using a physical mechanical analog of the respiratory system [13]. Because the IOS cannot distinguish between resistances during inspiration from those during expiration, the APD was then calibrated with a three liter syringe (flow) and manometer (pressure) for resistances in both inspiration and expiration directions following the procedure in [10].

2.1 Initial Exercise Calibration

Each subject was tested on the bicycle ergometer prior to the data collection to determine the proper settings to elicit 70% of the subject's predicted maximum heart rate. Subjects were seated on the ergometer which measures the amount of work done and asked to pedal at a rate of 80-90 rpm. The heart rate was monitored using the sensors on the ergometer. The ergometer settings were adjusted until the heart rate reached a steady state value of about 70% of age-predicted maximum heart rate.

2.2 Experimental Session and Respiratory Resistance Measurements

Following the exercise calibration, subjects were allowed to rest for a long enough time for the heart rate to return to normal resting values. The subjects were then asked to sit on the ergometer and rest while respiratory resistance measurements were continuously acquired and recorded for a minute using the APD and the APD computer program. Subjects were then asked to begin pedaling the ergometer using the predetermined settings that would elicit a heart rate of 70% of age-predicted maximum heart rate. Each subject's heart rate was monitored using the sensors on the ergometer. Subjects exercised on the ergometer for five minutes while breathing through the APD. Pedaling ceased at five minutes, and the post-exercise rest period continued for two and a half additional minutes. The total time for data collection was eight and one half minutes.

2.3 Data Analysis

Individual APD readings exhibit a moderate amount of variability, and this variability can obscure recognition of real resistance changes. At least some of this variability appears to come from dynamic resistance changes of physiological origin in the respiratory system [13]. The APD, when used as a stand-alone device, averages individual readings for about one minute to produce a reasonably stable resistance reading. When used with a computer, however, individual APD resistance readings are accessible, and these were used for this study. To dampen variation of these readings, each reading was averaged over readings obtained for ten seconds, and labeled with the time corresponding to the average time of the ten second sample. Samples overlapped by nine seconds so that an averaged reading was available for each second from time beginning at 5 seconds to time ending at 510 seconds. The number of samples for each of these time intervals varied, because resistance was calculated once for each airflow perturbation, but wheel rotation speed can vary somewhat, especially during the intense breathing of exercise. APD pressure and flow data were collected at 200/sec, but times for perturbations usually slowed during inspiration, when the wheel was pulled closer to the APD body, and became faster during expiration.

Data for the entire cohort of participants were analyzed using the Student's t-test [14]. This test was performed for six conditions: difference of APD inspiratory resistance (R_i) immediately before and resistance immediately after exercise ceased (two readings total, denoted as local differences), and the same for expiratory resistances (R_e); differences of R_i averaged for 30 seconds immediately before and 30 seconds immediately after exercise ceased (60 readings total), and the same for R_e ; and differences of R_i averaged for 60 seconds immediately before and 60 seconds immediately after exercise ceased (120 readings total), and the same for R_e . These values of Student's t were compared to two-tailed (sign ignored) tabled values at the $p=0.05$ level with 14 degrees of freedom [14]. Data for the entire cohort of participants were also analyzed using a t-test with paired means using resistance differences before and after exercise ceased.

In order to investigate whether each individual subject's R_i and R_e immediately before exercise ceased could be considered to be the same as R_i and R_e immediately after, the same ratios as described above for the entire cohort were calculated for each subject. Ratios of sample averages divided by appropriate standard deviations were calculated for three inspiratory and three expiratory conditions: R_i and R_e immediately on each side of exercise cessation (local), R_i and R_e averaged for 30 seconds before and after, and R_i and R_e averaged 60 seconds before and after. Lacking a standard deviation for one local reading, the standard deviation for the entire eight and one-half minute test was used as the denominator for the local ratios, but standard deviations for the 30 second and 60 second ratios used standard deviations calculated for each of these time intervals. It was not appropriate to use a t-test on the local ratios because of the use of the entire sample standard deviation, but the 30 second and 60 second ratios were tested at the $p=0.05$ level with 58 and 118 degrees of freedom, respectively.

All calculations were performed using the Microsoft (Redman, WA) Excel program.

3. RESULTS AND DISCUSSION

In Table 1 are shown demographic characteristics for the 15 subjects. In general, they were all young, healthy adult college students.

Table 1. Subject demographics. Values given are means \pm standard deviation and ranges

Sex	11 male, 4 female
Age (years)	22.3 \pm 3.4 (19 to 30)
Height (cm, [in])	173 \pm 6.9 cm [68.1 \pm 2.7 in] 165 to 185 [65 to 73]
Body mass (kg, [lb])	68.2 \pm 8.9 kg [150.1 \pm 19.6 lb] 47.7 to 79.1 [105 to 174]

In Fig. 1 is shown a graph of R_i (black) and R_e (gray) averaged for all 15 subjects. Exercise began at 60 seconds and ceased at 360 seconds (each time given by the solid vertical line on the graph). Resistances stabilized while the subjects rested pre-exercise, and increased by about 15% when exercise started. There appears to be some anticipatory increase immediately before exercise began. The trend during exercise was slightly positive for inspiration and somewhat negative for expiration. From the graph, it appears that there is no easily discernible resistance difference in either R_i or R_e at the cessation of exercise, although there was a marked decrease in both at about 30 seconds after exercise ceased. This is about the time that the high breathing flow rates accompanying exercise diminish.

In Fig. 2 are shown data for subject 10. As can be easily noted, the variation of resistance values is more pronounced for this typical subject than it is for the averaged values appearing in Fig. 1. Most of the trends appearing in Fig. 1 are also present here: 1) there is a stable period before exercise began, 2) there was a general increase in resistances once exercising, 3) there were no discernible differences immediately upon exercise cessation, and 4) there was a general decrease about 30 seconds after exercise stopped. There was no appearance of an anticipatory increase before exercise and the general trend for both R_i and R_e during exercise was slightly downward.

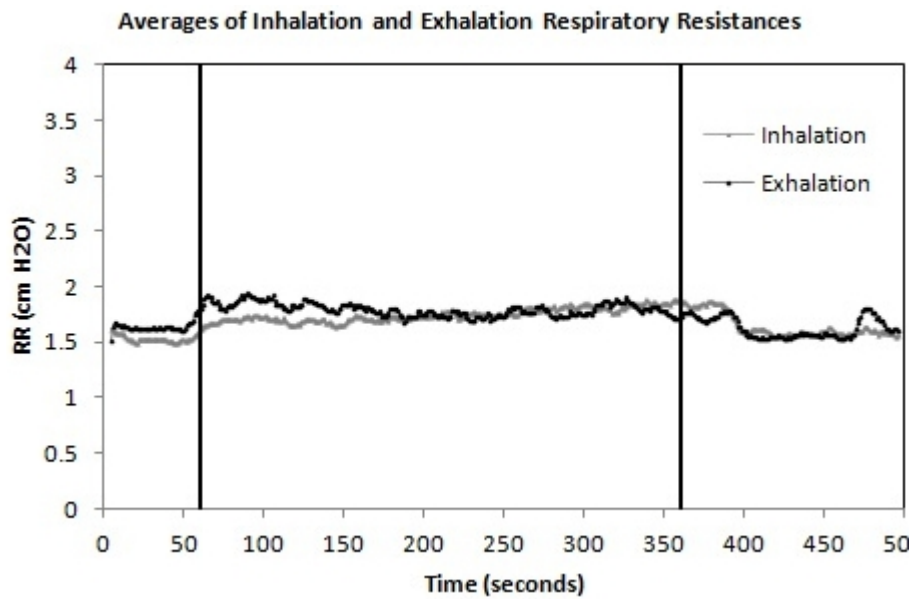


Fig. 1. Inspiratory (black) and expiratory (gray) resistance values averaged over all subject responses. Exercise began at 60 seconds and ended at 360 seconds

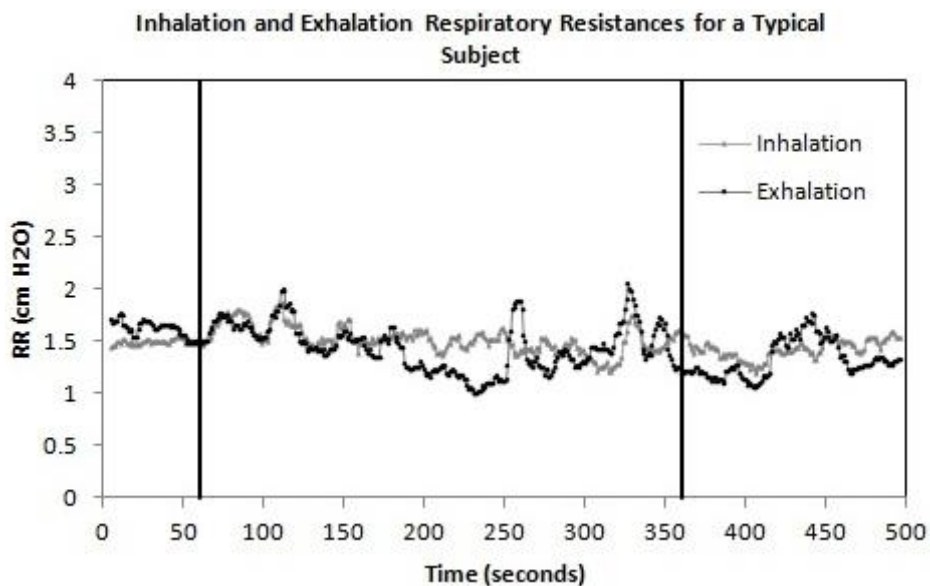


Fig. 2. Inspiratory and expiratory resistance values for subject 10, showing resistance values before, during, and after exercise

Fig. 3 shows the flow rates averaged over all subjects during the test. Steady state was only reached toward the end of the exercise period.

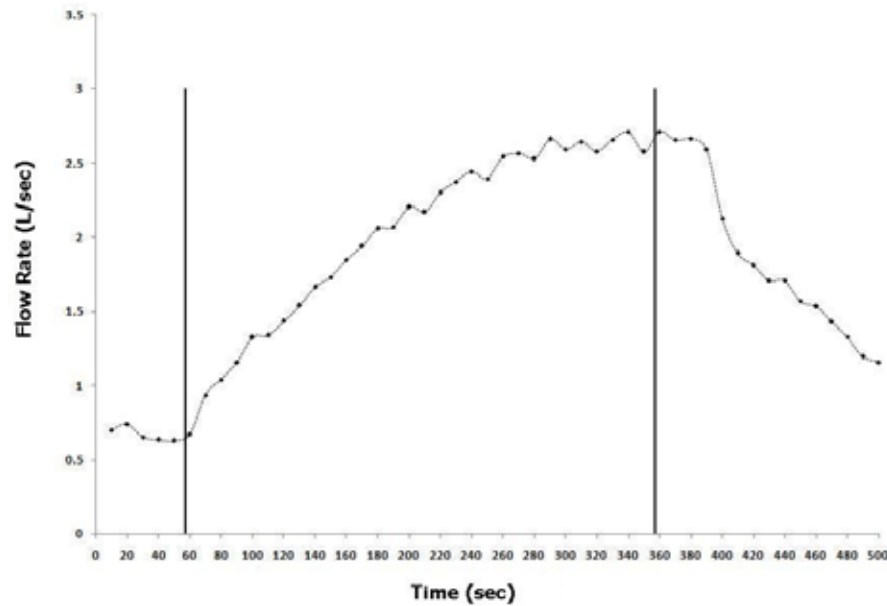


Fig. 3. Ten second averages of flow rates for all subjects

In Table 2 is a compilation of resistance differences to standard deviation ratios for each subject. No t-test run on individual subject data achieved statistical significance at the $P < .05$ level; thus individual subject resistances immediately before and after exercise ceased can be considered the same. Although no statistical test was applied to the local ratios, they are apparently of the same order of magnitude as are the statistically nonsignificant 30 second and 60 second ratios. All resistance differences are of the order of one standard deviation or less, so resistances before and after exercise ceases will likely be within a small percentage of each other for any given person. There was no apparent trend in these ratios as more samples were averaged. Therefore, averaging resistance readings over 30 or 60 seconds appears to offer no general increase in consistency before and after exercise ceases.

The calculated t values for the entire cohort of subjects for local, 30 second averaging, and 60 second averaging are given at the bottom of Table 2. Shown are the unpaired and paired t-test values. All but one of these values are highly nonsignificant, so it can be expected that resistances for the entire cohort of subjects would show no significant differences before and after exercise ceases. The only value to achieve statistical significance was the inhalation resistance averaged over 60 seconds. This is reasonable when looking at

Fig. 1, because average inhalation resistance appears to decrease significantly within 60 seconds after exercise ceases.

Based on the appearance of the data in Fig. 1, it appeared as if there was a significant shift in R_i and R_e as exercise began and also as exercise ceased. Paired observation statistical tests were performed for measurements on either side of the start of exercise and on either side of the end of exercise. For the first test, average R_i and R_e were formed for data appearing from 30 to 60 seconds and from 90 to 120 seconds. These values were compared as paired means with the intent to show whether the resistance increase at the beginning of exercise was statistically significant. The second test compared average R_i and R_e data from 330 to 360 seconds with corresponding data from 400 to 430 seconds. The intent of this test was to determine if the fall in resistances a short time after the end of exercise was statistically significant. Neither test achieved statistical significance. The variances of individual differences were very large, indicating that there was much variation from subject to subject. Some of this variance was caused by differences in response times; some subjects demonstrated the same trends, but the times for increases or decreases varied.

Table 2. Comparisons of sample differences to sample standard deviations at the end of exercise

Subject	Local ratio		30 sec ratio		60 sec ratio	
	Inh	Exh	Inh	Exh	Inh	Exh
1	1.035025	-0.20051	0.107149	-1.01713	0.898039	0.49386
2	0.00697	0.319235	-0.92187	-0.85342	0.537749	-0.89234
3	0.371235	-0.35245	0.965354	1.049834	0.898123	1.032399
4	-0.10916	-0.20051	-0.5316	-1.01713	0.414964	0.49386
5	0.153987	0.248836	-1.229165	-0.21692	0.308876	0.627609
6	-0.087439	0.542369	0.669109	1.298823	1.17987	1.397005
7	0.015388	-0.03211	0.393402	0.180411	1.119952	0.769254
8	0.009647	-0.08688	0.975555	-0.68473	1.234626	0.469874
9	-0.16222	-0.00401	1.688098	1.514769	1.074799	1.548484
10	0.198229	0.221179	0.877892	1.502858	0.428099	1.404698
11	-0.11961	-1.05996	0.735468	0.58048	0.633567	0.683837
12	-0.57798	-0.200511	-1.48109	-1.01713	0.370474	0.49386
13	0.132934	0.037933	-0.2054	0.536175	0.502232	1.196191
14	-0.22245	-0.51396	-0.33075	0.184346	0.811614	1.099917
15	-0.09744	-0.13101	0.002292	-0.04607	0.475427	0.841602
Averages (tvalue)	-0.07143	-0.05927	0.675099	1.073905	2.306372	1.375362
(paired t-alue)	-0.07143	-0.05927	0.071429	0.071429	0.159487	0.071429

Whenever statistical significance is obscured by large sample variances, nonparametric tests can sometimes be used instead. One such test is the Wilcoxon Signed Rank Test [14]. Using this test, R_i and R_e differences, both at the start of exercise and after exercise, were found to be statistically significant at the $P < .01$ level.

This study was undertaken mainly to provide evidence to support a procedure that would make the detection and substantiation of EIPVFM as measured with laryngoscope and APD able to be compared. Both require measurements to be taken at the mouth, and each can interfere with the other. If not impossible, at least it would be extremely difficult to make both measurements simultaneously. What these results have shown is that APD measurements taken immediately before exercise stops can be compared to laryngoscopic measurements immediately after. Resistance differences for the entire population of subjects tested in this study differ by so little as to be statistically highly nonsignificant. The same is true for individual subjects. Any differences that appear are going to be small and not going to influence conclusions about laryngoscopy and APD comparisons. This applies to both inspiratory and expiratory resistances.

However, although R_i and R_e do not differ significantly immediately at the cessation of exercise, resistances measured a half minute or more after exercise either begins or ends do change significantly from their former levels. Thus, resistances increase after exercise begins and decrease after exercise ceases, as shown in Fig. 1.

For many years it was believed that airway resistance did not change during exercise because any tendency to decrease would be offset by the effect of increased breathing flow rate [15]. However, de Bisschop et al. [16] measured average respiratory resistance during exercise with an IOS system and found that resistance immediately upon the cessation of exercise was higher than at rest, but lower than what would have been expected with the higher breathing flow rate. They attributed this to reflex bronchodilation during exercise. The transient resistance they measured had disappeared by the time a second resistance measurement was made 90 seconds after exercise stopped. Results from the present study show that both inhalation and exhalation resistances

decrease from their high exercise values within 45 seconds of exercise cessation.

Silverman et al. [17] used an APD to measure both inhalation and exhalation resistances at the end of exercise for subjects on a treadmill. They selected resistance values for which the breathing flow rates were within a close range to resting flow rates. Thus accounting for the effects of flow rate on resistances, they demonstrated that both inhalation resistance and exhalation resistance decreased from resting values immediately following exercise. Inhalation resistance changed more than exhalation resistance. Resistances quickly recovered to their pre-exercise values. There were no statistically significant differences between pre- and post-exercise values by 50 seconds after exercise. They were not able to measure resistances changes at the start of exercise.

The results in [17] are consistent with those of [16] and those of the present study. Resistances in Figs. 1 and 2 were not corrected for flow rate differences. These are the resistances that would be measured without selection based on flow rate, as given in Fig. 3. de Bisschop et al. [16] implied that, if they could have corrected for increased exercise hyperpnea, the average respiratory resistances they would have measured would have been lower than pre-exercise values. The conclusion that can be reached is that resistance increases during exercise and decreases after, but this increase is the result of two opposing trends: the augmentation due to flow rate and the diminished resistance due to (probably) bronchodilation.

Normally, one would expect exhalation resistance to be slightly higher than inhalation resistance, at least at rest. This is because of the slight narrowing of the airways during exhalation compared to inhalation. Inhalation resistance is clearly shown to be somewhat larger than exhalation resistance in Figs. 1 and 2. This difference is not maintained throughout the exercise period.

To be clear about this study and its results, this study does not present a new replacement method for the diagnosis of exercise-induced paradoxical vocal fold motion (EIPVFM). If such a method comes about, it must be the result of careful and deliberate study. The APD could possibly become an important part of a new diagnostic method, but only after many careful steps.

This is only the first of those steps. There is a problem that we have seen in applying laryngoscopic imaging to exercising patients, and an alternative may be more appropriate if it can be established that its indications are valid. The APD provides a pulmonary function measurement capability that has not previously been available to practitioners: the ability to easily measure respiratory resistance directly and separated into inhalation and exhalation phases. Spirometry does not do this and neither does forced oscillation. But, if it is to be used during exercise, then the APD must be validated for such use. If APD results are to be compared to those from the laryngoscope, then we must be sure that respiratory resistances do not change during the transition time from one measurement to the other. The results of this study confirm that respiratory resistances in normal subjects do not change immediately after exercise ceases. That is what this study has shown, and that is all this study has shown. Anything further must be tested in additional studies.

Clinical Significance: Measurements of respiratory resistance and vocal cord images during or immediately following exercise, which both require exclusive access to the mouth, cannot be made simultaneously, but this study demonstrates that both measurements can be made sequentially without loss of accuracy, as long as the two measurements are made within 30 seconds before and after the cessation of exercise. Measurements made with the APD, or other respiratory resistance measuring device, just before exercise ceases can be directly compared with laryngoscope images made soon after exercise cessation.

4. CONCLUSION

Both inspiratory and expiratory resistances increase at the start of exercise and decrease soon after exercise ceases. There is no statistically significant difference in either of these two resistance measurements immediately before and after exercise cessation.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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COMPETING INTERESTS

The authors have no competing interests.

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***The Mediating Effects of School Reputation
and School Image on the Relationship Between Quality
of Teaching Staff and Student Satisfaction in Higher
Education in Hong Kong***

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1. INTRODUCTION

It is clear that as a result of Hong Kong's higher education sector rapidly expanding, the question of how students see their learning institutions is assuming an increasing significance for stakeholders. The aim of this research was to find out through student perception, the mediating effect of school reputation and image on the relationship between quality of teaching staff and student satisfaction in Hong Kong's higher education sector.

Accordingly, the research investigated the respective influences of quality of teaching staff, school reputation and school image on student satisfaction; and examined possible mediating effects of school reputation and image on the relationship between the quality of teaching staff and student satisfaction.

Full-time students of higher education institutions and universities in Hong Kong were selected as the targeted participants in this research because, according to [1,2] they are the primary customers of higher education in today's competitive consumerist society.

1.1 Background of the Study

Quality assurance (QA) in higher education is receiving an increasing attention in many parts of the world as a result of the rapid expansion of this

sector and subsequent to recent education reforms, incurring thereby a need for the sector to respond to these changes as well as to the trend of globalization, in order to meet the expectations of communities as they develop into knowledge-based societies. It is almost a universal consensus that, in the concept of quality in the context of higher education is multifaceted, value laden and stakeholder-relative [3]. The nature of quality and its assurance has been taken up recently in the academic and professional literature, and new interpretations proposed [4,5] with various approaches to QA, such as total quality management [6,7], external quality monitoring (EQM) [8] and performance indicator [9,10] even practiced. A recent review of these approaches conducted by [1] has indicated that as one moves from the higher levels towards the lower levels, quality indicators that are of importance change and have a tendency to get softer, signifying that they are much more subjective than the quality indicators at the higher levels, such as students' attrition rates, and are more related to student experience, such as the quality of teaching and learning and student satisfaction with their various experiences.

1.2 The Higher Education in Hong Kong

Like many other jurisdictions, Hong Kong has been undergoing various education reforms, especially in the past five years, to respond to the trend of internationalization and globalization [11]. With the launch of the Qualifications Framework (QF) in 2008 by the Education Bureau in Hong Kong, the concern about the quality of different qualifications in the vocational and academic sectors is becoming even more explicit. Furthermore, the number of self-financing degree-awarding tertiary institutions in Hong Kong has increased to six, providing a total of over 13,000 places. With the rapid expansion of post-secondary education in Hong Kong, it has become necessary to address the question of quality of the academic provisions concerned [12]. The volume and diversity of the student body inevitably imposes different challenges on educational institutions.

Hong Kong's higher education institutions, particularly the publicly funded ones, are increasingly under public pressure to demonstrate and account for their educational quality unambiguously and distinctly. However,

the QA practices as currently adopted are more included towards an accountability-led view rather than an improvement-led view. Therefore, resources and efforts in many institutions have typically been committed more to the institutional aspects of the quality issues. Consequently, insufficient attention is paid to the student aspects, in particular students' experiences of various facets of their academic lives, which should be of paramount concern in the recent education reform of most countries, notably for the post-secondary sector in which a substantial expansion of student participation has been taking place. In the course of debates over various quality issues for higher education, a major focus of this research is the centrality of the student perception. This research is therefore conducted with the aim of finding out the mediating effects of school reputation and image on the relationship between quality of teaching staff and student satisfaction from the students' perspectives.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The following provides an overview of the literature concerning the higher education sector in Hong Kong and investigates the roles of and relationships among different marketing concepts, in particular the concepts of quality, reputation, image and satisfaction in higher education provisions.

2.1 The Higher Education Market in Hong Kong

The Chief Executive of the Hong Kong Special Administrative Region (HKSAR) pledged in his 2009-2010 Policy Address to invest in "education services....to enhance Hong Kong's status as a regional education hub" [13]. The objective was to strengthen the competitiveness of Hong Kong's education sector, enabling it to better capture the opportunities spawned by the enormous global demand for higher education [11].

To the existing institutions of higher learning, these initiatives hold both opportunities and challenges. Enrolment is expected to soar as lifelong learning and increased intake of non-local students allow the institutions to widen their net and at the same time to expand beyond their home market. However, the government's policy to encourage greater private sector involvement in higher education implies that the status quo will be destroyed and the existing

institutions will be put into direct competition with both new and established education providers from home and abroad [11].

Sitting on this cusp of tremendous change, it seems obvious that no institutions of higher learning can now extricate itself from participating in market competition. To operate as market competitors, higher education institutions have to do more than just produce glossy brochures and stage expensive advertising campaigns. They, like any marketers in a competitive market, are required to consider what their customers need and perceive as good [14]. Although a multitude of factors have been found to contribute to student satisfaction subject to the specific segments of the higher education market under study, quality of teaching staff, school image, and reputation are the three most prominent drivers [15,16].

2.2 Quality Assurance in the Higher Education in Hong Kong

From quality as a process emerges the concept of quality assurance (QA), which is a process-oriented system to ensure that the pre-defined standards of an organization are met and best practices or procedures are complied with [17,18,19]. It has become a trend in higher education provision across the world that QA initiatives be advocated and followed through to ensure quality of activities and continuous improvement [20]. In Hong Kong, QA is gaining prominence in the higher education sector due to, inter alia, the reform and rapid expansion of the education service in recent years, the urgent need to respond to the challenges of globalization, and the rising expectations of stakeholders [21,22].

The underlying principle for implementing QA in the education sector is to ensure that the main actors at the forefront of teaching and learning (school administration, teachers, students, parents and governing bodies) are committed to improving education performance and at the same time are given the means to see that the educational improvement objectives are implemented and fulfilled effectively [23,24].

2.3 Quality of Teaching Staff

Research reveals that students value good teaching and that teaching quality is directly related to students' perception of the quality of the high

order learning provided [25,26]. However, quality of teaching, like quality in general, is an elusive abstraction. Though different techniques and tools have been proposed to evaluate teaching quality, it remains challenging to identify all the traits of quality teaching, let alone assess the quality of an individual's teaching [25,26].

As [27] argued, to maintain or improve the quality of teaching, the teaching staff needs to develop and excel in these capabilities. [28] pointed out that there are four essential traits of good teaching: positive classroom climate, interest in learning, lesson organization, and clarity. The literature underlines the importance of knowledge, teaching skills, teacher sensitivity to student level and progress, clear teaching goals, fair assessment, and encouragement of independent thinking. And, in addition to pedagogical skills, good teachers need to have passion and demonstrate strong enthusiasm for their students, for the subject they teach and for teaching itself [29].

2.4 Student Satisfaction

One of the leading indicators of competitiveness in higher education provisions is the level of satisfaction of a student with regard to his/her experience from a particular institution [30]. Prior studies have given some slightly different definitions to the concept of student satisfaction. For example, [31] define student satisfaction as a "student's perceived value of his or her educational experiences at an educational institution". [32] define student satisfaction as "an evaluative summary of direct educational experience, based on the discrepancy between prior expectation and the performance perceived after passing through the educational cycle". [33] defined student satisfaction "as emotional or cognitive response or reaction to the learning experience". Although the definitions vary slightly from one to another, the common focus is on measuring a student's ex post evaluation of educational experiences. In this sense, these definitions can be regarded as rooted in the earlier definition of satisfaction developed by [34].

According to [35], student satisfaction is a perceived value. This perceived value is the outcome, the difference between expectation and perception, of the student's scrutiny of the value delivered by an educational institution. According to the expectancy disconfirmation theory [34,36], feelings

of satisfaction or dissatisfaction arise when one compares his or her expectations before a transaction with his or her perceptions after the transaction. In the context of higher education, if a student's perceptions exceed his or her expectations (a positive disconfirmation), student satisfaction may arise. On the contrary, if a student's perceptions fall short of meeting his or her expectations (a negative disconfirmation), student dissatisfaction may arise [34, 37].

2.4.1 Quality of teaching staff on student satisfaction

In marketing, service quality and satisfaction are two discrete but highly interrelated concepts [38]. While a plethora of research has highlighted the importance of product/service quality in driving customer satisfaction [14,34,39], some scholars argue that satisfaction is the antecedent of quality [40]. Nevertheless, empirical findings conclude service quality causes satisfaction [41]. Service marketing tenets indicate the difficulties in delivering consistent quality of service in order to satisfy customers [42,43,44,45]. The inconsistency due to its innate characteristics of inseparability, heterogeneity, intangibility, and perishability are applicable in relation to the quality of teaching at educational institutions. The inseparability of the delivery from consumption of the service is apparent in teaching as more than just the teaching material provided to the students; the style of delivery and explanation of the content is essential to a student's understanding. It is evident that teaching style differs from teacher to teacher, as does the style, the material provided, the knowledge delivered, and even body language differs. Total satisfaction can be a challenge to achieve as the acceptance of delivery style by one student can differ from another. However, in examining the teaching quality and student satisfaction linkage in a Canadian university, [46] used two separate sets of student samples (70 undergraduate students and 94 MBA students) to investigate the influence of a six teaching quality dimensions on student satisfaction in terms of course offerings and instructors. The results indicate that teaching quality strongly influences student satisfaction by showing that the quality dimensions explained 74% of student satisfaction with the course and 67% of student satisfaction with the instructors.

It is expected that a similar causality may exist in Hong Kong's higher education sector. Therefore, it is hypothesized that:

Hypothesis 1. The quality of teaching staff as perceived by students positively affects student satisfaction.

2.5 School Reputation in Higher Education

In the higher education environment, students may form a perception about their institution and the specific course offerings. Similar to reputation in the business setting, an institution's reputation hinges on deeds done in the past. If the institution "repeatedly succeeds in fulfilling its promises, it should have a favourable reputation, and inversely its expressed intentions may create a negative reputation" [47]. A positive and long-standing school reputation is also a strong indication of its high levels of quality and competence. [47] posited that "Institutional reputation may be viewed as a mirror of the organization's history that serves to communicate to its target groups the quality of its products or services in comparison with those of its competitors". This quality may be reflected in the school's capacity in meeting the expectations of the students, including their expectations for teaching staff of high professional caliber and for teachers who demonstrate characteristics of good pedagogical practice.

In addition, in the business sector, a good corporate reputation reduces customers' uncertainty in making buying decisions, boosts demand and helps a reputable firm to sell more to achieve its ultimate goal of profit maximization [48]. In higher education, a good school reputation also enhances the prestige of an institution and mitigates students' uncertainty in making enrollment decisions. However, contrary to workings in the business world, high levels of school reputation often lead to minimal sales. College aspirants will flood the most prestigious institutions with applications, but the majority of them will likely be disappointed since the supply of programmes is highly inelastic. In business transactions, customer satisfaction may turn into dissatisfaction and hurt the reputation of an institution if student demands cannot be adequately met for a long time [49]. Consequently, education institutions have to work hard to maintain their reputation and credibility. However, in the educational setting, the stricter the admission criteria and the

tougher the competition, the stronger will be students' desire to be admitted and the higher will be the school reputation [50].

2.5.1 Quality of teaching staff and school reputation

Though the link between quality of service and reputation of the service providers is well established in various sectors of the service industry [51,52,53], it is still unclear whether a similar positive association exists between quality of teaching staff and school reputation. In the higher education arena, there is a growing production of perceptual ratings or league table rankings of higher education institutions [54]. To gain a deeper understanding of the interplay between the constructs of teaching quality and reputation in higher education, the present research attempts to establish by empirical analysis whether there is a direct relationship between the two constructs in the higher education setting in Hong Kong. School reputation is measured by a 3-item scale developed by [47] to assess the perceived competence of an institution in delivering what it has promised, and the respondents' overall perception of school reputation and school competitiveness. It is therefore hypothesized that:

Hypothesis 2. The quality of teaching staff as perceived by students positively affects their perception of school reputation.

2.6 School Image in Higher Education

Image and reputation are two closely intertwined concepts. There has been much debate in the literature about the relationship between the two. [55] pointed out that there is disagreement among scholars on how the two concepts be defined and distinguished from one another. Some scholars, for example, [56] suggested that image should be subsumed within reputation, arguing that image is just one of the many components of reputation [55]. Despite the different arguments, there appears to be a general agreement among scholars participating in the debate that image is distinguished from reputation in that the former is influenced by the everyday encounters between an organization and an outsider. It is concerned with the outsider's impression of an organization and is likely to be influenced by things such as the name, logo, building, or even the uniform or dressing styles of the staff members of a particular organization [57]. Reputation, on the contrary, is forged

out of the more fundamental values of leadership, competitiveness, expertise, product and service philosophy, culture, and ethics which take a long time to cultivate and grow.

In the higher education setting, it is clear that school image is becoming increasingly important. To attract good students in the globalized higher education market and in order to maintain their profile and competitiveness, institutions across the world have taken a proactive attitude towards image building [58]. Despite this, school image remains an unclear concept and the definitional dispute is often resolved by drawing strength from the established conceptions and theories in business marketing [49]. Following this line of thinking, the present research defines school image as the ideal impression that a higher education institution would like others to see. The image of an institution is measured by a 3-item scale developed by [47] to assess the respondents' general perception, their estimation of the perception of their peers, and the perceived image of their own institution relative to other institutions.

2.6.1 Quality of teaching staff and school image

Prior studies on product or service marketing have confirmed the positive role that image plays on product/service advantage and competitiveness [59]. Moreover, the above-mentioned inherent characteristics of service present more challenges to build and sustain school image [42,43,44]. The intangibility, perishability, heterogeneity and inseparability of service make its image more vulnerable to variance in teaching quality, as image takes time to establish and consistency is one of image's most important requirements [43,60]. Research on corporate image has established that product/service quality is one of the key determinants of good image [61]. It is expected that a similar causality may also exist in the higher education sector as quality of teaching has a lot to do with building up a favourable impression in the minds of the students. Therefore, it is hypothesized that:

Hypothesis 3. The quality of teaching staff as perceived by students positively affects their perception of school image.

2.7 School Reputation and Student Satisfaction

Firm reputation, customer satisfaction and the link between these two constructs is a relatively well-researched domain in management studies [62,63]. There is an abundance of empirical research, primarily from the perspective of marketing, which demonstrates the casual link between the two concepts [64,65]. While prior studies on non-education service settings report a positive influence of customer satisfaction on firm reputation [65], some other studies demonstrate that the casual relationship is reserved [64,66,67]. The contrary findings have led some scholars to conclude that the two concepts are in fact interrelated and mutually interdependent [63,68].

The relationship between school reputation and student satisfaction in the higher education market is a relatively understudied area of research, as treating students as customers is, after all, relatively new and controversial [69]. Besides, the student-institution relationship is growing in complexity due to massification and globalization of higher education [49]. Nevertheless, as more college aspirants are given access to more choices of institutions nowadays, school reputation is becoming an increasingly important factor in their enrollment decisions. For those who have made it to the best schools, the satisfaction is beyond words. Therefore, it is hypothesized that:

Hypothesis 4. The reputation of a higher education institution as perceived by students positively affects student satisfaction.

2.8 School Image and Student Satisfaction

Some prior studies have found that brand image exerts a positive influence on customer satisfaction [39,70]. Other studies, however, claim that no such link exists. For example, in their study of the image and satisfaction link in the banking industry, [71] found that there is no direct influence of brand image on customer satisfaction. [72] conducted a three-year longitudinal study on various service sectors and confirmed the positive influence of image on customer satisfaction. They found that the influence of image on customer satisfaction increased over the three-year time span. In other words, the lack of influence of image on customer satisfaction as revealed by previous studies might simply be due to time lag or the existence of other factors mediating the relationship.

Although prior research has given moderate support to the influence of image on customer satisfaction in various service settings, this research proposes to extend the research scope to explore whether there is any positive influence of school image on student satisfaction. Therefore, it is hypothesized that:

Hypothesis 5. The image of a higher education institution as perceived by students positively affects student satisfaction.

2.9 Mediating Roles of School Reputation and Image

School reputation and image are presented as mediators, as it is postulated that the direct relationship between QTS and student satisfaction is intervened by these variables. Mediation is the effect of an independent variable on a dependent variable that goes through one or more third variables [73,74,75,76]. The effect of mediation was recognized as early as 1928 but in recent years various tests have been introduced to identify the exact nature of the mediation impact [73,75,76,77]. These interventions are recognized in the literature based on well-rooted theoretical and logical arguments. This research recognizes reputation and image as simple mediators that intervene the effect of QTS on SS separately [63,68,71,78].

Students' perception of school reputation is the first mediator proposed in the present research. As discussed above, quality of teaching staff is hypothesized to have a positive influence on student perception of school reputation as well as image, and student perception of school reputation and image positively influence student satisfaction. Therefore, it is hypothesized that:

Hypothesis 6. Student perception of the reputation of a higher education institution mediates the relationship between quality of teaching staff and student satisfaction.

Student perception of school image is the second mediator proposed in the present research. As discussed above, quality of teaching staff is hypothesized to have a positive influence on student perception of school reputation, and student perception of school image is also hypothesized to have a positive influence on student satisfaction. Therefore, it is hypothesized that:

Hypothesis 7. Student perception of the image of a higher education institution mediates the relationship between quality of teaching staff and student satisfaction.

2.10 Research Model

Seven hypotheses have been developed based on the literature on the marketing concepts of quality, satisfaction, reputation and image, and the corresponding concepts in the higher education market. Based upon the seven hypotheses developed, a research model (Fig. 1) was devised by adapting the following sets of constructs from prior studies.

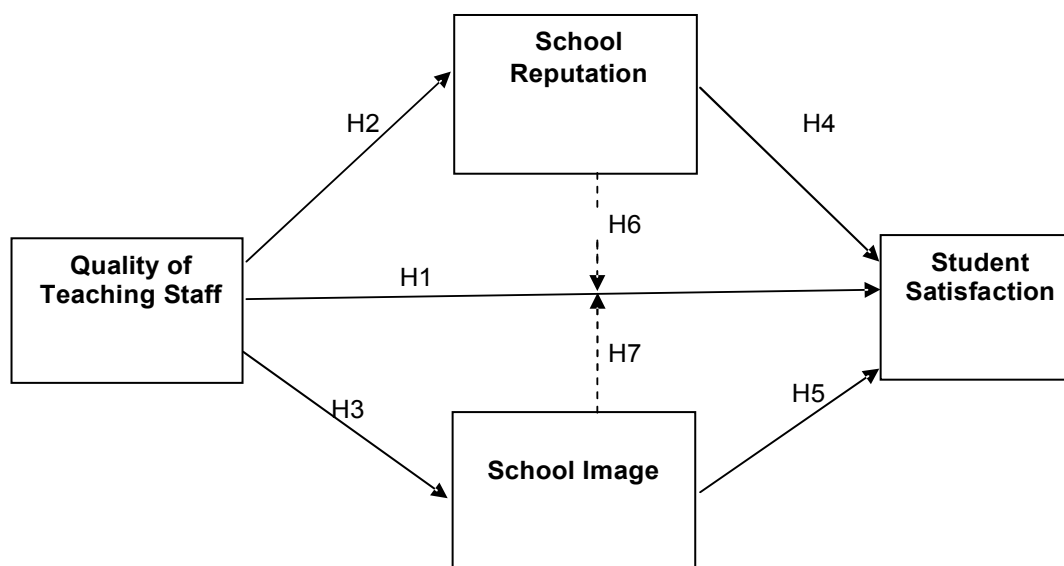


Fig. 1. Research model

The research framework shown above consists of four constructs, with one dependent variable named student satisfaction, two independent variables (which also act as two mediating variables) named school reputation and school image respectively and one independent variable named quality of teaching staff.

3. METHODOLOGY

3.1 Sample

Full-time students enrolling in diploma or degree programmes at various levels in all institutions offering post-secondary programmes in Hong Kong were selected as the target population. This population served the

purpose of the research, which was to explore the perception of full-time students of higher education on the mediating effects of school reputation and school image on the relationship between quality of teaching staff and student satisfaction. This research adopted a probability sampling technique in which samples were acquired by random selection so that each individual within the population has an equal opportunity to be selected. In this research, the researcher drew sample data of a database extracted from two major public domain directories of higher education institutions in Hong Kong: The University Grants Committee and the Education Bureau, in which consist of the point of contact at every post-secondary institutes in Hong Kong. A total of 2,000 copies of the questionnaire were sent to nine institutions of higher education in Hong Kong. By the end of the survey period, 1,170 responses had been received, representing a response rate of 58.5%. Of the 1,170 responses received, 32 were invalid due to missing data, giving a total of 1,138 valid responses.

3.2 Research Instruments

From the literature review, the following four constructs were identified for this research: Quality of Teaching Staff as the independent variable mediated by the constructs of School Reputation and School Image as mediating variables affecting the construct of Student Satisfaction as the dependent variable.

3.2.1 Quality of teaching staff

There is evidence that teaching quality of staff can be further enhanced through student feedback with additional consultation, interpretation guides on result and other relevant arrangement. This can also form part of the staff development for improvement [79,80,81]. The following measuring items are used according to [34,82,83]. The measuring items for Quality of Teaching Staff are shown in Table 1.

3.2.2 School reputation and school image

According to [84], institutional reputation is a sum total of a single stakeholder's perception of how well organizational responses are meeting the demands and expectations of many organizational stakeholders. The repu-

tation of an organization is built through its credible actions [85]. School reputation and school image were therefore intended to measure the reflection of quality and services by studying the following three constructs: (a) impression, (b) reputation, and (c) comparative advantage. The measuring items for School Reputation and School Image are shown in Table 2 and Table 3.

3.2.3 Student satisfaction

The measuring items for Student Satisfaction are adopted from Bennett and Rundle-Thiele, 2004; Oliver, 1980 and are listed in Table 4.

Table 1. Measuring items for quality of teaching staff (Adapted from [82])

ID	Questions (Constituent variables)
TS01	The teaching staff of my institution have appropriate academic credentials. (Academic Credentials)
TS02	The teaching staff of my institution are incorporating appropriate use of technology to teach. (Appropriate Use of Technology)
TS03	The teaching staff of my institution are effective communicators in the process of lecturing. (Aware of Learning Needs)
TS04	The teaching staff of my institution are aware of my learning needs and I can seek assistance from them. (Approachable and Friendly)
TS05	The teaching staff of my institution are approachable and display a friendly manner. (Approachable and Friendly)
TS06	The teaching staff of my institution treat students with respect. (Respect Students)
TS07	The teaching staff of my institution display positive attitudes to students and do their best to help. (Positive Attitude)
TS08	The teaching staff of my institution display empathy when I have difficulty in understanding a concept. (Display Empathy)

Table 2. Measuring Items for school reputation (Adapted from [47])

ID	Questions (Constituent variables)
SR1	In general, I believe that my institution always fulfils the promises it makes to its students. (Honouring Promise)
SR2	My institution has a good reputation. (Good Reputation)
SR3	I believe that the reputation of my institution is better than other institutions. (Better Reputation than Others)

Table 3. Measuring items for school image (Adapted from [47])

ID	Questions (Constituent variables)
SI1	I have always had a good impression of my institution. (Good Impression)
SI2	In my opinion, my institution has a good image in the minds of its students. (Good Image)
SI3	I believe that my institution has a better image than other institutions. (Better Image than Others)

Table 4. Measuring items for student satisfaction (Adapted from [34,83])

ID	Questions (Constituent variables)
SS1	I am satisfied with my decision to attend this institution. (Satisfied with Decision)
SS2	If I had a chance to do it all over again, I would still enrol in this institution. (Convicted in Decision Made)
SS3	My choice to enrol in this institution was a wise one. (Wise Choice)
SS4	I am happy with my decision to enrol in this institution. (Happy with Decision)
SS5	I did this right decision when I decided to enrol in this institution. (Right Decision)
SS6	I am happy that I enrolled in this institution. (Happy on the Course)

3.3 Data Analysis

The collected data were analyzed by the following quantitative methods.

3.3.1 Measurement assessment

The validity and reliability tests were used to evaluate the quality of the data that collected for assessment of the constructs for further analysis. Cronbach's coefficient alpha (α) was adopted to assess the internal consistency reliability in order to determine if the homogeneity of the items in the instrument are highly correlated and support the construct. Cronbach's coefficient alpha (α) has a maximum value of 1.0. Therefore, the higher the coefficient approaches 1.0, the more reliable are the measures. [86] suggested that the minimum requirement of Cronbach's coefficient alpha (α) is 0.6.

3.3.2 Factor analysis

Exploratory Factor Analysis (EFA) is used in this research as the factor analysis technique to explore the underlying structure of a collection of observed variables. Although the constructs of this research adapted from previous studies with satisfactory level of reliability, EFA is conducted in order to ensure the appropriateness of the measurement constructs for the collected data.

3.3.3 Hypotheses testing

In this research, linear and multiple regression analysis were conducted to test both direct and indirect influences of the independent variable of quality of teaching staff, and the two mediators: school reputation and school image, on the dependent variable of student satisfaction. Linear regression was used

to test the direct influence of quality of teaching staff, school reputation and school image on student satisfaction. Each of the eight quality of teaching staff dimensions was also tested independently using regression analysis to ascertain their respective influences on student satisfaction. A mediator influences the strength and direction of an independent variable on a dependent variable. The effects of the two mediators in this research, school reputation and school image, were tested with multiple regression analysis and a mediating effect was considered existent if the multiplicative term, school reputation times quality of teaching staff or quality of teaching staff times school image, was statistically significant [76].

4. FINDINGS

4.1 Characteristics of the Sample

Table 5 below shows the characteristics of respondents in respect of gender, marital status, age, and education level. Each of these characteristics are benchmarked and compared with the characteristics of Hong Kong's adult population.

Table 5. Demographic profile of valid respondents (n = 1138)

		Respondents	
		Frequency	Percentage (%)
Gender	Male	431	37.9%
	Female	707	62.1%
Age	18 – 21	854	75.0%
	22 – 25	269	23.6%
	26 – 29	15	1.3%
Level of Study	Associate Degree	448	39.4%
	Higher Diploma	409	35.9%
	Undergraduate	262	23.0%
	Others	19	1.7%
Years of Study	1 year or less	377	33.1%
	2 years	394	34.6%
	3 years	280	24.6%
	4 years or above	87	7.6%

4.2 Validity and Reliability Test

Factor analysis and Cronbach's alpha are generally recognized as the most popular validity and reliability approaches to test the quality of the collected data [87,88]. In this research, exploratory factor analysis was used to extract the underlying variables [88,89] and Cronbach's alpha test was

conducted to verify the internal consistency of the questionnaire items loaded into each underlying variable extracted [89,90]. In line with [89], questionnaire items of an underlying variable with a Cronbach's alpha value of 0.7 or higher suggest high reliability, while those with a Cronbach's alpha value not less than 0.6 are acceptable for statistical testing.

4.2.1 Exploratory factor analysis

As all the measuring scales for each of the hypothesized variables in this research were adapted from prior studies published in peer reviewed journals, it was considered reasonable to assume that the validity of the measuring scales were established by the researchers concerned and the reviewers prior to publication. However, given that the wording was fine-tuned to suit the special needs of this study, in order to ensure that the touch-up would not affect the quality of the measuring scales; exploratory factor analysis was performed to confirm the validity of the questionnaire [89,91].

Table 6 below shows KMO and that Bartlett's test outcome to ensure the data collected meets the assumptions for EFA. The KMO measure of sampling adequacy is 0.955 which is roughly the same of the minimum acceptable level of 0.96 [88,89], indicating excellent sampling adequacy. Meanwhile, Chi-square value of 15751.725, $df=190$ and $p\text{-value} = 0.0001$ ($p<0.05$), shows identity matrix does not exist in the data collected for this research. Finally, the number of items used in total is $k = 20$ and the sample size $n=1,138$, thus $n/k = 1,138/20=57$; which is greater than 5.

Table 6. KMO and Bartlett's test

Kaiser-Meyer-Olkin measure of sampling adequacy		.955
Bartlett's Test of Sphericity	Approx. Chi-Square	15751.725
	Df	190
	Sig.	.000

Table 7 shows a pattern matrix that shows all the items are in their corresponding components. Thus, all items used to measure the constructs for this research were validated as satisfying the convergent and discriminant validity.

Table 7. Exploratory factor analysis on the constructs (n = 1138)

Questionnaire Items	Component			
	1 (SS)	2 (QTS)	3(SI)	4(SR)
Student Satisfaction				
SS1	0.924			
SS2	0.883			
SS3	0.882			
SS4	0.879			
SS5	0.843			
SS6	.731			
Quality of Teaching Staff				
TS1		0.826		
TS2		0.818		
TS3		0.810		
TS4		0.799		
TS5		0.795		
TS6		0.704		
TS7		0.685		
TS8		0.675		
School Image				
SI1			0.859	
SI2			0.853	
SI3			0.687	
School Reputation				
SR1				0.863
SR2				0.769
SR3				0.684

Table 8 below shows a total of 71.08% of variance in responses to the items posted in the questionnaire. Amongst this, 47.32% of variance was explained by component 1 or student satisfaction, 13.34% explained by component 2 or quality of teaching staff, 6.70% explained by component 3 or school image, and 3.72% explained by school reputation. The balance of 28.92% of information that measures the constructs was lost during the data collection effort.

Table 8. Total variance explained by QTS, SS, SR and SI

Component	Initial Eigenvalues			Extraction sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
SS	9.465	47.323	47.323	9.465	47.323	47.323
QTS	2.667	13.336	60.660	2.667	13.336	60.660
SI	1.341	6.704	67.364	1.341	6.704	67.364
SR	.743	3.716	71.080	.743	3.716	71.080

4.2.2 Cronbach's alpha for reliability testing

Cronbach's alpha tests were conducted to measure the level of internal consistency among the items in each of the four variables of QTS, SS, SI and SR [89]. Table 9 below shows the Cronbach's alpha value for these constructs

with range from 0.860 to 0.940, indicating that the measuring scales are reliable and the data have good internal consistency for further analysis [89].

The measurement scales in the questionnaire were reliable and the data collected from the nine institutions of higher education had sufficient reliability and validity for hypothesis testing and further investigation. Prior to hypotheses testing, the scores of the four underlying variables of QTS, SS, SR and SI, were summated [88,89].

Table 9. Cronbach's alpha values of variables

Variable	Cronbach's alpha	Number of items
QTS	0.906	8
SS	0.940	6
SR	0.804	3
SI	0.860	3

4.3 Hypothesis testing

The seven hypotheses developed were tested using simple and multiple regression analysis.

4.3.1 Direct relationships

As hypotheses H1 to H5 are based on simple linear regression (SLR) analysis and are essential in determining the eligibility of mediating constructs, these were tested as follows.

H1: The quality of teaching staff as perceived by students positively affects student satisfaction.

Table 10. Coefficient table for the relationship SS – QTS

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	β	Std. error	Beta		
(Constant)	8.713	.962		9.057	.000
QTS	.486	.023	.524	20.751	.000

a. Dependent Variable: SS

Table 10 above shows $t=20.75$, $p\text{-value}=0.0001$ ($p\text{-value}<0.05$), indicating the significant influence of QTS on SS. The $\beta=0.49$, a positive value, specifying the direction of QTS and SS are the same. Thus, H1 is supported.

H2: The quality of teaching staff as perceived by students positively affects their perception of school reputation.

Table 11. Coefficient table for the relationship SR – QTS

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	β	Std. error	Beta		
(Constant)	5.022	.500		10.053	.000
QTS	.205	.012	.447	16.854	.000

a. Dependent variable: SR

Table 11 above shows $t=16.85$, $p\text{-value}=0.0001$ ($p\text{-value}<0.05$), indicating the significant influence of QTS on SR. The $\beta=0.205$, a positive value, specifying the direction of QTS and SR are the same. Thus, H2 is supported.

H3: The quality of teaching staff as perceived by students positively affects their perception of school image.

Table 12. Coefficient table for the relationship SI – QTS

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	β	Std. error	Beta		
(Constant)	5.517	.516		10.702	.000
QTS	.197	.013	.421	15.663	.000

a. Dependent variable: SI

Table 12 above shows $t=15.66$, $p\text{-value}=0.0001$ ($p\text{-value}<0.05$), indicating the significant influence of QTS on SI. The $\beta=0.197$, a positive value, specifying the direction of QTS and SI are the same. Thus, H3 is supported.

H4: The reputation of a higher education institution as perceived by students positively affects student satisfaction.

Table 13. Coefficient table for the relationship SS - SR

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	β	Std. error	Beta		
(Constant)	11.398	.637		17.886	.000
SR	1.276	.047	.631	27.401	.000

a. Dependent variable: SS

Table 13 above shows $t=27.40$, $p\text{-value}=0.0001$ ($p\text{-value}<0.05$), thus SR is a significant construct influencing SS, The $\beta=1.276$, a positive value, specifying the direction of SR and SS are the same. Thus, H4 is supported.

H5: The image of a higher education institution as perceived by students positively affects student satisfaction.

Table 14. Coefficient table for the relationship SS - SI

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.
	β	Std. error	Beta		
(Constant)	10.930	.619		17.656	.000
SI	1.296	.045	.652	28.993	.000

a. Dependent Variable: SS

Table 14 above shows $t=28.99$, $p\text{-value}=0.0001$ ($p\text{-value}<0.05$), thus SI is a significant construct influencing SS, The $\beta=1.296$, a positive value, specifying the direction of SS and SI are the same. Thus, H5 is supported.

4.3.2 Mediating effects

Multiple linear regression was used to test the mediating effect of school reputation (SR) on the relationship between QTS on SS met, Hypothesis 6 was tested using the following equations.

H6: Students' perception of the reputation of a higher education institution mediates the relationship between quality of teaching staff and student satisfaction.

Table 17 shows $t=20.751$, $p\text{-value}=0.0001$ ($p\text{-value}<0.05$), thus QTS is a significant construct influencing SS; and Table 15 confirms the model fit as $F=430.59$, $df=1, 1136$, $p\text{-value}=0.0001$ ($p\text{-value} < 0.05$).

In Table 16 indicates, $F=505.712$, $df=2, 1135$, $p\text{-value}=0.0001$ ($p\text{-value}<0.05$) whilst Table 18 shows that QTS: $t = 12.54$, $p\text{-value} = 0.0001$ ($p\text{-value}<0.05$), thus, QTS positively and significantly influences SS. SR: $t=20.53$, $p\text{-value}=0.0001$ ($p\text{-value}<0.05$), thus SR positively and significantly influences SS.

In testing H6, the following equations were compared:

$$SS = 8.71 + 0.49 (QTS) + e_1.$$

$$SS = 3.68 + 0.28 (QTS) + 1.00 (SR) + e_2.$$

By using Baron and Kenny's interpretation for testing mediating effects, as in Table 18, $\beta=1.00$ or SR is a significant variable, hence it is a mediator. In addition, $\beta=0.28$ (Table 18) is smaller than $\beta=0.486$ (Table 17), indicating the reduced effect of the independent construct (QTS). As Table 17 shows $\beta=0.28$, so QTS is significant, the mediating effect of SR is deemed to be partial. Thus, H6 is partially supported.

H7: Students' perception of the image of a higher education institution mediates the relationship between quality of teaching staff and student satisfaction.

Table 19 indicates that $F=569.62$, $df=2$, 1135 , $p\text{-value}=0.0001$ ($p\text{-value}<0.05$) whilst Table 20 shows that QTS: $t=13.12$, $p\text{-value}=0.0001$ ($p\text{-value}<0.05$), thus, QTS positively and significantly influences SS in this relationship. Table 20 also shows that SI: $t=22.675$, $p\text{-value}=0.0001$ ($p\text{-value}<0.05$), thus SI positively and significantly influences SS in this relationship.

In testing H7, the following equations were compared:

$$SS = 8.71 + 0.49 (QTS) + e_3.$$

$$SS = 2.96 + 0.28 (QTS) + 1.04 (SR) + e_4.$$

By using Baron and Kenny's interpretation, Table 20 shows that $\beta=1.042$ or SI is a significant variable, hence it is a mediator. In addition, $\beta=0.28$ (Table 20) which is smaller than $\beta=0.486$ (Table 17), indicating the reduced effect of the independent construct (QTS). As Table 20 shows $\beta=0.28$, so QTS is significant, the mediating effect of SI is deemed as partial mediator. Thus, H7 is partially supported.

Table 15. Model fit for relationship of SS – QTS

Model	Sum of squares	Df	Mean square	F	Sig.
Regression	12434.838	1	12434.838	430.588	.000 ^b
Residual	32806.242	1136	28.879		
Total	45241.080	1137			

a. Dependent variable: SS, b. Predictors: (Constant), QTS

Table 16. Model fit for relationship of SS – SR – QTS

Model	Sum of squares	Df	Mean square	F	Sig.
Regression	21318.212	2	10659.106	505.712	.000
Residual	23922.867	1135	21.077		
Total	45241.080	1137			

a. Dependent variable: SS, b. Predictors: (Constant), SR, QTS

Table 17. Coefficient table for the relationship SS – QTS

	Unstandardized coefficients		Standardized coefficients	T	Sig.
	β	Std. error	Beta		
(Constant)	8.713	.962		9.057	.000
QTS Model	.486	.023	.524	20.751	.000

a. Dependent variable: SS

Table 18. Coefficient table for the relationship SS – SR – QTS

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.	Collinearity statistics	
	β	Std. error	Beta			Tolerance	VIF
(Constant)	3.680	.858		4.291	.000		
QTS	.280	.022	.303	12.542	.000	.800	1.250
SR	1.002	.049	.495	20.530	.000	.800	1.250

a. Dependent variable: SS

Table 19. Model fit for relationship of SS – SI – QTS

Model	Sum of squares	Df	Mean square	F	Sig.
Regression	22662.682	2	11331.341	569.618	.000
Residual	22578.398	1135	19.893		
Total	45241.080	1137			

a. Dependent variable: SS, b. Predictors: (Constant), SI, QTS

Table 20. Coefficient table for the relationship SS – SI - QTS

Model	Unstandardized coefficients		Standardized coefficients	T	Sig.	Collinearity statistics	
	β	Std. error	Beta			Tolerance	VIF
(Constant)	2.964	.838		3.538	.000		
QTS	.281	.021	.303	13.117	.000	.822	1.216
SI	1.042	.046	.524	22.675	.000	.822	1.216

a. Dependent variable: SS

5. DISCUSSION

This research has theoretical importance as it contributes to various features of quality with a research model that describes and predicts the effects of quality of teaching staff, school reputation and school image on student satisfaction. While preceding readings of quality have mainly emphasized on the direct influences of different magnitudes of quality of teaching staff on student satisfaction, this research investigated the complicated relationship among constructs. One of the major results is the different degrees of influence that the quality of teaching staff has on student satisfaction and the interface of these two with the hypothesized mediators. School reputation was found to have a mediating effect on the positive side of quality of staff but the effect was only partially significant. This suggests that institutions with a good reputation may not be solely due to the quality of teaching staff. However, institutions with a poor reputation can be expected to be due to the quality of its teaching staff.

This research also confirms that the quality of teaching staff influences student satisfaction. The impact of quality on some general business settings has been widely analyzed in the literature, but no particular research work has been put on how it can be applied in a pragmatic educational setting. This finding has practical significance for policy setters and administrators of higher education in Hong Kong, because for the last thirty years the higher education in Hong Kong has been dominated by government-funded universities

leaving self-funded post-secondary institutions to struggle for their market share of quality students. One way is for self-funded post-secondary institutions to improve the quality of teaching staff so as to attract more students to enrol in the school. Institutions should take heed that the path to successful education is to go back to the basics of good teaching, using this aspect to build better reputation and image.

The findings of this research confirmed the positive effects of school reputation and school image on student satisfaction. It is also a norm that the majority of secondary school graduates in Hong Kong choose universities or post-secondary institutions based on their brand name and reputation. Self-funded institutions that are less reputable try to attract potential candidates by emphasizing the quality of their teaching and attempt to satisfy students by other means. With this information, higher education administrators may wish to build up the reputation and image of their institution by analyzing potential students' needs and match those needs with programme development and resource capabilities.

Educators need to concern over the quality of the programme, quality of teaching staff, and learning resources caused by the over-enrolment were expressed by stakeholders, including students, staff and alumni in late 2012, which resulted in a University inquiry into the operation of the College and the Institute [92]. Since the incident had attracted public attention and received wide media coverage, the University's reputation and image were seriously affected. The Inquiry Panel made twenty-nine recommendations, eleven of which were related to students' perception of their teaching, learning and resources, seven to the University's governance and image, five to student admission and further studies, and five to the quality of teaching staff. According to the Inquiry Panel, the majority of the teaching staff was part-timers with insufficient experience or administrative support and with a heavy workload. This could have been avoided if management had taken timely action in staff recruitment and had provided adequate administrative support.

The Lingnan incident also lends support to the findings of this research that the quality of teaching staff significantly affects student satisfaction, and that in turn student satisfaction has a highly significant effect on school reputation and school image. Just as [85] opined, while a positive reputation

leads to perceived credibility a tarnished reputation suggests a lack of credibility. As a consequence of the incident, Lingnan University had to change its senior management, including the Dean of the College, in order to re-establish its brand name and regain credibility in the eyes of the public.

The measurement scales for this research met the reliability and validity tests and were borrowed and modified to empirically substantiate the influence of school reputation and school image on quality of teaching staff and student satisfaction by using linear regression techniques. The constructs were based on deeply rooted theory and Cronbach's alpha tests on all constructs met the minimum level of 0.7 as recommended by [89] for highly reliable academic research. Furthermore KMO analysis showed that the samples were more than adequate for this study. Validity tests were based on factor loadings of 0.6167 to 0.791 for most constructs, except for student satisfaction that loaded at 0.700 to 0.828. The latter could be due to the large variances amongst the six questionnaire items on student satisfaction and the fact that it was the only dependent variable of the research.

There are situations in Hong Kong that some universities have to accept less capable students when there are many universities offering undergraduate places to high-school leavers. It will be a challenge to maintain the quality of student intake and some schools need to deploy extra resources to help less capable students reach an acceptable post-secondary education standard. These findings should prompt educators in management roles to give thoughtful considerations to ways in which they can enable students to achieve satisfaction in their post-secondary studies, as the quality of graduating students may be another way of gaining a good reputation and image for post-secondary institutions.

6. LIMITATIONS AND FUTURE RESEARCH

The first limitation of this research is the quantitative research methodology and tools used to examine the relationships among the study's four constructs: school reputation, school image, quality of teaching staff, and student satisfaction. It is highly likely some other constructs may exist that influence or mediate the hypothesized relationships. The relationship of influences displayed by different variables may shed further light on the mediating effects.

The second limitation of the research is that its findings may not be generalizable. Although data were collected from 1,170 respondents, a number that undoubtedly enhanced the quality of the study, the findings were substantially based on the perceptions of students studying sub-degree programmes in Hong Kong. The sub-degree sample may affect the applicability of the findings to other senior year students in undergraduate studies. Future studies could be conducted to determine how generalizable the findings of this research are to students studying other post-secondary programmes in Hong Kong or in other educational jurisdictions.

The third limitation of the research is associated to the finding that the two mediators, school reputation and school image partially influence the relationship between quality of teaching staff and student satisfaction. This finding suggests that the correlations concerned might be more complex than originally hypothesized. It is therefore suggested that a qualitative case study could be used as a primary tool to see how the different issues relate in a dynamic situation.

Based on the findings of this research, a number of recommendations are made for further related research. Firstly, as this research was applied to full-time higher education students in general, it may be useful for future research to concentrate on students of a specific discipline or on part-time students since the majority of post-secondary full time programmes are also offered in a part-time mode. In addition, the research findings revealed that a positive relationship exists between the quality of teaching staff and student satisfaction and confirmed the mediating effect of school reputation and school image. And, since results of the exploratory factor analysis found that school reputation and school image form an underlying 'school branding' superordinate variable, more research is needed to fully explore this new variable and its relationship to the independent and dependent variables.

7. CONCLUSION

In order to attract high quality students in the globalized higher education market and remain competitive, educational institutions across the world are taking a proactive attitude towards image building [58]. This research supports the findings of a longitudinal study by [72] confirming the positive

influence of image on customer satisfaction, which increased over the three-year time span of their research. It arrived at a similar finding of image with respect to student satisfaction but over a much shorter duration. This research also provides empirical evidence to show educators and administrators of higher education how important it is to enhance reputation and image through student satisfaction with teaching and learning. Under such circumstances, it is extremely important to cultivate an image-culture based on quality of teaching and not totally on branding parallel with organizational vision and structure, technical infrastructure, collaborative environment, and appropriate training [93]. This research provides help with building an image by having studied the constructs of impression, reputation, and comparative advantage, and confirming the causal relationship between satisfaction and reputation and that the two concepts are interrelated and mutually interdependent. This research also confirmed that satisfaction is the antecedent of quality [40] and that a long-standing and positive school reputation is also a strong indicator of its high levels of quality and competence [47].

The findings provide help with building an image by having studied the constructs of impression, reputation, and comparative advantage, and confirming the causal relationship between satisfaction and reputation and that the two concepts are interrelated and mutually interdependent. However, since this research was carried out exclusively in Hong Kong, further research is required in other jurisdictions to verify the adaptability of the findings.

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Elementary Teachers Educational Beliefs and Their Instructional Approaches: In Search of a Meaningful Relationship

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1. INTRODUCTION

The general quality of science instruction in schools has suffered almost constant criticism from as far back as the early 20th century. At that time, John Dewey proclaimed his displeasure at the way science as a school subject was being portrayed as simply a body of knowledge rather than a process of inquiry [1]. Dewey's assertion actually highlights the dichotomy which formed the basis of arguments concerning appropriate strategies of science instruction up to the present day. This dichotomy stems from whether science should be regarded as the body of knowledge that has accumulated over the centuries, or as the process of scientific inquiry that resulted in that body of knowledge, or indeed as a combination of both.

Researchers are in general agreement that science has, up to the present day, been taught in schools as predominantly a body of knowledge [2,3,4,5,6]. That this continues in the modern era could be regarded as surprising considering the focus of teacher education science curricula as well as the science curricula of both elementary and secondary schools on the teaching of science as a process of inquiry. This is inquiry-based instruction (IBI) and has been articulated as the recommended approach for science instruction by reputable researchers and organizations for over half a century.

It is important to now consider the possible reasons why teachers, despite receiving training in the use of IBI during their period of teacher education, would generally fall back on the use of the traditional, content focused instructional strategies. One area of research over the last 30 years is in teachers thought processes and its influence on their day to day instructional decisions.

Since the 1980s, there have been several studies investigating the role of individuals' beliefs in their actions and decision making. Pajares [7] did a synthesis of such studies and indicated that they were generally based on the assumption that beliefs are the best indicators of the decisions individuals make throughout their lives (e.g. Bandura, 1986; Dewey, 1933; Nisbett and Ross, 1980; Rokeach, 1968). Pajares therefore concluded that research into teachers' beliefs is important since it may inform educational practice in ways that had previously not been accomplished by the educational research of the time.

Irez [8] also noted Dewey's interpretation of the crucial importance of beliefs in that it:

“covers all matters of which we have no sure knowledge and yet, which we are sufficiently confident of to act upon” (p. 17).

Sigel (1985) provided a definition which took into consideration the importance of individual's experiences in the development of beliefs. According to Pajares [7], he defined beliefs as “Mental constructions of experience, often condensed and integrated into schemata or concepts are held to be true and that guide behavior” (p. 313). This definition also highlights the view that beliefs do not necessarily require a condition of truth. Irez [8] synthesized the definitions of a number of researchers (e.g. Clark and Peterson, 1986; Nespor, 1987; Pajares, 1992; Richardson, 1996) and provided the general definition that:

“Beliefs are psychological constructs that (a) includes understandings, assumptions, images or propositions considered to be true, (b) drive a person's actions and support decisions and judgments, (c) have highly variable and uncertain linkages to personal, episodic and emotional experiences, (d) although undeniably related to knowledge, differs from knowledge in that beliefs do not require a condition of truth” (p. 17).

The assumption can therefore be made that, teachers' instructional decisions in their science lessons may be a function of a number of factors, one of which is the educational beliefs that they hold. The question that now arises is how do teachers' beliefs that affect their instructional practice originate? Even more importantly, what is the nature of the beliefs which would cause trained teachers to move away from the teaching approaches and strategies learnt and practiced at teachers' college and instead use strategies deemed inappropriate by the education literature? To answer these questions one needs to understand the nature of the

recommended inquiry-based approaches compared to the traditional content-focused approaches. In addition, what is the possibility that particular educational beliefs may favour one approach or the other?

1.1 Instructional Approaches to Science Instruction

In the context of the classroom, an approach to instruction can be considered to be the way in which a teacher conceptualizes instruction and how it should be conducted to best facilitate student learning. This is related to teachers pedagogical content knowledge (PCK) which was described by Shulman [9] as teachers representation of how their content knowledge and general pedagogical knowledge of a subject discipline interact to produce understandings of how particular topics and issues could be organized and represented in instruction to cater for the diverse needs and interests of learners. This combines with teachers knowledge of context to form what Grossman [10] refers to as the four general areas of teachers knowledge. However, he also claimed that PCK probably had the greatest impact on teachers instructional practices.

Magnusson, Kracjik and Borko [11] linked teachers PCK to their instructional approaches in science when they identified various orientations to science teaching as components of PCK. They, in effect, defined these orientations as the general way in which teachers viewed science teaching within particular grade levels. Nine orientations to science teaching were proposed which were later categorized by Friedrichson [12] into two groups:

- a. Teacher centered orientations: Didactic and academic rigor.
- b. Orientations based on the reform initiatives and curriculum projects of the 1960s and continuing: Process, activity driven, discovery, conceptual change, project-based science, inquiry and guided inquiry.

The first category is taken to represent the traditional approaches to science instruction, while the second represents IBI approaches.

Anderson and Smith described teachers orientations as the combination between teachers thought processes and their actions [13]. These thought processes include the knowledge structures identified by Grossman (1990) and also teachers educational beliefs related to that knowledge. The actions represent the instructional strategies used by a teacher related to these thought processes. The determination of a teacher s approach to instruction can therefore best be

determined by using a 'conceptual yardstick that would allow some kind of measurement to be made along a continuum of 'teaching practice identified earlier as ranging from teacher-centered traditional approaches to student-centered inquiry-based approaches, with the latter being identified as the preferred approach for effective science instruction.

1.2 Traditional, Content Focused Instructional Approaches

Chiapetta and Koballa characterized much of the science teaching that presently occurs at all levels of the education system as teaching the 'products of science [4]. This assertion is targeted at the widely held view that generally the teaching of the science is focused on the content found in textbooks and other curriculum documents with comparatively less attention placed on the methods of scientific inquiry used to generate that knowledge.

The teaching of science as a 'body of knowledge has arguably remained the primary approach to science instruction at all levels of the education system up to the present day. Hence the references to this approach as 'traditional. It is a teacher-centered approach where the teacher is, as described by Ibrahim, primarily focused on content coverage and sees the students as knowledge reservoirs [5]. Damjanovic also described the students as regarding their teachers as expert knowledge sources and responsible for their learning [14]. The OECD [14] goes further and describes this approach as direct transmission, with the teachers role being to:

"communicate knowledge in a clear and structured way, to explain correct solutions, to give students clear resolvable problems, and to ensure calm and concentration in the classroom" (p. 92).

Referring to the orientations to science teaching, traditional science instruction is represented by the didactic and academic rigor orientations. Magnusson et al. [11] described the teacher with a didactic orientation as one whose goal is to "transmit the facts of science" (p. 100). The goal of one with an academic rigor orientation is to "represent a particular body of knowledge (p. 100). For science instruction this would include rigid verification exercises like laboratory work and demonstrations.

Recent developments in the U.S. give compelling evidence of the resilience of these traditional approaches to science instruction. In 2011, the

National Research Council (NRC) published their 'Framework for k-12 Science Education' which gives clear indication of teachers' reluctance to move away from traditional approaches. For example, there is the claim that k-12 science instruction still focuses on breadth rather than depth of content and students generally are not made to experience how science is actually done [16].

That research evidence suggests that this approach is still the most popular one used by teachers is an indication that, for a number of reasons, teachers are making the decision to stick with it despite their assumed knowledge of the preferred inquiry based approaches. The research literature actually provides some of these reasons, a few of which appear quite compelling. For example, there is the argument that teachers' 'experiences during their many years as students' results in attitudes and beliefs about teaching and learning that far outweigh their teacher education experiences [6,7,15,17,18]. With regards to science instruction, these attitudes and beliefs may cause teachers to generally be more comfortable using the instructional strategies they were used to as students.

Another argument is related to the emphasis of many schools on student success at examinations. Duffy and Raymer linked this to a general tendency of teachers to use traditional instructional strategies which are more aligned to content coverage [19]. They also linked this to students' superficial learning of content since they tended to be more focused on identifying what will be on a test than developing a deep understanding of the subject matter.

Jones and Carter also raised the argument that some teachers may actually believe that traditional approaches are most effective for science teaching [6]. Reasons given for this included teachers actually experiencing success as students being taught science by a 'favourite teacher using traditional approaches, teachers themselves continually being appraised as effective teachers using traditional approaches, and, as expounded by Jones and Carter, teachers who either, lack content knowledge or student-centered pedagogical skills, and are therefore more comfortable using traditional didactic approaches [6].

Despite these possible reasons for the predominance of traditional approaches to science instruction, most modern researchers are of the view that, as indicated by Levitt, passive instruction is an ineffective tool for learning science concepts [11], and, according to Chiappetta and Koballa, encourages poor learning strategies such as memorization of poorly understood facts [4].

1.3 Inquiry Based Instruction

In the early 20th century, Dewey criticized the content-focused science instruction of the time, arguing instead for IBI where the focus was on the development of the thinking and reasoning skills as well as the methodological skills of scientific inquiry [1]. These views actually formed the basis for the curriculum initiatives that started in the U.S. in the 1960s and spread to countries worldwide. This curriculum reform movement focused on primary and secondary school curricula and emphasized student centered instruction, development of scientific attitudes and process skills, the use of practical experience for students, and a focus on breadth rather than depth of content [21]. The process, activity, and discovery orientations to science teaching outlined by Magnusson et al. stemmed from these curriculum initiatives [11]. They described the goal of teachers with a process orientation as helping students develop process skills. Those with an activity orientation have the goal to involve students in hands-on activities, while those with a discovery orientation have the goal of providing opportunities for students to discover science concepts through their own activities.

These curriculum reform initiatives, however, did not have the expected improvement in science instruction in the U.S. This was revealed by a series of publications in the 1980s including Project Synthesis supported by the National Science Foundation, and 'A nation at risk' by the National Council on Excellence in Education. These reports resulted in renewed emphasis on curriculum reform but, according to Bybee, Powell and Trowbridge [1], it was through a series of benchmarks and standards for IBI published by the American Association for the Advancement of Science [22] and the National Research Council [23]. These benchmarks and standards were adopted by curriculum developers internationally, and formed the basis for their curriculum development initiatives.

Although many definitions of IBI were since put forward by researchers and organizations, the one originally put forward by the NRG [23] encompasses most of them:

“a multifaceted activity that involves making observations, posing questions, examining books and other sources of information, planning investigations, reviewing what is already known in light of experimental evidence, using tools to gather, analyze and interpret data, proposing the results, use of critical and logical thinking, and consideration of alternative explanations” (p. 23).

This definition illustrates the project-based science as well as inquiry orientations to science teaching put forward by Magnusson et al [11]. They indicated that the goal of the teacher with a project-based science orientation is to “involve students in the investigation of authentic problems (centered on) driving questions (p. 100). The goal of a teacher with an inquiry orientation is to represent science as inquiry using investigation-centered instruction.

The NRG definition also highlights particular differences between IBI and traditional instruction that may actually influence teachers decisions as to their day to day instructional strategies. For example, the activity oriented nature of IBI may not appeal to teachers who are primarily focused on content coverage. Teachers may also question whether they can actually access all the required resources for IBI. Also of importance is whether teachers consider that they are confident enough, or possess the necessary science content knowledge to have the level of classroom discourse that would stimulate the critical and logical thinking required by IBI.

Justice, Rice, Roy, Hudspith and Jenkins outlined Dewey's ideas of IBI as a belief that students need to develop critical thinking skills rather than memorization skills [24]. They therefore defined IBI as:

“instructional practices designed to promote the development of higher order intellectual and academic skills through student-driven and instructor-guided investigations of student generated questions” (p. 843).

This definition focuses attention on inquiry as an intellectual process. It brings out the important point that student experiments and other manipulative activities cannot on their own be considered to be following an inquiry process. There must be some critical examination and production of ideas, problems, experimental results, conclusions etc. Another key element of this definition is the student-driven, instructor-guided investigations of student-generated questions. This illustrates a most basic aspect of inquiry: the curiosity of human beings. Teachers are expected to stimulate student curiosity relevant to the topics being covered, which will lead to student investigations of their own questions. The instructor acting as a guide through this process illustrates the guided inquiry orientation to science teaching, the goal of which is to form a “community of learners whose members share responsibility for understanding the physical world” [11].

Also of relevance to IBI is the conceptual change model of learning which stemmed directly from constructivist ideology and is based on the view that by the

time learners encounter the formalized science instruction in the classroom, they have already constructed a multitude of pre-conceptions about the natural world. These pre-conceptions have been given names such as misconceptions, alternative conceptions, and native theories since they often do not correspond well with the scientific knowledge that is taught [4]. Wandersee, Mintzes and Novak described these conceptions as tenacious and resistant to change by conventional teaching strategies [25]. So in the science classroom, teaching strategies must, in effect, facilitate a process of conceptual change in students.

Magnusson et al [11] described the conceptual change orientation to science instruction where the teachers goal is to “facilitate the development of scientific knowledge by confronting students with contexts that challenge their native conceptions (p. 100). Liang and Gabel [26] identified a number of conceptual change teaching approaches that have been developed and have been shown to promote students conceptual understanding of science as well as improving their attitudes towards science teaching and learning (e.g. Driver, 1988; Gabel, 1998; Hand and Treagust, 1991; Heuson and Heuson, 1983; Stofflette and Stoddert, 1994). Chiappetta and Koballa [4] gave a general description of these approaches indicating that students prior knowledge is elicited and they are made to reflect on and confront their pre-conceptions of phenomena. Opportunities are also provided for students to find personal meaning with the new concepts from their interactions with objects, events and people.

Elementary teachers have themselves been on the receiving end of these instructional approaches due to their experiences as students. In addition, it is in the years of teacher education that they are formally exposed to the science instructional strategies that fall under the umbrella of either traditional approaches or IBI approaches. These experiences would most likely have resulted in the development of particular educational beliefs which may actually be instrumental in influencing their preferred instructional approaches. It is therefore pertinent to understand the nature of the educational beliefs that may occur in teachers as a result of their experiences with the aim of determining the appropriate interventions needed that would lead to a more effective implementation of IBI.

2. ELEMENTARY TEACHERS EDUCATIONAL BELIEFS

2.1 Importance of Studying Teachers Thinking Processes

Clark and Peterson [27] actually classified the process of teaching into two major domains: (1) teachers thought processes, and (2) teachers actions and their observable effects. They were clearly alluding to a strong influence of these thinking processes on the actions of teachers. This was further discussed by Fang [28] when he identified two underlying assumptions of research on teachers thinking as:

1. Teachers are professionals who make reasonable judgments and decisions within a complex and uncertain community.
2. Teachers thoughts, judgments and decisions guide their classroom behaviours.

2.2 Resiliency of Teachers Beliefs

An important reason cited in the literature for attention given to teachers beliefs is the resiliency of beliefs, even in the face of compelling factors contrary to these beliefs. Pajares [7], in his synthesis of belief research, alluded to the difficulty of belief change even under circumstances when it is logical or necessary for them to. This raises an important question. Are all beliefs of the same intensity, and hence equally resistant to change? Rokeach [29] was of the view that beliefs do differ in intensity and power. He posited that beliefs vary along a central-peripheral dimension, and the more central the belief, the more it will resist change. Rokeachs ideas bear important implications for teachers beliefs and practices. It can be reasonably concluded that the more central teachers beliefs are those that have withstood the test of time since, as indicated by Rokeach [29], these beliefs have obviously resisted change. Pajares [7] agreed when he asserted that the earlier beliefs developed by individuals are the ones most difficult it is to alter. Therefore, if teachers developed beliefs about teaching and learning as far back as when they were students in primary and secondary schools, and these beliefs persisted in them as teachers, it can be argued that these are central beliefs that may resist change even in the period of teacher education. Pajares [7] also asserted that beliefs that are newly acquired are the most vulnerable and, hence, subject to change. Therefore, any beliefs that teachers may acquire as a result of teacher education, may be peripheral beliefs, and these may quickly change when teachers

enter schools. This will especially be the case if these peripheral beliefs are contrary to the longer established central beliefs.

2.3 Teachers Personal Experiences and the Development of Beliefs

Rokeach [29] described beliefs as having a cognitive component which is most likely the result of personal experiences of individuals that are associated with the development of particular beliefs. With regards to teachers, various researchers have described beliefs related to the teaching-learning process as evolving over time due to a variety of factors including cultural influences and teachers experiences of schooling and instruction (e.g. [17], [30]). Researchers, however, have provided different interpretations as to exactly how personal experiences contribute to the development of beliefs. Eraut (1985) for example, postulated that any significant experience of an individual remains in the long term memory as a photographic image that continually contributes to the creation and recreation of knowledge, and hence beliefs (Cited in [7]). Nespor [31] argues instead that these previous episodes or events actually colour the comprehension of subsequent events.

Since teachers previous experiences influence the development of beliefs about the teaching-learning process, then it should also influence their behaviours as teachers. Meyer, Tabachnik, Hewson, Lamberger and Park [32] expressed the view that these beliefs act as filters for the new ideas learnt during teacher education. Fang [28] argued that these beliefs can be embodied in a teachers expectation of his or her students performance, or the teacher s theories about a particular subject area's learning and teaching. This is of particular relevance to science teaching, which has historically been delivered using traditional didactic modes. Strong beliefs about the effectiveness of traditional modes of instruction may have been developed which would influence, not only how a teacher reacts to IBI, but ultimately how he or she interacts with students during science instruction.

2.4 Teachers Beliefs and Their Classroom Practices

The proposed influence of teachers beliefs on their classroom practices is based on the assumption that beliefs generally are very effective in predicting behaviours of the individuals possessing them [7,29,33,34]. Every day, teachers are

expected to make a variety of classroom decisions. In addition, a number of planning decisions are made by teachers on a daily, weekly, termly and yearly basis. These decisions can be made individually or in conjunction with other teachers, and should be reflected in the classroom practices of individual teachers. The question which arises is: to what extent are the educational beliefs of individual teachers reflected in firstly, the planning decisions made, and secondly, their classroom practices?

Jones and Carter [6], commenting on the complex belief systems held by teachers, indicated that these beliefs influence teachers instructional discourse, instructional strategies, classroom management, selection of topics, and their assessment practices. It can also be argued that these belief systems also influence how teachers interact with other teachers during the instructional planning process. For example, new teachers may have low teaching efficacy beliefs, and hence, may continually give way to the ideas of more experienced teachers, whose teaching approaches and strategies may be different from that of the new teachers. Hence, the classroom practices of these new teachers may be more in line with the ideas of their more experienced colleagues than a reflection of their own beliefs.

If, however, the assumption is made that teachers classroom practices are generally the result of their own cognition rather than influenced by other teachers, then educational beliefs developed by teachers during their periods of schooling as well as teacher education, may be an important contributing factor to the nature of these practices. Levitt [20] cited Peterman (1993) who found that the main way in which teachers express their educational beliefs is through their behavior in the classroom. These beliefs were indicated by Nespor [31] as influencing teachers perceptions and judgments in the classroom, which in turn affect their behavior.

More recent studies on teachers beliefs and practices have indicated that the relationship may not be as straightforward as beliefs influencing practice. Smagorinsky, Cook, Moore, Jackson, and Fry [35] noted that new experiences may actually lead to changes in and/or additions to beliefs. This was supported by the research of Jones and Carter [6] which suggested that once instructional behaviours are enacted, responses to teachers actions affect their beliefs just as beliefs affect actions. They, however, pointed out that any alterations to teachers beliefs based on, say, student responses would depend on the strength of the students

responses, as well as the strength of the teachers beliefs. If, as earlier discussed, the newly acquired beliefs from teacher education are weaker than the longer established beliefs from teachers experiences as students; then it is these weaker beliefs that would be the ones which would more likely change as a result of inadequate student responses. Beliefs about IBI may be an aspect of these newly acquired beliefs. It should also be noted that inadequate responses may not only be from students. It could also be from other teachers, the school administration, and even parents.

Jones and Carter [6] pointed to research showing a conflict between teachers beliefs and their practices (e.g. King, Shumow and Lietz, 2001). Reasons given for this conflict include weak content background, and weak instructional skills of teachers. A contrary argument to these findings is that they may not necessarily be indicating a conflict between teachers beliefs and practice. It may be that the conflict is between practices and weakly held beliefs originating from teacher education experiences. Despite these experiences, stronger held beliefs from the many years of schooling may be still present, and teachers resort to them in the face of practical constraints to the beliefs originating from teacher education.

What then are the particular educational beliefs that can influence teachers instructional practices? Pajares [7] indicated that the construct of educational beliefs can be classified into teacher efficacy beliefs and epistemological beliefs. Levitt [20] also identified teachers beliefs about teaching and learning as important in that they “underlie the processing of a multitude of information a teacher is presented with in the classroom (p. 4). Enochs and Riggs [36] identified science teaching efficacy beliefs which, in effect, combined teacher efficacy, self efficacy and self esteem. In order to improve elementary teachers science instructional practices, it is important to consider how these beliefs may develop in teachers, how they could be measured in teachers, and also how they may be reflected in teachers instructional practices.

2.5 Measurement of Beliefs

If educational beliefs are so important in determining teachers instructional practices, then it is vitally important that researchers are able to, as accurately as possible, measure these beliefs. This is easier said than done since beliefs can be said to be individuals construction of the reality they have been exposed to and so

cannot be directly observed. It must be inferred from what individual's say or do. According to Rokeach [29], any inference drawn from individuals with a view of determining their beliefs, must take into account ways in which individuals give evidence of these beliefs. He added that this could include belief statements, statements about intentions to behave in a pre-disposed manner, or the actual behaviour related to the belief in question.

Many researchers have adopted qualitative methodologies for the determination of individuals beliefs (e.g. [20,37,38]). Strategies range from structured and semi-structured interviews to lesson observations. The argument is that these methodologies are most appropriate for the study of beliefs since, as expressed by Pajares [7], effective probes and strategies must be used to uncover deeply held beliefs. While this is a fair argument, the debilitating drawback is that qualitative methodologies limit the size of the population that can be investigated.

Despite the appropriateness of qualitative methodologies, a number of researchers (e.g. [5, 36, 39]) adopted quantitative methodologies for the measurement of teachers beliefs. One argument for this is that although beliefs are constructed realities, and therefore individualized, it is felt that these beliefs can be measured relative to enabling or inhibiting certain behaviours. This is similar to what has repeatedly occurred in research on attitudes over the last few decades. In this regard, the views expressed in Onwuegbuzie [40] that the relationship between quantitative and qualitative paradigms is one of isolated events lying on a continuum of scientific inquiry, are pertinent. Therefore, as asserted by Munby [38], the choice of whether to use quantitative or qualitative methodologies (or both), would depend on the type of data that is to be collected, as well as the use which is to be made of that data.

2.6 Categories of Teachers Educational Beliefs

2.6.1 Teachers personal epistemological beliefs

Yilmaz-Tuzan and Topcu [41] cites a definition of epistemology by Hofer (2002) as the “origin, nature, limits, methods and justification of human knowledge (p. 65). So personal epistemological beliefs can simply be defined as an individual's beliefs about the nature of knowledge and how we come to know. Jones and Carter [6] went further and described these beliefs as playing a mediating role in an individual's processing of new information. Yilmaz-Tuzan and Topcu [41]

described the possibility of an individual holding several epistemological beliefs at the same time, and that these beliefs shape a person's epistemology.

Personal epistemological beliefs are of particular relevance to science education, particularly the teaching-learning process, since on one hand, individual's personal epistemologies may most likely have been strongly influenced by their experiences as students in schools. On the other hand, teachers personal epistemologies would most likely influence the way they conceptualize the teaching-learning process and hence, what learning is like for individual students. Jones and Carter [6] also expressed the view that teachers personal epistemologies may serve as mental exemplars for "constructing and evaluating their own teaching practices" (p. 1072). It is therefore also likely that teachers personal epistemologies may also be reflected in their classroom behavior.

Researchers have provided different interpretations as to what generally constitutes personal epistemologies, and how these epistemologies develop in individuals. According to Yilmaz-Tuzan and Topcu [41], some researchers are of the view that personal epistemologies develop in stages similar to Piagetian cognitive development (e.g. Kegan, 1982; King and Kitchener, 2004; Perry, 1970). Two key stages in that development were identified by Yilmaz-Tuzan and Topcu [6] as:

1. Dualist: Knowledge seen as certain and authoritative.
2. Relativist: Knowledge seen as "cumulative constructions of observations but subject to judgment by different individuals (p. 66).

Hofer and Pintrich [42] went further and identified the more advanced stage of evaluativistic epistemologies where knowledge is seen as individuals construction of observations but with evaluation based on argument and empirical evidence. Yilmaz-Tuzan and Topcu [41] identified other researchers as having described personal epistemologies as a collection of beliefs (e.g. Schommer, 1988; Schommer and Walker, 1997). They adopted a multi-dimensional perspective which was explained by Yilmaz-Tuzan and Sami Topcu [41] as individuals having a multiplicity of beliefs about the certainty of knowledge, source of knowledge, justification of knowledge, acquisition of knowledge and the structure of knowledge. Using this multi-dimensional perspective, Schommer [39] hypothesized five epistemological beliefs:

1. Certain knowledge – beliefs about the stability of knowledge ranging from unchanging to tentative.

2. Simple knowledge — beliefs about the structure of knowledge ranging from isolated bits and pieces to integrated concepts.

3. Omniscient authority — beliefs about the source of knowledge ranging from omniscient authority to reason and empirical evidence.

4. Quick learning — beliefs about the speed of learning ranging from quick or not at all to gradual.

5. Innate ability — beliefs about ability to learn ranging from fixed at birth to improvable.

Both views of the development of epistemological beliefs recognize that there is a gradual continuum of which knowledge could be perceived by individuals. This continuum ranges from a view of knowledge as certain and authoritative to knowledge that is tentative, uncertain, and based on human reasoning and empirical evidence. The relevance to science teaching and learning can be clearly seen. Teachers whose epistemological beliefs are more dualist in nature, and hence, sees knowledge as certain and authoritative, may be more inclined to use the traditional, teacher-centered approaches to instruction than student-centered IBI. On the other hand, teachers with more relativist beliefs, who see knowledge as tentative and based on human reasoning and empirical evidence, may be more inclined to use IBI rather than the traditional approaches.

When the other dimensions of Schommer's hypothesized epistemological beliefs are examined, the same reasoning could be applied to show that the nature of a teacher's epistemological beliefs may be reflected in the teacher's approach to science instruction. For example, for the dimension 'simple knowledge, if a teacher sees knowledge as isolated bits and pieces, then his or her teaching strategies may be inclined towards traditional content-focused, text-book driven strategies. In contrast, a teacher who sees knowledge as integrated may utilize more student-centered strategies aimed at implementing a more cohesive and relevant science curriculum. If the assumption is made that teachers epistemological beliefs develop as a result of their experiences in formal education, then their 'simple knowledge beliefs may actually be inclined to a belief of knowledge as discrete isolated concepts. This is because traditional science instruction has focused on breadth of content with students being expected to learn a wide range of disconnected facts. This would partly explain their continued reliance on traditional approaches.

For the dimensions of 'quick learning and 'innate ability , teachers who believe that students ability to learn is fixed, may be inclined to use teacher-centered approaches, while those who believe that all students can learn, albeit at different rates, and students ability to learn can be improved, will be more inclined to use student-centered approaches. Again, many teachers experiences being taught using traditional approaches, involved mixed ability classroom situations where the majority of students experienced much difficulty learning the science content. For elementary teachers, this, in many cases, resulted in them either failing, or dropping the pure science subjects. This may be instrumental in the development of simple 'quick learning and 'innate ability beliefs in these teachers.

With regards to teachers 'omniscient authority beliefs, experiences from both formal and informal learning experiences may be instrumental in the development of simple beliefs. This include the focus of instruction on notes, textbooks, and the teacher as the source of knowledge, as well as societal influences such as that of religious and other doctrines.

2.6.2 Teachers beliefs about science teaching and learning

With regard to teaching, Chai, Teo and Lee [43] cited a number of researchers (e.g. Enstwistle et al., 2000; Kane, Sandretti and Heath, 2002; Samuelowicz and Bian, 2001; Teo, Chai, Hung and Lee, 2008) who classified teachers beliefs about teaching into two broad categories:

- a. Teaching as a process of knowledge transmission.
- b. Teaching as facilitating students knowledge construction.

With regards to science teaching, the first is in harmony with the traditional approaches, while the second indicates an important aspect of IBI. Elementary teachers beliefs about science teaching would most likely have had its strongest influence first from their experiences being taught science in primary and secondary schools, and secondly from their experiences in teacher education classrooms. These two experiences may be quite contradictory for teachers since they were most likely exposed to traditional instruction in primary and secondary schools while their teacher education experiences would have focused on IBI. The actual beliefs developed would most likely depend on which of the experiences had a stronger impact on teachers cognition. Researchers, such as Nespov [31], claim that the experiences of many years of primary and secondary school should far

outweigh the two years of teacher education. Therefore, any beliefs about science teaching developed by teachers during primary and secondary school experiences may actually persist beyond teacher education. These beliefs may actually favour traditional approaches to science instruction. It can therefore be concluded that elementary teacher education should not only focus on teaching preservice teachers about the use of IBI, but should also include strategies to change unsatisfactory beliefs about science teaching.

With regards to teachers beliefs about learning generally, and particularly the learning of science, these beliefs should tie in with epistemological beliefs which also represent beliefs about how people come to know. Of particular importance are Schommer's epistemological dimensions of 'quick learning and 'innate ability', especially as regards to teachers beliefs about their own students ability to learn science. As previously indicated, teachers experiences with learning science may lead to negative beliefs about their own students ability to learn science. Also of relevance to teachers beliefs about the teaching and learning of science are teachers beliefs about the subject itself. The research literature has pointed to negative attitudes to science and science teaching from a significant number of elementary school teachers (E.g. [44,45,46,47]), which may be the result of negative beliefs about science developed from teachers experiences as science students.

2.6.3 Science teaching efficacy beliefs

It was Bandura [33] who suggested that, based on various life experiences; individuals develop general expectations about their own capabilities of performing certain tasks. He referred to this as self efficacy and defined it as "a judgment of one's capability to accomplish a given level of performance (p. 391). This judgment may be based on a number of factors, which most likely would include the type of experiences an individual had relevant to the particular task in question. For example, with regards to the teaching of science, a teacher may have developed low self efficacy because of negative experiences with the learning of science as a student.

Teacher self efficacy has also been defined in relation to teachers belief in their own ability to positively affect students performance. Tschannen-Moran and

Woolfolk-Hoy [48] described teacher self efficacy as their beliefs about their ability to teach every student, including those who may be difficult or unmotivated.

With regards to teachers classroom behaviours, a number of researchers indicated findings showing that the levels of self-efficacy beliefs are connected to teachers behaviours and practices in the classroom (e.g. [49,50,51,52]). Marshall et al [51] cited Hoy and Woolfolk (1993) as well as Tschannen-Moran and Woolfolk-Hoy (2001) who found that the more efficacious teachers are, the more likely they are to successfully implement new instructional strategies as well as effectively respond to classroom challenges. These findings are important when considering the implementation of IBI by teachers. More highly efficacious teachers are therefore more likely to engage and persist in IBI.

Deemer [49] provided a more detailed analysis of how teaching efficacy can influence teachers instructional practice. Suggesting that personal teaching efficacy influences the classroom goals of teachers, she specifically indicated that low efficacious teachers spend “little effort in finding materials and planning lessons that challenge students” (p. 74). These are fundamental requirements for planning inquiry-based lessons. Deemer also indicated that these teachers do not adequately persist with the students having difficulty with the concepts being covered. She also noted that the converse was true for highly efficacious teachers.

It is likely that the period of teacher training of elementary teachers may be instrumental in either the development or alteration of their educational beliefs. It is therefore important to this discussion to consider the intended as well as the actual effects of elementary teacher education experiences on the knowledge and beliefs of teachers related to their science instructional practices.

3. ELEMENTARY TEACHERS PEDAGOGICAL TRAINING AND THEIR EDUCATIONAL BELIEFS

Initial teacher training in many jurisdictions is normally of two year duration and trainees may specialize in primary or secondary teacher education. In the primary teacher education programme, trainees are engaged in a number of content and methods courses. The content courses focus on the core areas of the primary school curriculum i.e. language arts, mathematics, science and social studies. The methods component should ideally expose student teachers to both the student centered and reform based orientations to science teaching suggested by

Magnusson, Kracjik and Borko [11] or IBI approaches. Teachers should also be exposed to instructional strategies aimed at encouraging their use of IBI.

Cook, Smagorinsky, Fry, Konopak and Moore [53] identified a lack of congruence in several instructional factors associated with schools with that associated with universities and colleges offering teacher education. They identified these factors as goals for schooling, expectations of the kinds of learning that benefit students, and the means through which students acquire and represent academic knowledge. These can all be considered to be very important and even fundamental factors in the education process that may serve to determine the way students are engaged in the teaching-learning environment. The result may actually be confusion in the minds of newly trained teachers entering the classroom, and according to Cook et al. [53], they may actually abandon the teaching strategies learnt and practiced at college and gravitate to the values of the school since it is here that their teaching competence will ultimately be judged.

These differences in instructional goals of elementary schools and teachers colleges may result in either the development or maintenance of educational beliefs which favour the goals of elementary schools. The reason for this was identified by Lortie [17] when he pointed out that the thousands of hours teachers spend in classrooms far outweigh the effects of the relatively fewer hours spent in teacher education. Although it can be argued that this is not a fair comparison since the teacher education experience is for more mature individuals and is primarily focused on teacher training, the merit in the comparison is seen when one considers that it is based on the development of beliefs which, according to Irez [8], have strong linkages to personal, episodic and emotional experiences. Rokeach [29] had actually noted that the time spent by teachers as students in primary and secondary schools are fertile ground for the development of educational beliefs. Pre-service teachers enter teacher education with these beliefs firmly in place [6,7,18] and, according to Jones and Carter [6], these beliefs act as filters for the new ideas being learnt during the teacher education process.

One set of elementary teachers beliefs that are developed during the years of elementary and secondary education are epistemological beliefs. Since these teachers were mainly exposed to traditional approaches to science instruction, they would most likely have entered their teacher education programmes with very native epistemological beliefs. Since, according to Pajares [7], these beliefs tend

to be relatively stable and resistant to change, they may actually persist in teachers despite their teacher education experiences. This is especially the case since, as noted by various researchers; there are several inadequacies in the teacher education process. For example, Brouwer and Korthagen [54] discussed the fragmented view of knowledge presented in teacher education curricula. In producing their national standards, the NRC [23] had noted that the preparation of pre-service primary school teachers was inadequate both in content and pedagogy. Brouwer and Korthagen [54] also expressed the widely held view that teacher educators generally do not display the best examples of good teaching. So the persistence of native epistemological beliefs in in-service teachers may be reflected in a predominance of traditional approaches to science instruction.

The inadequacies of the teacher education process may also result in the maintenance of low science teaching efficacy beliefs in elementary teachers. These beliefs have their background in the limited conceptual understanding of science ideas as noted by Plourde [18], and Hechter [55]. That these low science teaching efficacy beliefs persist even after pre-service teacher education has been noted by several researchers (e.g. [2, 5, 18, 56]). Abd-el-Khalick et al [2] extended this to a lack of teachers confidence teaching science in an effective inquiry-based manner. So the low science teaching efficacy beliefs of in-service teachers may also be reflected in their persisting with traditional approaches to science instruction. It has been suggested that teachers who lack confidence teaching science give it minimal emphasis within the curriculum [6], resulting in the implementation of poorly conceptualized and ineffective learning experiences in science [18].

With regards to pre-service elementary teachers beliefs about science teaching and learning, the assumption can also be made that, because of unsatisfactory experiences in secondary science education, these beliefs are low. For example, as suggested by Jones and Carter [6], pre-service teachers generally view teaching as a process of knowledge transmission. However, the development of positive science teaching and learning beliefs would also depend on the quality of the teacher education experiences. Researchers have provided varied reasons why teacher education may not result in the development of positive science teaching and learning beliefs, especially with regard to inquiry-based instruction and learning. Abd-el-Khalick et al [2] actually expressed doubts whether teacher development programmes can actually develop teachers knowledge of inquiry. Cain [37] cited

Doyle (1997) who observed that many pre-service teachers clung to their prior beliefs about teaching and learning even when their field experiences supported a different view. Varma et al [56] cited literature which suggested that inquiry-based instructional strategies in science are not uniformly incorporated into elementary science methods courses across the U.S. (E.g. Barrow, 2004; Smith and Gess-Newsome, 2004) and that field experiences may not provide appropriate models for IBI (Abell, 2006).

From this discussion, it seems clear that, as was noted by Pajares [7], teacher education curricula must take into consideration the entering beliefs of pre-service teachers. However, even if a teacher education programme is successful at developing more positive beliefs in elementary teachers there are contextual factors related to the school environment that may threaten the stability of that change.

4. SCHOOL CONTEXTUAL FACTORS AND ELEMENTARY TEACHERS BELIEFS

Elementary teachers PCK should represent a blend of their science content knowledge and general pedagogical knowledge within the unique contexts of their school and classroom situation. The development of these teachers PCK may therefore be problematic because of their inadequate conceptual understandings of science and also, as pointed out by Fang [28], because these “contextual factors can have powerful influences on teachers beliefs, and, in effect, affect their school practice (p. 53). The common conception that teachers do not use the IBI practiced at teachers colleges, may be due to the influence of these contextual factors. Based on their years of experience, teachers may actually develop what the authors of this paper refer to as applicability beliefs with reference to IBI. These are teachers beliefs of the applicability of IBI in their particular school s social, psychological and environmental contexts.

The conflict that is described by various researchers between teachers beliefs and their practices (e.g. [6]) may actually be the result of intervening applicability beliefs developed due to contextual factors impacting their implementation of the science curriculum. In many cases, the beliefs measured by researchers are epistemological beliefs and beliefs about science teaching and learning that were developed prior to and as part of in-service experiences. Fang [28] referred to these beliefs as “situational and transferred into instructional

practices only in relation to the complexities of the classroom (p. 55). Applicability beliefs, on the other hand, are directly related to teachers' experiences as classroom teachers and hence, may be more directly reflected in the classroom actions of teachers.

The social, psychological and environmental factors in schools that can be influential in the development of applicability beliefs to IBI are wide and varied. However, researchers have pointed to a number of key factors that are repeatedly raised by teachers when commenting on their implementation of the science curriculum. An important group of factors raised by a number of researchers are those related to the particular socio-cultural contexts of schools and their impact on beginning teachers. Brouwer and Korthagen [54] referred to this as the occupational socialization of teachers, and cited the view of Wideen et al. (1998) that beginning teachers may view their more experienced colleagues as more 'realistic role models' than their pre-service lecturers. They therefore tend to conform to the instructional practices of these colleagues, one of which may be the reliance on traditional approaches to science instruction. Cook et al [53] also commented on the social environment of schools, indicating that it promotes an ethic geared towards content coverage and control.

Other socio-cultural and psycho-social factors cited in the literature are:

- o Attitudes of school administrators and colleagues which can "support or diminish the effectiveness of beginning teachers by influencing beliefs about themselves and their students (Kilgore, Ross and Zbikowski; cited in [28], p. 54).
- o The adoption of particular instructional practices which are perceived by teachers to suit the particular characteristics of their students [5,15].

There are a number of factors related to the management of the school curriculum that may impact on the development of teachers' applicability beliefs. One that has been raised by a number of researchers (e.g. [2,5,6,18]) is an insufficient amount of time to effectively implement the science curriculum. This would directly impact on the development of applicability beliefs related to IBI since more time is needed for the implementation of IBI strategies than traditional ones. If the science curriculum is viewed as extensive, these teachers may deem traditional approaches more suitable for instruction than IBI.

Teachers' focus on preparing students for examinations may indeed be counter-productive to student learning and lead to an emphasis on traditional

approaches to instruction. This is especially the case for national standardized examinations, e.g. Minimum Standards and Common Entrance and Secondary Certificate Examinations, where results may be inappropriately used for the assessment of schools and teachers. Teachers may be excessively concerned with content coverage, and hence, more likely gravitate to traditional approaches to instruction. Other factors include the greater requirement of materials and equipment for teachers implementing IBI. These may be difficult to obtain and so may deter teachers from using IBI [2,5,6,8,18]. Also, very often teachers have to use their own finances to purchase the required materials. This may be perceived by teachers as a lack of institutional support for IBI [51] and may also result in the development of negative applicability beliefs.

It is therefore the researchers contention that teachers face a variety of contextual factors in their day to day teaching activities, which may result in the development of applicability beliefs related to a number of expectations regarding their classroom instruction. For science teaching, one such expectation is the requirement for IBI. These applicability beliefs may be strong enough to be a greater determinant of the actual teaching practices of teachers when compared to, longer established, epistemological beliefs and beliefs about teaching and learning.

5. CONCLUSIONS AND RECOMMENDATION

The nature of all the belief constructs discussed suggests the distinct possibility that teachers, to varying extents, may develop these beliefs as a result of their experiences in both formal and informal learning environments. It also suggests that these beliefs can be influential in determining the level of inquiry-based practices of teachers. It is therefore not only important to understand the nature and development of these beliefs, but also how teacher education and school authorities should deal with negative beliefs of teachers by the use of interventions for facilitating belief change.

Naive epistemological beliefs are probably the ones that would be most difficult to change because according to Pajares [7] they tend to be relatively stable. This resistance to change is most likely due to the nature of these beliefs and how they develop in individuals. Beliefs about knowledge and learning develop gradually as a result of both formal and informal learning experiences. So for example, dualist epistemological beliefs that knowledge comes from authoritative sources and is

stable and unchanging may be the result of a variety of educational experiences where individuals are simply required to accept the information given from authoritative sources like teachers, parents, pastors, books, and also, as indicated by NRC [16], a lack of coherence in the k-12 science curriculum where students are expected to learn a large number of disconnected facts. Unfortunately, this is the normal way children are educated up to and including their adult life. For those who become teachers, the research literature has shown that developed native epistemological beliefs are reflected in the traditional content focused instructional strategies rather than inquiry based strategies.

The movement towards the development of more sophisticated epistemological beliefs in k-12 educational institutions requires a rethinking of the education process that would allow teachers to move away from the content-focused instructional practices. The idea of schools focusing on breadth rather than depth of content is not new. However this seems to have so far not gained attention from curriculum developers in many countries who continue to cram large amounts of disconnected facts into science curricula and expect students to regurgitate them in examinations. Thus teachers are constantly under pressure to cover curricula and hence resort to the traditional approaches to instruction which would most likely lead to the development of native epistemological beliefs. What is required instead is the in-depth coverage of a few core areas in science instruction, where students are made to see the links between concepts in science, between science and other subject areas, and between science and their everyday experiences. This can be achieved by restructuring of science curricula, inquiry-based approaches to instruction, and teachers trained to integrate the curricula of different subject areas.

With regards to teacher education, Pajares [7] pointed to a way these beliefs could be changed in preservice teachers when he cited the view of Posner, Strike, Hewson and Gertzog (1982) that their conceptual change model and Piaget's assimilation and accommodation theory can be used to explain the resiliency of epistemological beliefs. Pajares [7] reasoned that when individuals hold deep and strong epistemological beliefs, any new information contrary to these beliefs will more likely be assimilated but not accommodated. There must first be dissatisfaction with the existing belief, and then the new belief must be "intelligible and appear plausible (p. 320) before accommodation takes place. So conceptual change strategies could be used in teacher education curricula where student teachers are

provided experiences where they are dissatisfied with their existing beliefs, and the new beliefs are made to seem intelligible and plausible. The study by Kienhues et al [57] actually found that the native epistemological beliefs of a group of university students changed to more sophisticated beliefs using teaching strategies based on the principles of conceptual change. Deniz [58] did a similar study but with teachers as the target group, and found similar results.

Levitt [20] attributed teachers' beliefs about science teaching and learning to accumulated images of an individual's experiences with learning science in the formal school system. Teachers' experiences learning under traditional modes of instruction are most likely influential in the development of negative beliefs about science as well as the teaching and learning of science. For many elementary school teachers, these experiences also resulted in unsatisfactory levels of science content knowledge and poor attitudes to science. Since elementary science education should set the foundation for students' appreciation and understanding of science, it is imperative that appropriate strategies be implemented to change this situation. These are the same strategies that were outlined for the improvement of teachers' and students' epistemological beliefs.

The applicability belief construct was conceptualized by the authors as a possible explanation of the findings of a number of researchers that teachers were claiming various psychological, environmental and socio-cultural hindrances to their use of IBI. These beliefs about school-based hindrances to IBI are important in that they may actually be intervening variables that act against teachers implementing IBI despite the possibility that the other educational beliefs may actually facilitate IBI. Engendering positive applicability beliefs would however require widespread interventions to the management of school curricula including increased social and financial support for teachers, alteration to timetables, integration of subject curricula, and a rethinking about the purposes of examinations.

In attempting to tackle elementary teachers' low science teaching efficacy beliefs it is first important to identify the reasons for these beliefs being low for so many primary school teachers even after they have completed their teacher training. For a substantial number of these teachers, their experiences of secondary school science did not encourage the development of positive attitudes to the subject. This is most likely a key issue in the development of low science teaching efficacy beliefs. The strategies outlined earlier for the improvement in

epistemological and science teaching beliefs are also applicable to improving the science teaching efficacy beliefs of teachers. However this is a long term solution. In the short term, the focus must be on teacher education, especially how the teacher education science curriculum and its implementation could be adjusted to cater for the low science teaching efficacy beliefs of students entering the programme, and turn out trained teachers with significantly improved beliefs.

To change preservice science teaching efficacy beliefs, Plourde [18] made a suggestion also utilizing similar principles to that of conceptual change models. He recommended that students be engaged in experiences in which they would be encouraged to first become aware of, and then confront their existing beliefs about their ability to teach science. Other strategies suggested by researchers ranged from effective integration of science content and pedagogy, to the use of IBI by teacher educators. Hechter [55] cited a number of studies in which the integration of science content and methods in single courses were showed to result in improved teachers science teaching efficacy (e.g. Appleton, 1995; Cantrell et al, 2003; Palmer, 2006). Liang and Richardson [59] looked instead at the effects of IBI on teacher candidates science teaching efficacy. They found that scaffolded inquiry techniques (where written instructional supports are provided to students during student-initiated inquiry) resulted in improved personal science teaching efficacy of teachers.

As this discussion has indicated, teachers educational beliefs are indeed quite possibly an important factor in their science instructional decisions. However, despite being deeply held and resilient, school based interventions as well as changes to teacher education curricula could be implemented to change the beliefs that result in the implementation of unsatisfactory content focused instructional approaches. There are promising developments in the U.S. where what is referred to as 'The Next Generation Science Standards' is in the process of being developed by collaboration between the NRC, the American Association for the Advancement of Science (AAAS) and Achieve. These standards are in the final stages of public consultation and articulate the need for integrating science, technology and engineering concepts in k-12 instruction. It is indicated that these curricula should focus on a smaller number of cross-cutting concepts, have a greater coherence in the science concepts done across grade levels, and utilize constructivist and inquiry-based strategies in the implementation of curricula [60]. If

initiatives such as these are properly implemented in k-12 education, it should be instrumental in the development of positive beliefs in the next generation of elementary science teachers.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Aggression Behaviour of Delinquent and Non-Delinquent Adolescents

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1. INTRODUCTION

In spite of facing many social problems, juvenile delinquency is one of the major problems in India. The menace is so severe that several thousands of children are officially labeled as delinquents every year and they are placed into correctional homes. There are also thousands of cases which are not officially recorded and brought under the justice system. Sustained increase in juvenile delinquency over decades has been affecting the growth and harmony of the society and it has been considered as a social, economic and ethical issue. However, it does not mean that the juvenile delinquency was non-existent in the country before. It might have been there but in a far less proportion. The joint family system, the self-sufficient pattern of the traditional Indian village and such other factors offered a kind of automatic check on the growth of delinquency in the past. Hence, the instances of children found to have indulged in delinquent behavior were rare. Dutta [1] observes “juvenile delinquency is rapidly becoming a serious menace in India and with the progressive industrialization of many parts of the country. Which were essentially rural areas until a few years ago, this problem will soon assume the same proportions as in many of the western countries”.

According to Juvenile Justice (Care and Protection of Children) Act (2000) when young children below the age of eighteen indulge in criminal and

antisocial behavior, it is regarded as juvenile delinquency. Crimes of children are presumed as juvenile crime because they are not aware of the legal implications of their activities. Therefore, they are referred to as children with bad conduct. Crime committed by individuals above statutory age is called criminals because they are well aware of the criminal and legal implications of their anti-social behavior. The Indian Penal Code (IPC) used the term 'juvenile offence' instead of juvenile delinquency. Now it uses the term 'juvenile in conflict with the law' and the children between the 7–18 years are called as juvenile delinquents.

Juvenile delinquency is multidimensional phenomenon involving social, economic and psychological aspects. Psychological and psychiatric theories argue that criminal behaviour originates primarily in the personalities of offenders rather than in their biology or in situation. Among many personality factors, emotional maladjustment has been considered as one of the important factors.

According to Glueck and Glueck theory delinquency is a symptom of emotional maladjustment. Many delinquents are emotionally disturbed [2]. Emotional instability would be expected to multiply with the antisocial conduct. It has been reported by many researchers that the crimes like murder and rape are mainly the crimes of emotionality [3,4]. As mentioned by Friedlander many delinquents not only have a long history of severe frustration, they also react aggressively to stress situations [5].

A range of childhood problems can be subsumed under the headings of internalizing and externalizing syndromes [6,7]. Under the heading of internalizing syndromes are a variety of problems reflective of depression, withdrawal, anxiety obsessions, somatic complaints and so on. Under externalizing syndromes aggressiveness and delinquency are included as main problems. Aggressive behavior seems to constitute both a common and sometimes serious problem of childhood that has important implications for later adjustment.

1.1 Aggression

Aggression involves hurting others on purpose. It has been defined as "any form of behavior directed towards the goal of harming or injuring another person" [8]. Traditionally, psychologists have directed aggression as

behavior against another person with the intention of committing harm. This definition refers to socially unacceptable behaviour. Working definition of aggression define aggression as the willingness to engage in physical and psychological acts of harm in order to control the actions of other people. It incorporates the idea that aggression involves psychological as well as physical harm. According to widely accepted definition, aggression is: “an aggressive act in any form of behaviour designed to harm, or injure a living being who is motivated to avoid such treatment” [9]. It has become increasingly clear that it can be displayed by children and adolescents.

One distinction frequently examined in research is between reactive and proactive aggression [10]. Proactive aggression is aggressive behaviour that is initiated by the individual to achieve some desired outcome. It is important to note that aggressive behaviour need not involve fighting or other forms of physical attack. The individual may show physical aggression in the form of hitting, shoving, biting, scratching, and kicking or they may display nonphysical aggression by being verbally abusive toward others. Reactive aggression is generally defined as aggression that occurs as an angry response to a perceived provocation of threat [11], whereas proactive aggression is conceptualized as aggression that is unprovoked and is used for instrumental gain or dominance over others [12,10].

Indirect aggressiveness is defined as harming others through covert behaviours such as gossiping and rumor spreading [13].

1.2 Aggression and Delinquency

Huesmann et al., [14] tracked one sample of 600 subjects for 22 years. They found that highly aggressive 8 year olds often became relatively hostile 30-year-olds who were likely to batter their spouses or children and to be convicted of criminal offenses. Twin studies suggest that some individuals are genetically predisposed to have aggressive behaviour and other antisocial acts [15,16]. Childhood aggression is frequently associated with a host of negative outcomes such as subsequent psychopathology, juvenile delinquency and criminality [17,18,19]. In addition, early aggression tends to be fairly stable. Aggression that begins early in childhood is the single best predictor of later criminal behaviour [20]. Longitudinal investigations have demonstrated that

aggression is one of the best known predictors of future social, psychological, behavioural, delinquency and peer victimization [21].

Two aspects of social-psychological adjustment—aggressive behaviour and delinquency, were assessed before and after one year period of time. It was revealed that the strongest predictor of future social-psychological adjustment problems was the combination of relational and physical aggression. Relational aggression also contributed unique information relative to physical aggression in the prediction of future maladjustment [22]. Youths with earlier ages of onset were more likely to engage in several types of physical aggression, frequent lying, theft and vandalism [23]. Research on adult forensic samples suggest that antisocial individuals who show psychopathic traits are more aggressive than other antisocial individuals, exhibiting a higher rate of aggression both inside and outside of forensic institutions and showing aggression that result in more severe harm to their victims [24]. The presence of callous-emotional (CU) traits may designate a particularly severe and aggressive pattern of conduct problems [25,26] and it may enhance the prediction of later delinquency. Several studies have documented the presence of CU traits predicting subsequent delinquency, aggression, number of violent re-offending in antisocial youths [27,28,29]. There is also evidence to suggest that children with conduct problems who are aggressive also tend to form a severe and chronic subgroup of antisocial youth [30].

Higher frequency of aggressive acts was significantly associated with higher levels of anger and stronger beliefs that physical aggression is an appropriate course of action in conflicts. Juvenile offenders reported higher levels of anger experience and higher frequency of aggression and antisocial behaviour compared to high school students [31]. Childhood exposure to violence against females and male-modeled anti-social behaviour were examined as risk factors for sexual aggression and non-sexual aggression and delinquency among adolescents. Both risk factors produced direct and indirect effects on non-sexual aggression and delinquency [32]. Hamalainen and Pulkinen [33] showed that a group of convicted men had been more aggressive and lower in prosocial behaviour. Juvenile delinquents had been

more aggressive than adolescent delinquents. Among those, recidivists were more aggressive and lower in prosocial behaviour.

Researchers assessed the prevalence of severe aggressive behaviour and conduct disorder in runaway and homeless adolescents. Conduct disorders were present in 55% and severe aggression in 62% of the subjects. Severe aggression was associated with other problem behaviours including arrests and convictions [34]. Exposure to socially deviant peers, even in treatment environments, has been shown to produce lasting detrimental effects on young males including long term increases in aggressive and antisocial behaviour [35].

Within the backdrop of above studies emphasizing on aggressive traits more prevalent among the delinquents the present study was conducted with the below mentioned objectives and hypotheses.

2. METHODOLOGY

2.1 Objectives

1. To ascertain the magnitude of aggressive behaviour among delinquent and non-delinquent adolescents.
2. To examine the effect of domicile on aggressive behaviour of delinquent and non-delinquent adolescents.

2.2 Hypotheses

1. Magnitude of aggressive behaviour is significantly higher among delinquent adolescents than non-delinquent adolescents.
2. There is significant effect of domicile on aggressive behaviour of delinquent and non-delinquent adolescents.

2.3 Study Sample

This research on exploring the level of aggressive behaviour was conducted on 321 **male** adolescents consisting of two sub-sample groups. Female samples were not included in the present study due to lack of availability of adequate size of delinquent adolescents. The characteristics of the sample groups have been mentioned below:

2.3.1 Delinquent adolescents

The male adolescents, between the age group of 14-18years, who have committed offense ranging from petty theft to serious offenses like murder and

rape, were selected for this group. They were confirmed cases of offense under Indian Penal Code (IPC) and they were selected from the State Observation Homes located in Bangalore, Mysore, Shimoga and Dharwad. The delinquent adolescents were administered the questionnaire individually, the researcher read out the statements and responses given by them were recorded carefully. The sample sizes of the delinquent adolescents were 150.

2.3.2 Non-delinquent adolescents

The non-delinquent adolescents were selected from the schools and colleges studying in 8th grade to II preuniversity course. They were selected from Karnatak Public High School, Karnatak College, K E Board School and Basel Mission High School located in Dharwad city of Karnataka state. The sample size of the group was 171 adolescents. In selecting the non-delinquents sample adolescents the inclusion criterion of the adolescents not having any delinquency background were considered.

2.4 Tools

2.4.1 Aggression scale

The aggression scale developed by Pal and Naqvi [36] was administered to the subjects. The scale has 30 items of statements measuring various aggressive behaviour ranging from rude answering to violent attacking on other individuals. Each item has 6 alternative answers. The scoring was done following the below method. For answer of 'very much' a score of 5 was given and a score of 0 was given for 'not at all' responses, and intermediate scores were given for the remaining responses. Total raw score was calculated simply adding the scores on all items. The total raw score ranges from 0 to 50. The higher score on this scale indicates higher aggressive behaviour. But the scale does not provide separate scores for proactive and reactive aggressive behaviour. It provides scores including both the types of aggressive behaviour.

The test author has calculated the split-half reliability by odd-even method. The correlation co-efficient was 0.82, which shows that the scale is highly reliable. The test-retest reliability of the scale was found to be 0.78. The

validity of the scale has been calculated by two methods. For the content validity the items of the scale has been collected through the experts' opinions and available literature. The validity of this scale was again checked through the administration of both, present scale and Chauhan and Tiwari's Frustration test (only aggression scores were calculated). The validity co-efficient was found to be 0.74, which shows that the present scale is valid for measurement of aggression.

2.4.2 Pilot study

A pilot study on 50 subjects including both above said groups was conducted. Necessary modifications in the terminologies and statements were made in the test which was translated from English to Kannada language. After the data collection the data was subjected to 't' analysis. The findings provided significant difference in the aggressive behaviour that the scores more favouring the delinquent adolescent groups. Later, data for the main research was collected using the modified Kannada version questionnaires. Further analyses was carried out and interpreted.

2.4.3 Procedure

After seeking the permission by the concerned authorities of the institutes, including that of Karnataka State Women and Child Welfare Department and schools/colleges, 30 items aggression scale was administered to the subjects individually. For the ethical consideration, the subjects were explained about purpose of the study and they were assured of the confidentiality. The data from the subjects were collected from the first author.

The responses of the subjects were scored and subjected to statistical analysis.

2.4.4 Statistical techniques

After calculating the scores for each of the subjects, Mean and SD were calculated for the sub-groups separately. 't' analyses was carried out to determine the significance level of difference between the comparative groups.

3. RESULTS AND DISCUSSION

Aggression, as a personality trait, is closely related to delinquency of the adolescents. In the present research aggression was measured using the test among the delinquent adolescents and the non-delinquent adolescents.

Table 1. Means, standard deviations and t-value of the delinquent and the non-delinquent adolescents on aggression

Sample Groups	Mean	SD	't' value
Delinquent Adolescents (n=150)	117.75	16.78	25.94**
Non-delinquent Adolescents (n=171)	72.24	14.92	

*** Significant at 0.01 level*

Table 1. depicts the aggression scores of the delinquent adolescents and the non-delinquent adolescents. On aggression there was significant difference in the mean scores (delinquent adolescents mean 117.75 (SD 16.78)/non-delinquent adolescents mean 72.24 (SD 14.92), $t=25.94$, $p<0.001$). The above result clearly implies that the delinquent adolescents have higher level of aggression than the non-delinquent adolescents. They experience anger to the extent that they damage objects or harm the person who provokes anger. Even for a small thing they get anger too much and intend to harm others or harm others. They establish relationships with persons those retaliate against society (for example, involving with juvenile gang) and they go against the traditions and standards of the family and society. This shows that the delinquent adolescents inability to control or regulate aggression, they are much prone to delinquent activities or delinquent adolescents have aggression at the higher level than the non-delinquent adolescents.

Findings on the delinquent adolescents indicate that proactive aggression is associated with fights and delinquency [37,38] and reactive aggression is generally accompanied by anger and emotional outbursts and has been associated with impulsivity [39,10]. Loeber [19] and Patterson et al., [21] showed that aggression that begins early in childhood is the single best predictor of later criminal behaviour. Aggressive behaviour takes various forms and juvenile delinquency encompasses a wide range of acts that violate social norms and rights of others. Physical aggression such as hitting, pushing and kicking is one obvious example of delinquent behaviour. Non-aggressive delinquent

behaviour includes lying, stealing, breaking rules. Compared to physical aggression, non-aggressive antisocial behaviour is found to be a predictor of criminal offenses. Buss and Shackelford [40] mentions that the aggressive behaviour can be explained as a complex interaction of genetic dispositions, observational learning and cognitive scripts.

Table 2. Means, standard deviations and t-value of the delinquent rural and urban adolescents on aggression

Delinquent adolescents	Mean	SD	't' value
Rural (n=23)	119.26	15.54	0.47
Urban (n=171)	117.48	17.03	

Table 2. depicts the aggression scores of the delinquent rural and urban adolescents. On aggression, there were little differences in the mean scores obtained by the adolescents belonging to different domicile (rural delinquent adolescents mean 119.26 (SD 15.54)/urban delinquent adolescents mean 117.48 (SD 17.03), $t=0.47$, $p>0.005$). The above results state that domicile has no significant effect on aggression level of the delinquent adolescents. This non-significant result between the delinquent adolescents of the rural and the urban domicile are expected to be because of homogenous level of aggression among the delinquent adolescents irrespective of their domicile background. It may be assumed that adolescents indulge in delinquent activities irrespective of their domicile due to their higher level of aggression. The present results also support the view point that the aggression variable plays a significant role in the causation of delinquency irrespective their domicile.

Table 3. Means, standard deviations and t-value of the non-delinquent rural and urban adolescents on aggression

Non delinquent Adolescents	Mean	SD	't' value
Rural (n=89)	74.51	14.15	2.28**
Urban (n=82)	69.37	15.31	

** Significant at 0.01 level

Table 3. depicts the aggression scores of the non-delinquent rural and urban adolescents. The results indicate that the non-delinquent adolescents of rural domicile have higher aggressive behaviour than the non-delinquent

adolescents of urban domicile (rural non-delinquent adolescents mean 74.51 (SD 14.15)/urban non-delinquent adolescents mean 69.37 (SD 15.31), $t=2.28$, $p<001$).

Studies indicate that juvenile delinquents from urban environment report more behavioural problems. This rural/urban difference may be attributed to greater opportunities to join deviant peer groups in urban environment. The juvenile delinquents of urban setting reported considerably elevated levels of internalizing, externalizing and other behavioural problems [41]. It was observed by researchers that the rural criminals were significantly maladjusted in emotional areas as compared to the urban criminals [42]. In another study no associations were found between living in an urban versus rural area and emotional/behavioural problems in the north Norwegian samples [43]. However other research revealed that rural Muslim students have higher aggression than urban Muslim students [44]. Children and adolescents from the lower socio-economic strata particularly males from larger urban areas exhibit more aggressive behaviour and higher levels of delinquency [45,46].

Present contradictory result may be verified with larger sample groups, as present study involves smaller sample size.

4. CONCLUSION

As hypothesized in the present research, the aggression behaviour was found to be more among the delinquent adolescents than the non-delinquent adolescents. The demographic variable domicile was found to be having significant diverse effect on the aggression level of the non-delinquent adolescents, aggressive behavior being found to be more among rural adolescents. Whereas on the delinquent adolescents the domicile back-ground has no differential effect on aggressive behavior. It is suggested that the goal of rehabilitation of the delinquents should be to develop skills to control and regulate their emotions appropriately and adequately. Encouraging positive emotions should also be the part of the therapy for delinquent and non-delinquent adolescents.

CONSENT

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report.

ETHICAL APPROVAL

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

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Language Learning Desirability in the Istria County

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Abstract: The objective of this sociolinguistic research that was carried out in the seven major towns of the Istria County was to shed light on the attitudes of parents and future parents (N=3512) regarding the language learning desirability during their children/future children elementary school education, with particular reference to the Italian language learning, given the importance of Italian as the language of the social environment in the Istrian County, an institutionally bilingual County (where the Croatian-Italian bilingualism is recognized *de iure* and *de facto* realized). The results show that the English language is the most intensely desired language, according to its communication prestige. In contrast to the rest of Croatia (Mardesic 2010, Mihaljevic Djigunovic and Kovacic 1996), the Italian language in the Istrian County occupies the second place according to the criterion of desirability, primarily as a pragmatic resource which brings instrumental advantages, as confirmed in other previous studies (Scotti Jurić and Ambrosi Randić 2010). However, at the integrative level, the Croatian-Italian bilingualism is an indispensable constituent of the Istrian identity, in line with the promotion and development of linguistic pluralism and multiculturalism. The results confirm a high level of sociolinguistic and sociocultural awareness of parents / future parents in terms of the multilingual fostering of younger generations and the significance of the Italian language as the language of the social environment.

Keywords: attitudes, language learning, bilingualism, multilingualism, Istria, Italian, English.

Poželjnost učenja jezika u Istarskoj županiji

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Sažetak: Cilj ovoga sociolingvističkog istraživanja koje je provedeno u sedam najvećih gradova Istarske županije bio je ispitivanje stavova roditelja i budućih roditelja (N=3512) u vidu najpoželjnijih jezika koje bi željeli da njihova djeca uče tijekom osnovnoškolskoga obrazovanja. Željelo se ujedno utvrditi u kojem su omjeru ispitanici višejezični i podudaraju li se poznati jezici roditelja/budućih roditelja s jezicima koje smatraju poželjnima za učenje kod djece, s posebnim osvrtom na talijanski jezik, s obzirom na značaj talijanskoga kao jezika društvene sredine u Istarskoj županiji. Naime, u Istarskoj županiji postoji institucionalizirana hrvatsko-talijanska dvojezičnosti te su kroatofoni i italofofoni idiomi zastupljeni u svakodnevnoj interakciji. Rezultati ukazuju na to da je natpolovična većina ispitanika po poznavanju jezika višejezična. Okvirno, kod većine ispitanika nailazi se na podudaranje između jezika koje ispitanici poznaju i poželjnih jezika za učenje u okviru osnovnoškolskoga obrazovanja. Na razini uzorka iskazuje se najintenzivnija želja za učenjem engleskoga jezika koji se prema kriteriju poželjnosti nalazi na prvome mjestu kod gotovo svih ispitanika, a sukladno njegovome komunikacijskom prestižu. Za razliku od ostatka Hrvatske (Mardešić 2010; Mihaljević Djigunović i Kovačić 1996), talijanski jezik u Istarskoj županiji zauzima drugo mjesto prema kriteriju poželjnosti, prvenstveno kao pragmatični resurs koji donosi instrumentalne prednosti, što je potvrđeno i drugim prethodno provedenim istraživanjima (Scotti Jurić i Ambrosi Randić 2010). No, na integrativnoj razini, hrvatsko-talijanska dvojezičnost poima se kao neizostavivi dio istarskoga identiteta, a u skladu s poticanjem i razvijanjem višejezičnosti, odnosno jezičnoga pluralizma i višekulturalnosti. Na razini uzorka se dakle potvrđuje sociolingvistička i sociokulturna osviještenost roditelja/budućih roditelja kada je u pitanju višejezično ovladavanje mlađih generacija te značaj talijanskoga jezika kao jezika društvene sredine, odnosno hrvatsko-talijanske dvojezičnosti u Istri.

Ključne riječi: stavovi, učenje jezika, dvojezičnost, višejezičnost, Istra, talijanski, engleski.

Uvod

Sociolingvistička slika Istarske županije obilježena je službenom hrvatsko-talijanskom dvojezičnošću ostvarenom na društvenom i institucionalnom planu te kompleksnim oblikom višejezičnosti (Bogliun Debeljuh 1985, 1988, 1989a, 1989b, 1989c, 1991; Filipi 1989, 1996; Milani Kruljac 1990, 1995, 1996, 2001, 2003; Milani Kruljac i Orbanić 1989). Povijesna prisutnost kroatofone i italofofne jezične zajednice

na istarskome području odredila je specifičan položaj dijasistemske raslojenosti te složene odnose jezične otočnosti italo fonih i drugih alohtonih idioma u okviru dominacije kroatofonije (Blagoni, 2007).

Osobito su složene prisutne diglosijske/nesavršeno poliglosijske (Milani Kruljac 1990, 2001) dinamike raslojenosti između kodova kroatofonije i italo fonije (koji oblikuju sistemsku/funkcionalnu dvojezičnost/višejezičnost) te, poglavito, unutar italo fonoga dijasistema, osobito između talijanskoga jezika kao službenoga jezika Talijanske nacionalne zajednice u Istri (koji posjeduje najveću jurilingvističku zaštitu na samome vrhu jezično-političke hijerarhije, ali je lišen komunikacijske vitalnosti u svakodnevicu) i makroregionalnoga/panregionalnoga istromletačkog dijalekta kao materinskoga i međukohezivnoga jezika gotovo svih italo fonih žitelja (koji posjeduju neospornu komunikacijsku prestiž), odnosno drugih mjesnih govora (Blagoni 2005, 2007; Filipi 1989, 1996, 2005; Milani Kruljac 1995, 1989).

Institucijska prepoznatljivost talijanskoga jezika u Istarskoj županiji ujedno je potvrđena postojanjem paralelnim obrazovnim sustavom na hrvatskome i talijanskome jeziku u dvojezičnim jedinicama lokalne samouprave te institucijskim podržavanjem učenja talijanskoga jezika kao jezika društvene sredine u (većinskim) školama s hrvatskim nastavnim jezikom (Blagoni 2002, 2012, 2007). Naime, službena istarska jezična politika (i statutarne odredbe dvojezičnih gradova i općina Istarske županije) propisuje i/ili promovira i odluke u okviru nastave talijanskoga jezika kao jezika društvene sredine u državnim obrazovnim ustanovama s nastavom na hrvatskom i talijanskim jeziku. Tijekom osnovnoškolskoga obrazovanja postoji mogućnost i učenja drugih (stranih) jezika, među kojima je engleski jezik najzastupljeniji te prema prethodno provedenim istraživanjima (Mardešić 2010; Scotti Jurić i Ambrosi Randić 2010) i najpoželjniji strani jezik. O nedvojbenosti prestiža engleskoga jezika nije potrebno posebno govoriti; nespornu je njegovu komunikacijsku prestiž te instrumentalne i integrativne prednosti koje njegovo poznavanje donosi pojedincu.

Metodologija istraživanja

Svrha provedenoga sociolingvističkog terenskog istraživanja kvantitativne naravi bila je ispitati stavove roditelja i budućih roditelja (istarskih žitelja) u vidu najpoželjnijih jezika koje bi željeli da njihova djeca uče tijekom osnovnoškolskoga obrazovanja. Istraživanje je provedeno putem anketnoga obrasca u sedam najvećih

istarskih gradova (Pula-Pola, Rovinj-Rovigno, Poreč-Parenzo, Buje-Buie, Labin, Buzet, Pazin i njihove okolice) i obuhvatilo je ciljni uzorak od 3512 ispitanika (1181 muškaraca i 2040 i žena). Uzorak je sačinjen od srednjoškolaca i studenata od 13. do 25. godine (66% ispitanika – budućih roditelja) i roditelja djece predškolskoga uzrasta od 26. do 55. godine (34 % ispitanika). U pogledu učenja jezika (kao oblika jezičnoga planiranja), istraživanjem se htjelo ispitati gledišta roditelja i onih za koje se pretpostavlja da će u velikoj većini postati roditeljima u budućnosti u trenutku uspostavljanja dvojezičnosti/višejezičnosti, odnosno prije donošenja odluka i prije same manifestacije pojave, budući da su u tom pogledu pretpostavke i stavovi njihovi prilično značajni.

Od ispitanika se nastojalo doznati koje jezike poznaju te koje jezike (po redoslijedu poželjnosti), kako bi se utvrdio omjer višejezičnosti među ispitanicima (prema njihovoj samoprocjeni, bez ispitivanja komunikacijskih kompetencija) i koji su prema njima najpoželjniji jezici koje bi htjeli da njihova djeca uče tijekom osnovnoškolskoga obrazovanja. Analizom povezanosti odgovora na ta dva pitanja, htjelo se utvrditi postoji li ikakav međusobni utjecaj između te dvije varijable i pri tom razlučiti u kojem se omjeru jezici poklapaju.

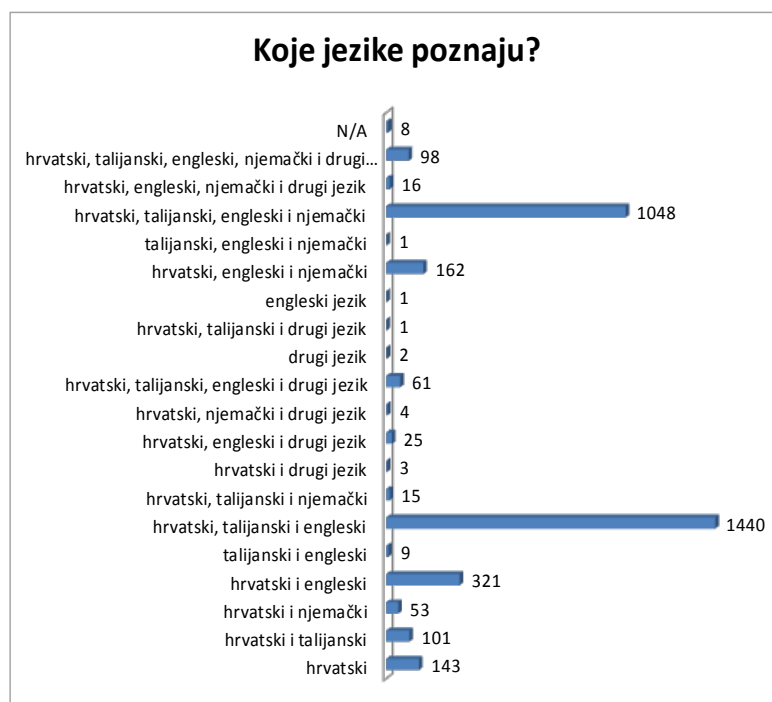
Sukladno prethodno provedenim istraživanjima u Istarskoj županiji (Mardešić 2010; Scotti Jurić i Ambrosi Randić 2010) status najpoželjnijega jezika za učenje nedvojbeno je dodijeljen engleskome jeziku te se, stoga, mogao očekivati sličan rezultat, vodeći računa o njegovom neosporivom komunikacijskom prestižu. Nadalje, posebno nas je zanimao intenzitet poželjnosti učenja talijanskoga jezika kada su u pitanju mlađe generacije, kako bi se proučio odraz istoga na podržavanje odluke o javnoj valjanosti hrvatsko-talijanske dvojezičnosti u Istarskoj županiji te na položaj talijanskoga kao jezika društvene sredine.

Rezultati

U navođenju jezika koje ispitanici poznaju, ponuđeno je više odgovora i dana je mogućnost višestrukoga odabira i dopisivanja slobodnoga odgovora. Među poznate jezike ispitanici ubrajaju sljedeće jezike (vidi sliku 1): hrvatski, talijanski, engleski i njemački (1048 ispitanika – 29,8% uzorka), hrvatski, talijanski i engleski (1440 ispitanika – 41,0% uzorka), hrvatski i engleski (321 ispitanika – 9,1% uzorka), hrvatski, engleski i njemački (162 ispitanika – 4,6% uzorka), hrvatski (143 ispitanika – 4,0% uzorka), hrvatski i talijanski (101 ispitanik – 2,8% uzorka), hrvatski, talijanski, engleski,

njemački i drugi jezik¹ (98 ispitanika – 2,7% uzorka), hrvatski, talijanski, engleski i drugi jezik (61 ispitanika – 1,7% uzorka), hrvatski i njemački (53 ispitanika – 1,5% uzorka), hrvatski, engleski i drugi jezik (25 ispitanika – 0,7% uzorka), hrvatski, engleski, njemački i drugi jezik (16 ispitanika – 0,4% uzorka), hrvatski, talijanski i njemački (15 ispitanika – 0,4% uzorka), talijanski i engleski (9 ispitanika – 0,2% uzorka), hrvatski, njemački i drugi jezik (4 ispitanika – 0,1% uzorka), hrvatski i drugi jezik (3 ispitanika – 0,08% uzorka), drugi jezik (2 – 0,05% uzorka), hrvatski, talijanski i drugi jezik (1 ispitanik – 0,02% uzorka), engleski jezik (1 ispitanik – 0,02% uzorka), talijanski, engleski i njemački (1 ispitanik – 0,02% uzorka). Osmam ispitanika nije odgovorilo na pitanje. Prema odgovorima, moguće je zaključiti da je natpolovična većina ispitanika višezjezična, odnosno 1440 ispitanika (41% uzorka) navodi da uz hrvatski jezik poznaje još talijanski i engleski, a 1048 ispitanika (30%) navodi talijanski, engleski i njemački.

Slika 1: Jezici koje ispitanici poznaju



Pri navođenju jezika koje bi željeli da im dijete/djeca uče tijekom osnovnoškolskoga obrazovanja, ispitanicima su ponuđeni sljedeći jezici: engleski,

¹ Pod kategoriju drugih jezika svrstani su jezici koji nisu bili ponuđeni među odgovorima, odnosno jezici koje su ispitanici dopisali pod slobodni odgovor: turski, nizozemski, latinski, švedski, japanski, španjolski, norveški, portugalski, poljski, albanski, srpski, slovenski, slovački, arapski, finski, mađarski, grčki ili jezik koji dijete bude željelo.

njemački, francuski, talijanski, ruski i kineski te je pružena mogućnost višestrukog odabira i dopisivanja slobodnoga odgovora. Ističemo da su ispitanici među najpoželjnije jezike uvrstili na prvo mjesto engleski jezik te na drugo mjesto talijanski jezik. Redoslijed jezika prema kriteriju poželjnosti je sljedeći: engleski (potvrđuje to 93,8% uzorka), talijanski (73,9% uzorka), njemački (43,9% uzorka), francuski (25,2% uzorka), ruski (17,1% uzorka), kineski (9,3% uzorka) i španjolski jezik (6,2% uzorka). Osam ispitanika (0,22%) nije odgovorilo na pitanje.

Okvirno kod većine ispitanika nailazimo na podudaranje između jezika koje ispitanici poznaju i jezika koje bi željeli da im djeca uče u školi. Što se negativnih stavova prema učenju talijanskog jezika tiče, ukupno 909 ispitanika (25,9%) ne bi željelo da im dijete/djeca uče talijanski jezik u osnovnoj školi. Među njima se ističe 92,3% jednojezičnih ispitanika koja navode da poznaju samo hrvatski, 91,4% ispitanika koji navode hrvatski, engleski i njemački, 90% onih koji navode hrvatski i engleski, 87,5% onih koji navode hrvatski, engleski, njemački i još jedan strani jezik te 84% onih koji navode hrvatski, engleski i još jedan strani jezik. Dakako, bilo bi poželjno detaljnije istražiti razloge za nastajanje tih negativnih gledišta putem kvalitativnih metoda.

Scotti Jurić i Ambrosi Randić (2010) istražuju motivacijske faktore (integrativne i instrumentalne, intrinzične i ekstrinzične) u okviru učenja talijanskoga jezika kao jezika društvene sredine u Istri u vidu njegovog jezičnog prestiža, potreba i želja učenika, ciljeva učenja i očekivanja (u školi i kod kuće), zanimanja za talijansku kulturu i civilizaciju te postojanosti stereotipa i stavova². U odnosu na rezultate istraživanja kojega je provela Milani Kruljac (1988), autorice bilježe pad motivacije prema učenju talijanskoga jezika u Istri, čemu se pripisuje sve intenzivnija potražnja za engleskim kao stranim jezikom koji zauzima prvo mjesto na skali poželjnosti kod učenika, zbog mogućih društvenih, profesionalnih i gospodarskih prednosti³. Talijanski jezik zauzima drugo mjesto. Opadanje intrinzične i integrativne motivacije (koja se može izmijeniti

² Autorice su istražile motivacijske faktore pomoću anketnog obrasca na uzorku od 1156 učenika od 5. do 8. razreda hrvatskih osnovnih i srednjih škola u Bujama, Labinu, Pazinu, Poreču, Puli, Rijeci, Rovinju i Umagu te 688 roditelja i 51 nastavnika. Ustanovljeno je da motivacija učenika nije dovoljno snažna da bi se promoviralo učenje talijanskoga jezika.

³ U hrvatskome društvu postoji najveća instrumentalna i integracijska motivacija za ovladavanje engleskim jezikom (Mihaljević-Djigunović i Kovačić, 1996: 169), s obzirom na njegovu komunikacijsku značajnost na globalnoj svjetskoj razini. Talijanski često zauzima treće ili četvrto mjesto, dok drugo inače pripada njemačkome jeziku (Mardešić, 2010: 83). Mardešić (2010: 89) u svome istraživanju o motivaciji i stavovima prema učenju talijanskoga jezika provodi usporedbu rovinjskih i zagrebačkih osnovnoškolaca i srednjoškolaca te ukazuje na pozitivnije stavove i veću iskazanu motivaciju kod Zagrepčana, za koje predavanja predstavljaju jedinu potencijalnu priliku za izloženost talijanskome jeziku.

tijekom vremena) bilježi se kod osnovnoškolaca te opadanje traje tijekom pohađanja srednje škole (Baker, 1992; Scotti Jurić i Ambrosi Randić, 2010). Ističe se uloga instrumentalne (utilitarističke) orijentacije i ekstrinzične motivacije (nagrade i priznanja od strane roditelja, nastavnika i okoline)⁴ te u istraživanjima dominiraju instrumentalni razlozi vezani uz njegovo ovladavanje (Gardner, 1982).

U nastavku se donose rezultati usporedne analize i prikaz međuodnosa nezavisnih (fiksni) varijabli putem *cross-tab* metode. Posebna pozornost posvećena je vrijednostima koje odstupaju od prosjeka (dakle najvišima i najnižima). Obrada podataka, dakako, nije sveobuhvatna u vidu svih mogućih kombinacija i interpretacija, već su primijenjena samo najznačajnija križanja za svrhu i cilj ovoga istraživanja. U sljedećoj tablici donosimo odgovore ispitanika koji žele da im djeca u osnovnoj školi uče talijanski jezik. Kao što je prethodno napomenuto, analizom smo htjeli utvrditi postoji li kakav utjecaj između tih varijabli, odnosno razlučiti u kojoj se mjeri navedeni jezici/odgovori poklapaju.

U stupcima su kombinacije jezika koje ispitanici navode da poznaju, a u redovima žele li ili ne žele da im dijete uči talijanski jezik. Uzmemo li u obzir red u kojemu se nalazi jedinica *žele da im dijete uči talijanski*, moguće je promatrati kako se postotak mijenja ovisno o tome koje jezike roditelji poznaju (vidi tablicu 2).

U prosjeku bi 74,1% svih ispitanika željelo da im djeca u osnovnoj školi uče talijanski jezik. Vidljivo je da u svim grupama gdje ispitanici poznaju talijanski taj je postotak visok, a niži u onim gdje ga ne poznaju. Tako bi čak 100% ispitanika koji navode da poznaju talijanski, engleski i njemački jezik te oni koji navode hrvatski, talijanski i još jedan strani jezik (koji nije ni engleski ni njemački, kao npr. ruski, mađarski, albanski, itd.) htjelo da im dijete uči talijanski u osnovnoj školi. Oko 91% ispitanika koji poznaju hrvatski, talijanski i engleski te onih koji poznaju hrvatski, talijanski, engleski i njemački dijele istu želju, što se odnosi i na 88,8% ispitanika koji navode da poznaju hrvatski, talijanski, engleski, njemački i još jedan strani jezik; 80% onih koji navode hrvatski, talijanski i njemački; 78,7% onih koji navode hrvatski, talijanski, engleski i još jedan strani jezik; 77,8% onih koji navode engleski i talijanski; 75,2% onih koji navode hrvatski i talijanski, itd.

⁴ Na područjima gdje talijanski nije jezik društvene sredine i stoga nije obavezan u školama (nedostatak ekstrinzične motivacije), potrebno je razviti intrinzičnu osobnu motivaciju koja se temelji na subjektivnim pojedinačnim odabirima.

Tablica 2: Povezanost jezika koje roditelji poznaju i želje da njihova djeca uče talijanski jezik

Poznavanje jezika	Hr	Hr tal	Hr nije	Hr eng	Tal eng	Hr tal eng	Hr tal nije	Hr dr.	Hreng dr.	Hr nije dr.	Hr tal eng dr.	Dr.	Hr tal dr.	Eng	Hreng nije	Taleng nije	Hr Tal eng nije	Hr engnije dr.	Hr tal engnije	Tot.
Žele da dijete uči tal. jezik	131	25	32	28	2	125	3	1	21	1	13	2	0	1	148	0	90	14	11	909
Xxxxxx	92	24	60	90	22	9	20	33	84	25	21	100	0	100	91	0	9	87	11	26
%	11	76	21	32	7	131	12	2	4	3	48	0	1	0	14	1	958	2	87	259
%	8	75	40	10	78	91	80	67	16	75	79	0	100	0	9	100	91	12	89	74
Total	142	101	53	32	9	144	15	3	25	4	61	2	1	1	162	1	105	16	98	350
%	100,0%	100,0%	100,0%	10,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Kada se govori o talijanskome jeziku u Istri, prisutni su isprepleteni odnosi između dvojezičnosti/višejezičnosti pojedinaca i sklonosti prema jezičnome učenju, odnosno jezičnoj uporabi, što upućuje na činjenicu da postoji kompleksna sociolingvistička realnost. Naime, ta realnost nije posljedica samo i isključivo istarskoga institucionalnog jezičnog planiranja i institucionalizirane jezične politike. Oblik funkcionalne dvojezičnosti (hrvatsko/čakavsko-istromletačke) koji je potvrđen brojnim istraživanjima (Blagoni 2002, 2012, 2007; Filipi 1989, 1996, 2005, Milani Kruljac 1990, 1995, 1989, 2001) pretpostavlja neupitni komunikacijski prestiž hrvatskoga jezika (odnosno čakavskoga dijalekta) i istromletačkoga dijalekta u svakodnevnim interakcijama u Istri. Istromletački predstavlja prvi i pravi materinski jezik italofonih žitelja, odnosno međukohezivni kod koji se najradije koristi u okviru italofone istarske zajednice (Poropat Jeletić 2017). Talijanski jezik ne posjeduje komunikacijski prestiž u svakodnevici te zauzima simbolični jezični prostor, unatoč institucionalnoj potpori i zamišljenoj ulozi premošćivanja. Ne čudi, stoga, trend opadanja intrinzične i integrativne motivacije za učenje talijanskoga jezika, odnosno rast instrumentalne (utilitarističke) orijentacije i ekstrinzične motivacije za njegovo ovladavanje, u vidu neospornih prednosti koje njegovo poznavanje donosi osobito u okviru kulturno-umjetničke domene, prekogranične komunikacije i mobilnosti te gospodarskih i turističkih djelatnosti.

Zaključak

Istraživanjem se potvrđuje visoki udio višejezičnih (trojezičnih, odnosno četverojezičnih) istarskih žitelja te promicanje višejezičnosti kod mlađih generacija. Nadalje, kod većine ispitanika nailazi se na podudaranje između poznatih jezika i jezika koje bi oni kao roditelji ili budući roditelji željeli da im djeca uče u školi. Za razliku od ostatka Hrvatske (Mardešić 2010; Mihaljević Djigunović i Kovačić 1996), talijanski jezik u Istarskoj županiji zauzima drugo mjesto prema kriteriju poželjnosti, prvenstveno kao pragmatični resurs koji donosi instrumentalne prednosti, što je potvrđeno i drugim prethodno provedenim istraživanjima (Scotti Jurić i Ambrosi Randić 2010). Rezultati ovoga istraživanja ukazuju na to da je engleski jezik najpoželjniji jezik za učenje za gotovo sve ispitanike (94% uzorka), a talijanski se jezik nalazi na drugome mjestu (74% uzorka). Slijede njemački, francuski te ruski. U istarskome društvu, kao i u hrvatskome društvu, potvrđuje se sve intenzivnija potražnja za engleskim kao stranim jezikom te najveća instrumentalna i integracijska motivacija za ovladavanje engleskim jezikom (Mihaljević-Djigunović i Kovačić, 1996), s obzirom na njegov komunikacijski prestiž u svijetu. U ostatku Hrvatske, drugo mjesto po poželjnosti inače pripada njemačkome jeziku, a talijanski često zauzima treće ili četvrto mjesto (Mardešić, 2010). Dragovoljno ovladavanje talijanskoga jezika kod kroatofonih govornika u Istri povezano je u većoj mjeri s motivacijom da se jezikom čini (uporaba jezika u pragmatičnom smislu), čime se talijanskome pridaje značajka sredstva za općenje (Orbanić, 1999). Dakako, neosporive su instrumentalne prednosti koje znanje talijanskoga donosi kao pragmatični resurs. Na integrativnoj razini hrvatsko-talijanska dvojezičnost poima se kao neizostavivi dio istarskoga identiteta, a u skladu s poticanjem i razvijanjem višejezičnosti, odnosno jezičnoga pluralizma i višekulturalnosti.

Ispitanici, dakle, u skladu sa statutarnim odredbama dvojezične Istarske županije, dvojezičnih gradova i općina iskazuju podržavanje poticanja učenja talijanskoga jezika kao jezika društvene sredine. Time podržavaju njegovu javnu valjanost, funkcioniranje i širenje (Bogliun Debeljuh 1985). Na razini uzorka se dakle potvrđuje sociolingvistička i sociokulturna osviještenost roditelja/budućih roditelja kada je u pitanju višejezično ovladavanje mlađih generacija te značaj talijanskoga jezika, odnosno hrvatsko-talijanske dvojezičnosti u Istri (kao individualne i društvene pojave). Takvi povoljni stavovi i odnosi ispitanika ukazuju na prisutnost društvene zrelosti istarskih žitelja u vidu civilizacijskoga i demokratskoga prihvaćanja jezičnoga i sociokulturnoga pluralizma.

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Ukraine Incognita: Secondary Folklore of Non-Slavic National Minorities of Ukraine the End of XX – the Beginning of XXI Centuries

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Abstract: The article deals with the peculiarities of the process of revival of the folklore musical art of non-Slavic national minorities of Ukraine on the example of the most famous representatives and the most important features of the secular folklore representation (topics of songs, genre, stylistic characteristics, cultivated ceremonies) of each of these ethnic groups.

Keywords: national minority of Ukraine, ethnic culture, national art, ethnic musical art, musical secular folklore of Ukraine.

Україна incognita: вторинне фольклорне виконавство неслов'янських національних меншин України кінця XX – початку XXI ст.

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Анотація: У статті розглянуто особливості процесу відродження фольклорного музичного мистецтва неслов'янських національних меншин України на прикладі найвідоміших представників та найважливіших особливостей секундарної фольклорної репрезентації (тематика пісень, жанрові, стильові характеристики, культивована обрядовість) кожної із зазначених етнічних груп.

Ключові слова: національна меншина України, етнічна культура, національне мистецтво, етнічне музичне мистецтво, музичний секундарний фольклор України.

Постановка питання. Поступове відродження духовного життя національних меншин в Україні є одними із пріоритетних настанов культурної політики країни, яка всіляко прагне задовольнити культурні запити та потреби етнічних спільнот України, надати можливості представникам різних національностей плекати, зберігати свою етнічну виразність, мову й культуру, мистецтво, традиції, звичаї та обряди. Сформована за роки незалежності політико-правова база України створила надійне підґрунтя для гармонійного поєднання інтересів усіх етнонаціональних компонентів українського суспільства, рівних умов для їхньої активної участі в державотворчих процесах, забезпечення балансу й потреб розвитку як етнічної більшості, так й етнічних меншин [9]. Україна є багатонаціональною, поліетнічною державою, місцем, де перетинаються різні культури, територією, де можна почути фольклорне виконавство багатьох народів світу, які своєю культурою далекі від слов'янської ментальності та усної пісенної народної творчості. Проте саме така строката палітра віддалених за ментальністю та характером пісенно-музичного мистецтва, способом виконання культур неслов'янських національних меншин України творять різнопланове та поліфонічне фольклорне музичне сьогодення держави. **Актуальність теми** підтверджує зростаючий інтерес до етнічного музичного мистецтва в багатонаціональному українському суспільстві.

Огляд історіографії. Дослідження загального, оглядового характеру з науково-етнографічної методики збирання та вивчення народної музичної творчості належать таким науковцям: О. Аляб'єва, Ф. Колесси, К. Квітки, М. Максимовича, М. Лисенка, Д. Ревуцького, С. Людкевича, Й. Роздольського, М. Дмитренко, О. Серова. Питання розвитку фольклорних традицій окремих малих народів України висвітлене в роботах таких дослідників: Л. Мушкетик розглянув фольклор українсько-угорського порубіжжя; І. Миронова вивчила проблеми національно-культурного будівництва етнічних меншин Півдня України; О. Гуменюк дослідив кримськотатарську народну емігрантську пісню; І. Кдинова опрацювала проблеми музичного мистецтва національних менших України за роки незалежності. Календарно-обрядові звичаї етносів України досліджували Борисенко В. К. [1], О. В. Курочкін [7]. Вивченню музичних культур національних меншин було присвячено дисертаційне дослідження С. Таранця (фольклорні традиції болгар Одещини). О. Макаренко в «Нарисах з історії фольклорно-музичної спадщини Півдня Укра-

їни» подав порівняльну характеристику культур національних меншин та українців. Однак, відсутні дослідження, які б розглядали та охопили цілісний процес вторинного фольклорного виконавства неслов'янських національних меншин України від часу проголошення незалежності й донині.

Метою статті є охарактеризувати процес відродження та розвитку фольклорного музичного мистецтва неслов'янських національних меншин України на прикладі найвідоміших представників кожної з чисельних общин; визначити найбільш апробовані ними жанри пісенної усної народної творчості та календарної обрядовості. **Новизна роботи.** Вперше зроблено спробу комплексно розглянути специфіку розвитку фольклорного виконавства неслов'янських національних меншин України в контексті масштабного сучасного фольклористичного руху держави.

Виклад основного матеріалу. Характеристика фольклорно-музичної традиції неслов'янських національних меншин України опирається на питомі риси відповідної національної культури: збереження базових (фундаментальних) рис етнічного характеру шляхом створення на базі громадських організацій, земляцтва та різноманітних об'єднань патріотичного та культурно-мистецького спрямування музичних колективів, які мають на меті відтворити та зберегти в діаспорі надбаня свого титульного народу. Як свідчать цифри останнього перепису населення України (2001 р.), національні (етнічні) меншини становили 14 млн. чол., або 27.3% від усіх жителів. Тут проживають представники понад 100 народів. Для задоволення мистецьких та культурних потреб малі народи України організують у рамках своїх общин громадські організації, земляцтва тощо. Зараз в країні створені та активно працюють понад 780 національно-культурних товариств, на базі яких функціонують гуртки, ансамблі, хореографічні колективи, недільні школи, курси з вивчення мов тощо. Вони належать до Асоціації національно-культурних об'єднань й спільно послідовно розбудовують культурно-мистецьке життя національних меншин, сприяють відродженню національних традицій. Нині діє 95 центрів національних культур, Будинків народної творчості, центрів фольклору та етнографії, близько 2 тис. національних аматорських колективів [11].

Найбільш популярними формами обміну мистецькими доробками та популяризації фольклору національних меншин є фестивалі, огляди-конкурси та інші культурні акції: Всеукраїнський фестиваль мистецтв національних меншин «Ми – українські» (м. Запоріжжя), Міжнародний тюрко-татарський конкурс-фестиваль

«Київ-сандугачі», Міжнародний фестиваль ромів «Амала» (Київ), Всеукраїнський фестиваль єврейської культури «Шолом, Україно!» (Київ), Міжнародний фестиваль культур національних меншин «Мелодії солоних озер» (Ужгород), Київський етнічний фестиваль «Фольклорама» [9]. Варто наголосити на форумі національних культур «Всі ми діти твої, Україно» (Вінниця, Шаргород, з 1992), у якому беруть участь хорові, музичні, хореографічні, вокально-хореографічні колективи, вокальні ансамблі та окремі виконавці авторських творів на мові свого народу, солісти-вокалісти, інструменталісти громадських організацій національних меншин України.

Найбільшою етнічною групою неслов'ян України є **молдовани** (0,5 %; здебільшого проживають на території Одеської та Чернівецької областей, значно менше на Сході країни). Молдовани, як і українці, – аграрний та віруючий народ, тому їхня пісенна спадщина також сконцентрована на хліборобному та релігійному календарях. Саме тому народнопісенні жанри, які найчастіше культивуються фольклорними колективами молдавської національної меншини на теренах України, це календарна обрядовість (зокрема, колядки, щедрівки в молдаван – хзітура, плугу, урэтура та інші), родинно-побутова тематика тощо. Котовський р-н Одеської області багатий на ансамбль молдавської музики «Тараф» (с. Стара Кульна), колектив шумових інструментів «Лошкарі» (с. Липецьке II ч.), фольклорний колектив молдавської культури «Каса маре» (с. Липецьке), які популяризують традиції свого титульного народу, виконують молдавські народні пісні, здебільшого родинно-побутового та патріотичного характерів, застосовують яскравий музичний супровід під скрипку, трубу, баян, най, флуер, чімпай, цимбали тощо. Відтворенням народних обрядів зимового циклу займається народний аматорський фольклорно-етнографічний колектив **«Церенкуца»** КУ «Клуб с. Маршинці» Новоселицький р-ну Чернівецької обл. (керівник Аурелія Бордіян). Колектив прагне показати різнобарвність та строкатість місцевих народних звичаїв та обрядів, своєрідність національного молдавського строю, неповторну кольорову гаму цього вбрання.

За чисельністю населення наступним серед неслов'ян етнічним народом України виступають **кримські татари** (0,5 %; мешкають на території АР Крим (після недавньої окупації Кримського півострова багато з його жителів перебралися до Києва), в Запорізькій та Херсонській областях). Кримські татари здавна славились любов'ю до музики й співів. Розрізняють такі групи пісень кримських татар:

трудо́ві (делейрджилер), хороводні (бегим кврт), весільні (салгьмр бою), любовні (еля козьялюи), сімейні (попувл шалим), соціальні (бир кичкене алаша), молодецькі (алим), солдатські (солдат Али), історичні (сувихкьсув) та інші. Високе визнання отримав вокальний народний ансамбль татарської пісні «Шатлик» (худ. керівник – Елеонора Булатова, 1989). Ансамблем випущено аудіокасети: «Тальян мони» (Душа гармоні), «Ін зур бахет» (Велике щастя) та жартівливої композиції «Жомга» (Зустріч у п'ятницю). Сповіданням традицій творчості народу, його найвищої духовної культури славиться кримськотатарський фольклорний ансамбль «Кирим» (1990, Сімферополь, художній керівник – заслужений діяч мистецтв України Сервер Какура). На основі кримськотатарських народних пісень і танців, сказань і легенд ним створені вокально-хореографічні композиції: «Аг'ир ава ве Хайтарма», «Тим-тим», «Явлук'», «Чобан», «Дюгюн» і багато інших. Колектив ретельно збирає безцінну музичну спадщину кримськотатарського народу. До оркестру ансамблю залучені старовинні національні інструменти кримських татар – чубук-давул, уд, зурна, кавал, ней, дарі, саз тощо. У репертуарі ансамблю «Кирим» присутній один із невивчених жанрів – духовний спів «ілягі» [5].

Яро відстоюють свої традиції та мову **угорці** України (0,3 %; проживають у Закарпатській (96.7%) та Дніпропетровській (0.5%) областях). Серед досить великої кількості громадських організацій угорців діють такі колективи: ансамбль «Угорські мелодії», фольклорний гурт із Вишкова «Шодро», народний самодіяльний ансамбль угорської народної пісні «Ружа» Будинку культури с. Тийглаш (керівник Сікора Ч.), ансамбль «Чіпкиш» (керівник Молнар І.), ансамбль угорських народних інструментів Ужгородського коледжу культури і мистецтва (керівник Михайло Петрушевський), народний інструментальний ансамбль «Тисогаті» с. Салівка (керівник Біро Аніко), народні троїсті музики родин Маньо та Шіманів Тячівського р-ну, фольклорний колектив «Нітниківк», любительське об'єднання народної пісні «Чологань» (керівник Марія Ігнац), інструментальний ансамбль «Цімбори» (керівник Федір Бернат) тощо. Популяризацією слов'янської та не-слов'янської народної усної пісенної творчості займається фольклорний ансамбль «**Ужгород**». Творча робота колективу зорієнтована на специфіку різних регіональних локально-етнографічних культур – гуцулів, бойків, лемків та національних меншин (угорців). У репертуарі – закарпатоукраїнські, угорські, словацькі, румунські пісні, народні танці, весільні інструментальні мелодії, вокально-хореогра-

фічні та інструментальні композиції. Ансамблісти займаються пошуком не популярних пісень, а менш поширених, тих, які збереглися в окремих місцевостях Закарпаття. Такі пісні, як «Долина, долина», «Заграй, циган, тоту товту», «Ой летіли гусоньки» є тому потвердженням. У програмі виступів ансамблю – латканки, коломийки Воловецького, Великоберезнянського та інших районів, парубоцькі весільні пісні з Мукачівщини та інші, а також весільна обрядовість українських угорців [3].

Іншим неслов'янським народом України є **румун** (0,3 %; проживають переважно на Буковині (115 тис., 76% румунів України) та Північній Мармарощині). Серед цієї етнічної групи існують такі фольклорні колективи: фольклорно-етнографічний ансамбль «Мергерітар» при Будинку культури села Магала Новоселицького р-ну, Чернівецької обл., народний аматорський фольклорний колектив «Датіна» Будинку культури с. Опришени Глибоцького р-ну, «Мерцішор» клубу мікрорайону «Красногорівка» м. Чернівці, фольклорний колектив «Ізвораш» Будинку культури с. Ропча Сторожинецького р-ну; фольклорні колективи «Царанкуца» Будинку культури с. Сучевени та «Калинонька» Будинку культури с. Черепківка Глибоцького району, фольклорний колектив «Бусуйок молдовенеск» с. Строїнці (Л. Ротару), хоровий колектив «Драгош воде», оркестри румунської музики «Мерцішор», «Мугурел», «Плай» та ін. [10]. Фольклорний ансамбль **«Трайстуца»** Глибоцького Будинку творчості дітей та юнацтва на базі Купського НВК №2 (керівник – Марія Іллівна Зегрі) був заснований у 2001 році за бажанням учнів, учителів, батьків та адміністрації школи з метою збереження й розвитку давніх народних традицій та обрядів румунів Буковинського краю. Фольклорний ансамбль зберігає та продовжує місцеві традиції. Зокрема, представляє стародавні обряди та свята «Ла стина чобеняске», «Кинтекул де ла буніка ші катрінца ші опінка», «Ашай жокул нямулуй», «Хай копий се коліндем», Фестиваль «Флоріле далбе» [8]. Ансамбль є учасником багатьох регіональних фестивалів, вечорів румунської культури, тематичних свят та культурних заходів. Крім того, румунська община традиційно проводить у Чернівцях національні свята «Мерцішор», «Лімба ноастре чя ромине» та «Флоріле далбе».

Чільне та активне місце з-поміж національних меншин України займали (до Другої світової війни) **євреї** (0,2 %; м. Київ, в Одеська, Дніпровська, Харківська, Донецька, Вінницька, Житомирська, Чернівецька області). Популярним фолькло-

ним жанром єврейських колективів України є фрейлакси – єврейські пісні емоційно-проникливого характеру. Окрім того, єврейський фольклор часто передбачає виконання балад, скорбничих плачів, застольних, робочих та рекрутських пісень. Виділяються серед колективів: народний квартет «Шейне-Халев», при релігійній громаді діють фольклорні колективи «Мехина 12» і «Ніколь-Хале», які продовжують традиції народного духовного співу євреїв (Вінниця). Популяризує єврейську народну пісенну творчість інструментальний ансамбль клезмери «Фрейлекс», який стилізує давні єврейські пісні та мелодії, виконує пісенне попурі (клезмери – єврейські музики, які подорожували селами й містечками, грали на різних святкових гуляннях). Клейзмерський інструментальний ансамбль Вознесенської релігійної громади «Хабад Любович» виконує народні гімни, релігійні пісні, народні мелодії, попурі на теми єврейських народних танців). Активним учасником міжнародних та всеукраїнських фестивалів («Шалом, Україна», «Клезфести в Україні») є ансамбль єврейської музики «Мазл Тов» (м. Первомайськ). Народний аматорський вокальний ансамбль «Сімхе» виконує духовні народні єврейські пісні, прагне відтворити східну мелізматичну й традиційне гармонійне багатоголосся, що притаманне єврейській народній пісні; демонструє традиційний одяг та специфічну поведінкову манеру на сцені.

Спільними за певними ознаками є національні меншини **вірмен** (0,2 %), **грузинська** (0,1 %) та **азербайджанська** об'єднані громади України. Вірмен презентує народний ансамбль пісні й танцю **«Айренік»** (1997, існує на базі вірменського молодіжного клубу в м. Київ) Союзу вірмен України. У репертуарі ансамблю понад 30 народних вокально-хореографічних композицій патріотичного та календарно-обрядового змісту. Популярність мають постанови «Шалахо», «Егег», «Кочари», «Терендез» та вокально-хореографічна увертюра «Вірменія». Грузинську пісенну мелізматичну культивує **грузинська** національна меншина. Найважливішу роль у популяризації грузинської пісні займає грузинська музична школа-студія «Іберія» (2002, Київ, керівник – М. Сулаквелідзе). Школою щороку проводяться спільні концерти під назвою «Вінок дружби». **Азербайджанську** народну пісенну традицію підтримує в Україні ансамбль пісні й танцю «Азербайджан» (худ. керівник – народний артист України Гурбан Аббасов). До складу ансамблю входить понад 60 осіб.

Давню, але уже не чисельну групу, представляють **греки** України (0,2 %). Жанрова система грецьких народних пісень охоплює такі їхні різновиди, як епічні,

історичні, побутові. На сучасному етапі у фольклорній традиції греків Приазов'я існують не лише давні за походженням обрядові історичні та ліричні пісні, частівки, але й твори нового румейського фольклору, що зароджувався у 19 ст. [5]. Народний грецький фольклорний самодіяльний ансамбль пісні й танцю «**Сарта-нські самоцвіти**» гідно відроджує традиційну музику греків на теренах нашої держави. У 2002 році ансамбль став дипломантом Міжнародного академічного рейтингу «Золота фортуна» за значний вклад у розвиток грецької національної культури й високу виконавчу майстерність. Репертуар ансамблю складається зі старовинних мелодій, народних пісень і танців, а також сучасних творів румейських поетів і музикантів. У Ніжині діє дитячий хореографічний колектив «Зосимки», учасники якого виконують народні грецькі танці й пісні на концертах і фестивалях.

Національна меншина **ромів** України налічує лише 0,1 % від загального населення країни. Цей народ відомий своїми фольклорними романсами, запальними весільними танцями й мажорною музикою. Відомі такі колективи: народний аматорський ансамбль пісні й танцю «Братство» Вінницької обласної громадської організації «Чачуно алав», циганські ансамблі – «Ягорі» Іванівського СБК Калинівського району, «Братство» та «Шатро» м. Вінниці; ансамбль циганської пісні і танцю «Тернер» (при циганській діаспорі м. Коростень). Усі вони пропагують фольклорне мистецтво своєї народності, презентують різноманітні національні костюми та специфічну обрядовість (ворожбитство, шаманство, мандрівний театр), яка також супроводжується піснями. Діяльність циганського фольклорного ансамблю «**Бахтале**» (1985) демонструє колорит циганського мистецтва південної України; оспівує нелегку кочову долю циганів, часто складні родинно-побутові реалії, швидке заміжжя, високу смертність тощо. Однією із провідних тематик репертуару ансамблю є пісні про кохання, які передаються з покоління в покоління. Члени ансамблю прагнуть відтворювати протяжне багатоголосся, надривний спів, як одні із найважливіших традицій циган.

Німці також виступають давньою, але нині уже нечисельною меншиною України (33.3 тис.; Дніпровська, Донецька, Одеська, Закарпатська, Запорізька, Луганська обл., АР Крим). У Чернівцях існують австро-німецький ансамбль народної пісні «Кляйнер-Фенікс», дорослий та дитячий аматорські фольклорні колективи «Фантазія» (громадська організація «Товариство німців «Відергебурт»»), які продовжують давні традиції німців міста, виконують німецькі народні пісні та організують свята на Панській вулиці міста [5]. Театр німецького фольклорного танцю

«DEUTSCHE QUELLE» (худ. Керівник – С. Цех) є лауреатом міжнародних та всеукраїнських фестивалів, володарем багатьох дипломів та нагород за участь у концертах державного рівня. Фольклорний ансамбль «Heimliche Melodie» (Хаймеліхе мелоді; керівник – Л. Сорокопуд, 1996, на базі Товариства німців «Відергебурт») за провідний напрямок має виконання тірольських народних пісень.

Національна меншина **литовців** налічує 7207 осіб. Існує кілька колективів вторинного виконавства литовців. Ансамбль «Вільтіс» (з лит. Viltis – надія) Київського товариства литовської культури, який апробує найкращі традиції народного фольклору. У репертуарі колективу понад 50 творів: народні пісні, обрядові та релігійні, жартівливі. Пісня «Мусу денос кайп швянтес» (у перекладі - «наші дні наче свято») та литовський народний танок «Полька» є тому яскравим потвердженням. Учасників самодіяльного колективу Київського товариства литовської культури ім. Майроніса – фольклорно-етнографічний ансамбль «Sesules» єднає любов до народного литовського фольклору. у репертуарі колективу – народні пісні й танці Литви [6].

Замикають огляд вторинного виконавства та жанрово-тематичних особливостей побутування пісенного фольклору неслов'янських національних меншин України – **гагаузи** (31 923 особи) та **ассирійці** (3.143 чол.). Народне музичне мистецтво Гагаузького культурного товариства представляє вокальний дует сестер Ганни та Юлії Мітіогло. У репертуарі дуету народні гагаузькі твори, неповторні й мелодійні, з етнічним забарвленням національного горлового співу. **Ассирійці** попри бездержавність прагнуть зберегти рідну мову, національні музичні, зокрема, пісенно-інструментальні традиції. Діяльність фольклорної групи «Маднха» («Схід», 1981, Аветис Балаянц) є прикладом збереження національних музичних традицій, стилізованих за допомогою вокально-інтонаційних прийомів звуковидобування. У репертуарі групи є автентичні пісні, записані на території сучасного Іраку [4].

Висновки. У статті розглянуто особливості процесу відродження фольклорного музичного мистецтва неслов'янських національних меншин України на прикладі найвідоміших представників та найважливіших особливостей секундарної фольклорної репрезентації (тематика пісень, жанрові, стильові характеристики, культивована обрядовість) кожної із зазначених етнічних груп. Визначено, що найбільш популярними напрямками побутування вторинних фольклорних колективів неслов'янських національних меншин є відродження власних національних

традицій в українському етнокультурному контексті, спрямованих на ознайомлення з їхніми культурами, пісенним фольклором, прагненням бути почутими та побаченими [2]. **Перспективи подальших досліджень.** У розвідці розглянуто лише мала частка колективів-представників усіх національних меншин та апробованого ними фольклорного пісенного матеріалу. Подальші дослідження варто зосередити на ширшому аналізі кожної із зазначених груп та на розгляді особливостей виконання ними своєї фольклорної спадщини.

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Issues of Identification of Religious Symbols Within the Framework of the Criminological Theory of Religious Hygiene of the Population

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Abstract: In this paper, the authors propose to legislatively limit the symbology of cults dangerous for society.

Keywords: symbol; symbolism; religion; cult; a warning; criminality and association.

Вопросы идентификации религиозных символов в рамках криминологической теории религиозной гигиены населения

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Аннотация: В данной работе авторы предлагают конкретные меры по предупреждению антисоциального воздействия на общество со стороны социально-опасных религиозных культов путем законодательного ограничения распространения их символических изображений.

Ключевые слова: символ; символика; религия; культ; предупреждение; криминогенность и объединения.

В криминологических исследованиях преступлений, совершенных по религиозным мотивам, возникают сложности идентификации религиозных символов с исповедуемой идеологией. В большинстве случаев схожую, одинаковую или неразличимую для не специалиста символику используют совершенно разные по социальной и иной направленности общественные, в том числе и религиозные объединения.

Понятие «символ» происходит от греческого слова *σύμβολον* - связь, сущность в немногих знаках. Под символом подразумевается картинное изображение с переносным иносказательным значением¹. Система символов и знаков - «символика», отличается многообразием своего содержания, с помощью которых выражаются отвлеченные понятия и концепции.

В настоящее время существуют различные виды символик, таких как:

1) Государственная символика - отличительные знаки конкретного государства. Данная символика установлена конституцией или специальным законом;

2) Символика общественных объединений, организаций, движений. Такая символика должна соответствовать требованиям законодательства Российской Федерации об охране интеллектуальной собственности²;

3) Символика городов и населенных пунктов также регулируется и принимается в соответствии с законодательством³;

4) Военная символика - совокупность символов вооруженных сил, учреждены Указами Президента и Приказами Министра обороны РФ⁴;

¹Литературная энциклопедия: Словарь литературных терминов: В 2-х т. — М.; Л.: Изд-во Л. Д. Френкель Под ред. Н. Бродского, А. Лаврецкого, Э. Лунина, В. Львова-Рогачевского, М. Розанова, В. Чешихина-Ветринского, 1925.

² Федеральный Закон от 12.01.1996 N 7-ФЗ (ред. от 03.07.2016) "О некоммерческих организациях", ст. 3, п. 5.

³ Федеральный закон "Об общих принципах организации местного самоуправления в Российской Федерации" от 06.10.2003 N 131-ФЗ, ст. 9.

⁴ Приказ Министра обороны Российской Федерации от 26 мая 2004 г. № 160 «О флаге Военно-воздушных сил»

5) Религиозная символика;

В настоящее время исследованию вопросов религиозных символов уделяется недостаточное внимание, как уже изученной проблеме, несмотря на то, что в современном мире огромное количество преступлений совершаются под той или иной религиозной символикой, часто вновь созданной.

Сложности появляются в вопросах идентификации различного рода религиозных символов, т.е. невозможно сразу идентифицировать носителя определенной символики и исповедуемую им идеологию, их социальную полезность, социальную нейтральность и социальную опасность.

Проблематика возникает в различных плоскостях, а именно:

во-первых, схожую символику могут использовать различные по своей сути религиозные объединения, например, христианский крест;

во-вторых, аналогичную символику могут использовать некоторые политические объединения. Так, например, свастика - индуистский символ Солнца, гармонии, единства сил и стихий, а также благоприятных предначертаний;

в-третьих, она же может стать и частью государственной символики, и частью символики общественного объединения. Так, например, символ ислама - полумесяц и пятиконечная звезда;

в-четвертых, при совершении различных ритуалов символика может меняться внутри одного религиозного объединения в зависимости от сложности и важности самого ритуала;

в-пятых, помимо формы (орнамента) или части орнамента может меняться цвет и форма символики в зависимости от совершаемого ритуала;

в-шестых, для правильной (точной) идентификации религиозной символики необходимо также знать ее сочетание с другими религиозными атрибутами, например, с религиозной одеждой. Известно, что при совершении террористических актов последователи различных религий носят соответствующую для этого момента одежду или некоторые традиционные части одежды удаляются;

в-седьмых, религиозной символикой может быть целое здание или часть здания, часть окружающей природы, она также может, выражаться в действиях человека, в его мимике;

Помимо вышеперечисленного, большое значение для точной идентификации имеют период времени года; пол индивида, носившего символику; помещение; место нанесения символики и внешняя среда.

На наш взгляд, немаловажен и сам материал, из чего изготовлена сама символика, в некоторых случаях это может быть от различного вида красителя до останков частей человеческого тела.

В настоящее время в мире существуют масштабные социально-опасные культы, использующие учения мировых и национально-государственных религий в своих антисоциальных целях. Например, Аль-Каида, ИГИЛ (ИГ), Фронт ан-Нусра.

В подобных объединениях, кроме проведения террористических актов, постоянно ведут деятельность по созданию новых псевдоисламистских образований и по радикализации уже существующих. Их основной целью является свержение светских режимов в арабских странах и установление там теократического строя с нормами шариата (исламского права) в искаженной интерпретации, а в перспективе - объединение всех мусульманских стран в один всемирный халифат. Также они декларируют противодействие распространению влияния западных стран, особенно США, как в регионе, так и по всему миру, считая западную цивилизацию развращенной и ущербной, при этом с охотой идут на контакт с представителями последних и не боятся применять технику и технологии, разработанные «развратной цивилизацией». Отдельным пунктом является уничтожение государства Израиль.

Так, например, основными целями «Аль-Каида», по словам Бен Ладена, всегда были: изгнание американцев и американского влияния из всех мусульманских стран, особенно Саудовской Аравии; уничтожение Израиля; свержение прозападных диктатур (по их мнению) во всем Ближнем Востоке.

Что касается используемой ими символики, особенно исламской, то ее, как таковой, не существует, поскольку эта религия максимально лаконична в употреблении каких-либо изображений и совершенно в них не нуждается. Однако существует определенная атрибутика, обрядовость, свод правил, что тоже является своеобразным символом. В исламе престол, управляющий миром, поддерживают восемь ангелов, соответствующих восьми направлениям и восьми группам букв арабского алфавита. В связи с этим в восточных орнаментах приветствуются и восьмиконечные звезды⁵,

⁵Исламская символика. Полная энциклопедия символов. - Режим доступа: http://the-symbol.ru/islamskaya_religioznayz_simvolika.htm.

«Аль-Каида» (араб. القاعدة, al-qā'idah, «основа», «база», «фундамент», «принцип») - одна из самых крупных ультрарадикальных международных террористических организации.

Религиозной символикой «Аль-Каида» является прямоугольный флаг, на котором написано мусульманскими символами веры на арабском языке لا إله إلا الله (Ля иляха илля Ллах Мухаммадун Расулю-Ллах), что в переводе на русский означает «Нет божества кроме Бога Единого, и Мухаммад - пророк Его».

«Исламское государство», ИГ или ИГИЛ - международная террористическая организация, исповедующая ислам суннитского направления, действует преимущественно на территории Саудовской Аравии и Ирака. С 2013 года непризнанное квазигосударство, самопровозглашенное как всемирный халифат с шариатской формой правления и штаб-квартирой в сирийском городе Эр-Ракка.

Возникла в 1999 году в Ираке как террористическая группировка «Джамаат ат-Таухид валь-Джихад» (основатель иорданец Ахмед Фадыль Халейла, известный как Абу Мусаб аз-Заркави). Целью данной террористической организации является захват всего исламского мира и создание на территории исторического Леванта суннитского халифата.

Символикой ИГИЛ, так же, как и в символике «Аль-Каида», является черный прямоугольный флаг с изображением на нем белых мусульманских символов веры в виде надписи и круга неправильной формы, в центре которого надпись. На флаге вверху грубой арабской вязью написано "иляха илля" La-Ilah, в переводе означает "Там нет Бога, кроме Бога". Белый круг неправильной формы в центре флага имитирует личную перстень-печатку самого пророка, отпечаток которой он оставлял под письмами вместо своей подписи. Внутри всего лишь три слова: «Алла расул Мухаммад» (надпись читается снизу вверх), что означает в переводе "Мухаммад посланник Бога". Поскольку это имитация текста полутора тысячелетней давности, то все намеренно написано кривым шрифтом.

Фронт ан-Нусра — «Фронт помощи народу аш-Шама», (с июля 2016 года «Джебхат Фатах аш-Шам» (араб. الجبهة الإسلامية في الشام)) - отделение международной исламистской террористической организации «Аль-Каида» на территории Сирии и Ливана.

Группировка основана 23 января 2012 года во время начала гражданской войны в Сирии. С тех пор она рассматривается как одна из наиболее успешных среди повстанческих группировок. Основная цель фронта «ан-Нусра» - в долгосрочной перспективе установить исламский халифат. Стратегия «ан-Нусра» заключается в интегрировании местных сообществ и получении их благосклонного к себе отношения, что отвечает директиве Аймана аз-Завахири, по которой организация должна улучшить свои связи с сирийским населением и повстанческими формированиями.

Символикой, как и в вышеперечисленных, является черный флаг с надписями на арабском языке. Крупная надпись на арабском языке переводится как: «Нет Бога, кроме Аллаха». Выполнена она в белых тонах как символ выделения единобожьей истины среди мирового культа. Надпись, находящаяся ниже, и изображение меча символизируют «священную войну». Данное изображение такого флага было взято у флага Джихада.

Во всех взятых террористических организациях используется черный флаг. Черный флаг является флагом Посланника Аллаха Мухаммада, который назывался «аль-Укьяб» (в переводе означает орел, царь птиц и воли). Доказательством тому служит хадис, написанный в книге ас-Суюти «аль-Хави», в котором говорится: «Флаг Посланника Аллаха был черным и назывался аль-Укьяб, и его чалма была черного цвета».

Преступления, совершаемые последователями различного рода религиозных объединений, не ограничиваются только культовым (религиозным) мотивом, а охватывают весь спектр гражданско-правовых, административно-правовых и уголовно-правовых запретов и этим создают тяжелейшую криминогенную ситуацию, усложненную религиозной тематикой в разной степени. Несомненно, подобная ситуация требует серьезного отношения к себе, т.е. разработки целого ряда мер по предупреждению подобных явлений, в том числе и в части демонстрации и ношения в любой форме символик социально-опасных культов, прибегающих к террористическому принуждению, равно, как и изображения их создателей, идеологов и лидеров.

Для сокращения отрицательного влияния со стороны исследуемых объединений мы предлагаем:

1) внести поправки в статью 20.3 КоАП и статью 20.29 КоАП путем включения символики социально-опасных религиозных культов, прибегающих к террористическому принуждению;

2) приравнять к таковой символике любое изображение лидеров, идеологов и основателей исследуемых объединений;

3) данные статьи криминализировать, т.е. признать в уголовном законе деяние общественно опасным и объявить его уголовно наказуемым;

4) разрешить их демонстрацию и использование для научно-исследовательских работ и официально зарегистрированных в РФ средств массовой информации;

5) создать реестр запрещенных символики и атрибутики подобных объединений;

По нашему мнению, перечисленные меры позволят в разы сократить антисоциальное воздействие на общество со стороны социально-опасных культов.

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The Types of Communication in Animate and Inanimate Nature and Their Classification

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Abstract: This work is intended to demonstrate an unusual view on the famous problem of the interaction of nature (people, society, flora, fauna, civilization) and inanimate (Earth, Sun and Space) live. The authors examine communication models of famous authors, based on the different objects of communication, and offer their unconventional view on the variety of subjects of communication. Selected communication options, and a classification of the types of communication are presented in the article. The article is addressed to those who study the processes of communication and its peculiarities in the modern world, its potential threat to humankind in a global context.

Keywords: communication, animate and inanimate nature, globalization, communicant, recipient, object and subject of communication, communication war.

Виды коммуникации в живой и неживой природе и их классификация

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Аннотация: Данная статья призвана продемонстрировать необычный взгляд по известной проблеме – взаимодействие живой природы (человек, социум, флора, фауна, цивилизация) с неживой (Земля, Солнце и Звездный мир). Авторы рассматривают модели коммуникации известных авторов, построенные в зависимости от объекта коммуникации, и предлагают свой нетрадиционный взгляд на рассмотрение разновидностей субъектов коммуникации. Коммуникации в современном мире и взаимодействие людей с живыми структурами, природными неживыми структурами и различных структур между собой рассмотрены с целью раскрыть сущность и природу коммуникации человека с окружающим миром и их проявления. Выделены параметры коммуникации и предложена классификация видов коммуникации, проведен анализ сущности коммуникации, форм ее проявления и реализации, определены значащие факторы, средства, объекты и субъекты (структуры живой и неживой природы) для классификации разновидностей коммуникации. Статья адресована тем, кто изучает процессы коммуникации, её особенности в современном мире, её возможные угрозы для человечества в глобальном контексте.

Ключевые слова: коммуникация, живая и неживая природа, глобализация, коммуникант, реципиент, объект и субъект коммуникации, коммуникационные войны.

Введение

Человеческие формации прошли различные стадии развития, связанные с устной речью, письменностью, печатным словом, электронными средствами массовой коммуникаций (СМК). По мере трансформации субъектов коммуникации, менялся и её объект. XXI век – век глобализации коммуникаций. Термин «глобализация» отражает качественные изменения в различных сферах социума и цивилизации, в каждой из которых, возникают новые коммуникативные связи. При более широком рассмотрении, люди связаны не только между собой как личности и как участники социума, но и со всеми объектами, явлениями и

событиями в природе, которые их окружают его. Компоненты природы связаны между собой и воздействуют друг на друга независимо от человека. В то же время они воздействуют на отдельного человека и даже на глобальное сообщество. Следовательно, исследователям структуры и процесса коммуникаций необходимо рассматривать не только и состояние структуры (модели) коммуникации, процесс взаимодействия но и причинно-следственные связи, вызывающие их.

Методы, использованные в статье: дедукции, наблюдения, моделирования, сравнительный анализ, метод обобщений, классификации.

Понятие и авторское структурирование моделей коммуникации

Понятие «коммуникация» (от лат.communication), означает – делаю общим, общаюсь, взаимодействую. Это процесс, протекающий между отправителем и получателем сообщения – передача информации от субъекта объекту и обратно. При таком рассмотрении коммуникация – это разновидность взаимодействия между субъектами [1, с. 13]. Исключение составляет автокоммуникация, когда субъект общается с самим собой и одновременно выступает и как коммуникант, и как реципиент. Существуют и другие определения термина «коммуникация»: «коммуникация (лат. communicatio, от communico – делать общим, делать сообща, связывать, общаться), взаимодействие людей и животных, предполагающее обмен информацией с помощью специализирующих сигналов-посредников. В человеческом обществе коммуникация – общение, обмен мыслями, знаниями, чувствами, поступками. Коммуникация осуществляется посредством знаков; основным средством человеческой коммуникации считается вербальный (словесный) язык. В то же время невербальная коммуникация (жесты, мимика, условные знаки и т.д.) первична по происхождению, шире по объёму и иногда важнее для взаимопонимания.

При более широком рассмотрении коммуникация – это процесс, протекающий между отправителем и получателем, передача информации и взаимодействие (связь, воздействие) между живыми и неживыми структурами (компонентами) природы.

Сегодня широко известны модели коммуникации, сформированные известными авторами по различным основаниям классификации [2, с. 15]:

- 1) лингвистическая (У. Матурано);
- 2) литературная (В. Шкловский);

- 3) герменевтическая (Г. Шпет);
- 4) семиотическая (Ю. Лотман);
- 5) культурологическая (М. Бахтин);
- 6) психоаналитическая (З. Фрейд);
- 7) архетипическая (К.Г. Юнг);
- 8) психотерапевтическая (Ж.М.Э. Лакан);
- 9) «спираль молчания» (Э. Ноэль-Нойман);
- 10) диффузная (Э. Роджерс);
- 11) «привратника» (К. Левин);
- 12) мифологическая (Р. Барт, К. Леви-Стросс, Б. Малиновский);
- 13) цветовая (И. Глинская, С. Стефанов).

Важность учета перечисленных выше моделей при их теоретической интерпретации и практическом применении обоснована следующими факторами:

- Лингвистическая модель крайне важна, поскольку в качестве объекта коммуникации используется язык (определенная система знаков), с помощью которой информации придается смысловое значение.
- Литературная модель предполагает структуру или схему, по которой строится то, или иное литературное произведение.
- Герменевтическая модель подчеркивает значение слова в контексте для расшифровки текста или его перевода на другой язык.
- Семиотическая модель показывает значимость символа в объекте коммуникации, используемого для кодирования информации.
- Культурологическая модель подчеркивает диалогичность праздничной коммуникации, ее театральность, яркость, многовариантность.
- Психоаналитическая модель подчеркивает значение подсознательных процессов индивида, является основой для подпороговой коммуникации.
- Архетипическая модель используется в рекламе, при формировании имиджа известных личностей, обращая внимание на пласт древней культуры, ее национальные особенности.
- Психотерапевтическая модель подчеркивает особенности психики людей, их способности, и применяется для обучения языкам, в тренингах, (например, используя нейро-лингвистическое программирование).

- «Спираль молчания» – модель, используемая при формировании общественного мнения, когда люди из-за страха изоляции в обществе, сохраняют молчание, присоединяясь к большинству.
- Диффузная модель показывает коммуникацию инноваций, степень их распространения в обществе.
- Модель привратника подчеркивает значимость тех, кто работает с информацией, наделяя ее новыми смыслами.
- Мифологическая модель наиболее актуальна в современной социальной коммуникации, где создаются и внедряются в сознание граждан новые социально-политические мифы.
- Цветовая модель коммуникации, осуществляемая с помощью цветowych символов, она подчеркивает значение цвета в коммуникации (например, в геральдике государств, городов, логотипов товаров и др.).

Подчеркнем особенности цветовой модели коммуникации, предлагаемой авторами статьи. Человек воспринимает окружающую среду не только в виде картины, в которой имеются статические и динамические образы (контуры), но и в многоцветье радуги, включая смешение цветов, дающую широчайшую палитру для передачи и восприятия ее людьми. Цвет, как символ коммуникации несет огромную нагрузку и социальных организационных коммуникациях и в межличностных отношениях. Человека окружает цвет, люди краснеют от стыда и зеленеют от злости. Расы сформировались по цвету кожи. Цветовые гаммы стали использоваться как фирменные цвета, значительно упрощая идентификацию организаций и усиливая таким способом свои коммуникативные свойства.

Отличительные признаки и социальные задачи коммуникации

Люди – обитатели Галактики, дети Солнца, думающие создания Земли. Люди сотканы из вещества, существуют в различных измерениях полей и времени. Жизнь человека и всего человечества протекает в узелке двух бесконечностей – прошлого и будущего.

Люди – не просто живые существа, а индивидуумы и участники социума. В подсознании человека существует и низменное (борьба за власть, алчность, зависть, инстинкты), и возвышенное (любовь, сострадание, альтруизм). Эти чувства проявляются особенно ярко в межличностной, лично- социальной коммуникации.

Любой человек всегда находится в текущем процессе коммуникации. Умение эффективно построить коммуникационный процесс создает предпосылки для успеха. Таким образом, основными социальными задачами социальной коммуникации являются: 1) создание и поддержание общей картины мира; 2) создание картины отдельной общности (страны, группы и не только); 3) передача ценности культуры из поколения в поколение (в темпоральном разрезе).

Отличительными признаками коммуникации являются:

1. Наличие не менее одного или двух и более субъектов или объектов (отдельный человек, группа людей, общество и природа в целом) и средство коммуникации (объект).

2. Наличие передаваемых сведений в виде информации, описывающей материальный или нематериальный объект.

3. Целесообразность или функциональность, свойственная коммуникации [3, с. 15]:

Исходя из сказанного, можно сделать вывод: коммуникация есть прямое или опосредованное целесообразное взаимодействие двух или более субъектов (структур) посредством определенных символов.

Разновидности коммуникации:

В работе Ф.И. Шаркова [4, с. 269-270] даны определения и разновидности коммуникации, выделенные по различным основаниям классификации:

дистанционная, локальная, уличная (по пространству); аксиальная (по направлению); активная, пассивная (по силе воздействия); аудиовизуальная, вербальная, визуальная, невербальная, семиотическая (по объекту коммуникации); внутригрупповая, межличностная, межгрупповая, групповая, множественная, социальная, массовая, международная (по участникам коммуникации); внутриличностная (автокоммуникация); деловая, манипулятивная, маркетинговая, научная, политическая, производственная, протестная, рекламная, учебная, эксклюзивная (по цели); конфликтная, кризисная, экспрессивная (по результату); культурно-духовная, межкультурная, художественная (по влиянию культуры); моментальная, длительная (по времени); непосредственная, опосредованная (по структуре коммуникации); публичная, непубличная, офисная (по месту).

Из приведенных примеров можно заключить, что участниками коммуникации (отправитель и получатель), которые порождают и интерпретируют сообщения, могут быть как индивиды, так и общественные институты, социальные структуры, социумы и цивилизации в целом.

Ниже дана классификация видов коммуникации в зависимости от участников коммуникации, в системе человек – социум – фауна – флора – цивилизация.

Таблица 1. Участники и разновидности коммуникации в зависимости от участников коммуникации

Коммуни- кации	Разновидности коммуникаций в зависимости от участников коммуникации				
	<i>человек</i>	<i>социум</i>	<i>цивилизация</i>	<i>растения</i>	<i>животные</i>
автоком- муникация	автоличност- ная	автосо- циаль- ная	автоцивили- зационная	авто-фито	авто-зоо
личностная	межличностная	лично- сттно- социа- льная	лично- цивилизаци- онная	лично- фито	лично-зоо
социальная	социально- личностная	межсо- циаль- ная	социально- цивилиза- ционная	социально- фито	социально-зоо
цивилиза- ционная	цивилиза- ционно- личностная	цивилиз- ационно- социаль- ная	межцивили- зационная	цивилизаци- онно-фито	цивилизаци- онно-зоо
фитоком- муникация	фито- личностная	фито- социа- льная	фито- цивилизаци- онная	межфитовая	фито-зоо
зоокомму- никации	зоо-личностная	зоо- социа- льная	зоо-цивилизаци- онная	зоо-фито	межзоо

Раскроем содержание типов коммуникаций, приводимых в таблице 1.

Автокоммуникация – субъект общается, взаимодействует с самим собой, трансформируя своё сознание.

Личностная коммуникация – коммуникация между отдельными личностями (межличностная) или между личностями в группе. Личностная коммуникация подразделяется на:

- личностная однополая (мужчины с мужчинами, женщины с женщинами, мальчики с мальчиками или девочки с девочками);
- личностно-разнополая (гендерная) – мужчины с женщинами или девочки с мальчиками),
- семейная (муж с женой, бабушка и дедушка с внуками, супруги с детьми), кровно-родственная (коммуникация между кровными родственниками);
- коллегиальная (коммуникация между коллегами);
- другие виды коммуникации на базе различных межличностных связей (однокурсники, соотечественники и др.).

Социальная коммуникация – коммуникация социума или других социумов с личностью, коммуникация отдельных структур социума между собой в пределах одного социума, между социумами или их структурами. А также коммуникация социума со структурами цивилизаций как часть её или с другими цивилизациями, с растениями и животными.

Цивилизационная коммуникация – коммуникация личности в рамках своей цивилизации или других цивилизаций; социума в рамках своей цивилизации или других цивилизаций; цивилизации в рамках своей цивилизации или других цивилизаций. Сюда же можно отнести коммуникации, в которые вступает цивилизация с растениями и животными.

Фитокоммуникация – коммуникация между растениями или между растениями с человеком, социумом, цивилизацией и животными.

Зоокоммуникация – коммуникация между животными, животные с растениями, животные с человеком, животные с социумом и животные с цивилизацией.

В рассмотренных коммуникациях могут быть две разновидности результатов – гармоничные и конфликтные (коммуникационные конфликты или войны).

Для большей наглядности сведем примеры в таблицу 2.

Таблица 2. Гармоничные и конфликтные коммуникации

Коммуникации	Гармоничные взаимоотношения	Конфликтные взаимоотношения
Автокоммуникация	Счастье, радость, расцвет, рост, развитие, гармония, стабильность, любовь к себе	Угрызение совести, распад личности, раздвоение личности, недовольство, переоценка ценностей, агрессия
Межличностная однополовая коммуникация	Взаимопомощь, взаимопонимание, дружба	Споры, ссоры, конфликты, коммуникационные войны
Межличностная разнополовая (гендерная) коммуникация	Взаимопомощь, дружба, любовь	Споры, ссоры, конфликты, коммуникационные войны
Социальная коммуникация	Процветание, стабильность	Недовольство, агрессия, демонстрации, революции, гражданская война
Цивилизационная	Мирное сосуществование, взаимопомощь, историческая приемственность	Экономические блокады, информационные и коммуникационные войны, вооруженные конфликты
Зоокоммуникация	Взаимопонимание, взаимопомощь, забота, симбиоз	Агрессия, нападения, эксплуатация, уничтожение
Фитокоммуникация	Забота, симбиоз	Уничтожение, варварство, загрязнение

Все виды коммуникации приводят к развитию или к разрушению внутренней структуры коммуникации. Например, в автокоммуникации человек размышляет и приходит к определенному решению. Таким образом, в структуре его коммуникации появилось дополнение в виде нового результата. Это дополнение становится его достоянием, приступая к реализации своего решения, он создает новый продукт: рисует картину, пишет стихотворение или песню, сажает дерево. В коммуникации Человек-Социум последнее воздействует на человека, меняя его, а человек также может повлиять на изменение социума.

Можно расширить классификацию видов коммуникации, рассматривая подсистемы указанных базовых оснований классификации.

Классификация коммуникации живой и неживой природы

Природа является одновременно объединяющим и разъединяющим фактором между целым и её компонентами. Мембраны ощущения и восприятия, созданные Природой (глаза, уши, язык, нос и покров тела) и человеком (телескопы, микроскопы, солнечные очки,) расширяют возможности, эмоции человека, а иногда делают субъективным и иллюзорным его восприятие мира (например, с помощью алкоголя и наркотиков).

Люди постоянно взаимодействуют с окружающим их миром, обмениваясь информацией, веществом, энергией, приобретая все это у Природы. Взаимодействие между неживыми структурами природы – на основе закона всемирного тяготения, электромагнитных волн и других излучений. Красиво звучит поэтическое выражение этих процессов: «Звезда с звездой говорит» (М.Лермонтовым), «Земное эхо солнечных бурь» (А.Чижевским). Такие художественные приемы обогащают как содержание коммуникации, так и самих участников коммуникации, меняя определенным образом содержательные или формальные структуры коммуникаций.

Таблица 3. Коммуникация структур неживой и живой природы

Структуры реципиентов	Структуры воздействия		
	<i>Земля</i>	<i>Солнечная система</i>	<i>Звездные миры</i>
люди	терраличностная	гелиоличностная	астроличностная
социум	терасоциальная	гелиосоциальная	астросоциальная
Человечество (цивилизации)	терраци- визационная	гелиоцивилизационная	астроцивилизационная
растения	террафито	гелиофито	астрофито
животные	терразоо	гелиозоо	астрозоо

В каждой ячейке таблицы 3 дано название коммуникаций без слова «коммуникация». Термин «терра» предложил студент ИМЭБ РУДН Михаил Смирнов. Метафорично можно было бы определить каждую ячейку первой строки – сознательные ростки на Земле, дети Солнца, обитатели звездного мира.

Множество примеров осуществления названных типов и видов коммуникаций описывается в художественных произведениях. Например, постоянно общаются между собой Герои сказок. Вспомним хотя бы такие русские сказки как «Колобок», «Золотой петушок», «Серый волк», «Дедушкина рукавичка», «Баба Яга», «Золотая рыбка» и др. О разных видах коммуникации далее поговорим на примере сказки Петра Павловича Ершова «Конёк-Горбунок».

Пётр Павлович Ершов (1815—1869) родился в Сибири. В детстве он слушал сказки сибирских крестьян, многие запомнил на всю жизнь и сам хорошо их рассказывал. Однако, вряд ли Пётр Павлович Ершов мог предположить, какое великое множество разновидностей коммуникации он использовал в сказке «Конёк-Горбунок». Это очевидно, несмотря на то, что термин «коммуникация» он вообще не использовал. Сказка была напечатана в 1834 году. А. С. Пушкин отозвался о ней с большой похвалой. Она имеет огромный успех у русских читателей и зрителей уже третье столетие. В чем же секрет ее успеха? Возможно в использовании множества видов коммуникации. Примеры их приводятся ниже:

Межличностная коммуникация:

«Эй вы, сонные тетери!
Отпирайте брату двери,
Под дождём я весь промок
С головы до самых ног».
Братья двери отворили,

Астроличностная коммуникация:

Звёзды на небе считает
Да краюшку уплетает.

Автоличностная коммуникация:

«Эхе-хе! так вот какой
Наш воришка!.. Но, постой,
Я шутить ведь не умею,
Разом сяду те на шею.
Вишь, какая саранча!»

Зооличностная коммуникация:

На другой день утром рано,
Разбудил конёк Ивана:
«Гей! Хозяин! полно спать!
Время дело исправлять!»

Социальная коммуникация:

Вот он въехал в конный ряд.
На колени все тут пали
И «ура!» царю кричали.

Автокоммуникация:

«Тьфу ты, дьявольская сила!
Эк их, дряни, привалило!
Чай, их тут с десятков с пять.
Кабы всех переимать —
То-то было бы поживы!
Неча молвить, страх красивы!

Ножки красные у всех;
 А хвосты-то – сущий смех!
 Чай, таких у куриц нету;
 А уж сколько, парень, свету —
 Словно бабушкина печь!»

Гендерная коммуникация:

«Перстень твой, душа, найден, —
 Сладкогласно молвил он, —
 И теперь, примолвить снова,
 Нет препятствия никакого
 Завтра утром, светик мой,
 Обвенчаться мне с тобой.
 Но не хочешь ли, дружочек,
 Свой увидеть перстенёчек?
 Он в дворце моём лежит».
 Царь-девица говорит:
 «Знаю, знаю! Но, признаться,
 Нам нельзя ещё венчаться». —
 «Отчего же, светик мой?
 Я люблю тебя душой,
 Мне, прости ты мою смелость,
 Страх жениться захотелось.
 Если ж ты... то я умру
 Завтра ж с горя поутру.
 Сжался, матушка царица!»

Зоосоциальная коммуникация:

Кит сердито закричал
 И усами закачал.
 Осетры тут поклонились,
 В земский суд бежать пустились

Социальная коммуникация:

«Эко диво! – все кричали. —
 Мы и слыхом не слыхали,
 Чтобы лъзя похорошеть!»
 Царь велел себя раздеть,
 Два раза перекрестился, —
 Бух в котёл – и там сварился!
 Царь-девица тут встаёт,
 Знак к молчанью подаёт,
 Покрывало поднимает
 И к прислужникам вещает:
 «Царь велел вам долго жить!
 Я хочу царицей быть.
 Люба ль я вам? Отвечайте!
 Если любя, то признайте
 Володетелем всего —
 И супруга моего!»
 Тут царица замолчала,
 На Ивана показала.
 «Люба, любя! – все кричат. —
 За тебя хоть в самый ад!
 Твоего ради таланта
 Признаём царя Ивана!»

«Коммуникация – это непрекращающийся процесс, на каждом этапе которого обеспечивается согласованность действий участников, что в идеале должно приводить к жизненному процветанию общины» [5,451]. Разница между коммуникацией у человека и животных в том, что человек использует речь как средство общения. Речь – это канал развития интеллекта, которым обладает лишь человек. Коммуникация – это связь между участниками коммуникации. Участники воздействуют друг на друга, меняя, сближаясь, или удаляясь друг от друга. Эти связи удивительные, тонкие, невидимые, а иногда и опасные, делают коммуникацию сложной, а её результаты не поддаются прогнозированию. Это поэтично выразил поэт Валерий Брюсов в стихотворении «Сонет к форме» [6,120]. Прочитываем всего две кватры из этого замечательного стихотворения:

Есть тонкие властительные связи
Меж контуром и запахом цветка.
Так бриллиант невидим нам, пока
Под гранями не оживет в алмазе.

Так образы изменчивых фантазий,
Бегущие, как в небе облака,
Окаменев, живут потом века
В отточенной и завершенной фразе.

Выводы. *Итак, что дает классификация разновидностей коммуникации:*

1. Улучшает взаимопонимание между специалистами в сфере коммуникации.
2. Осуществляется конкретизация и уточнение терминологии.
3. Формируется база данных для систематизации и прогнозирования развития коммуникации.
4. Намечается некий ориентир для создания новых разновидностей коммуникации и модификации существующих.
5. Возможность уточнять структуры планов, стандартов и программ, по которым проводится обучение студентов основам теории коммуникации.

6. Структурируются в целом знания проблем коммуникации.
7. Появляется ясность, четкость и однозначность формулировок при создании рекомендуемых и регламентирующих документов.

Заключение

Коммуникации между живой и неживой природой присутствуют в таких направлениях науки, как геология, география, естествознание, философия, математика, изучение Солнечной системы и космоса, астрофизика и др. Особенности и сложности коммуникации состоят в индивидуальности и разнообразии участников коммуникации, но предвидеть результаты коммуникации практически невозможно. Виды коммуникации имеют свойство трансформации. Они обновляются, модифицируются, создаются новые. Проблема классификации разновидностей коммуникации является перманентной. Составление новых классификаций помогает структурировать знания в той или иной области.

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The Images of the Russian Ballet in the Fine Arts in the End of the XIX - the Beginning of the XX Centuries

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Abstract: This article is devoted to the subject of the interdisciplinary interest which is depicted in the artistic heritage and dedicated to the Russian ballet of the Silver Age. The author of the article explores the nature of the pictorial basics in choreography, reveals the artistic searches and the various decisions in the masterpieces of graphics, painting and sculpture, dedicated to the ballet theater and mostly connected with "The Russian Seasons" of S. Diaghilev. The main iconographic principles, the typology and the ballet images' interpretation are revealed with the help of the panoramic analysis' methodology. The strong attention is paid to the dance's dynamics as the main problem of the artistic searches, and, moreover, to the relationship between the dance's motive and its fulfillment's style. The searches of the "World of Art"'s artists are viewed throughout the "prism" of the content's problematics and the ballet's poetics. L. Bakst's works are particularly analyzed, as they became not only a peculiar starting point, but also a history's constant of the ballet theater and the decorative culture of the late 19th and early 20th centuries. An emphasis is placed on his artistic discoveries in the field of the outline solutions' motion display of the costumes that transformed the theater and made it a director, having determined the creative intentions of the following designers and the further generations. The images of the ballet directed by V. Serov and Z. Serebryakova are considered from the starting

point of the individual principle's formation in their works of art, based on the example of the practical activity behind the scenes of theaters. The classical ballet's plastic component is researched in a wide range of the dancing art's worldview problems, which is manifested throughout the internal patterns of the various types' expressiveness of the dance movements and reflected in the artistic solution system in the sculptural material. The study of this topic is based on the materials of art and archival documents, located in Russian and foreign museums and in private collections.

Keywords: the ballet images, the choreography, the artistic interpretation, the forms of interaction.

Introduction

The Problems of choreography, which on the brink of the XIX-XX centuries were always standing apart from the art's great way, now become the subject of the liveliest and the most interested discussions and disputes. The classical dance, which was figuratively named by the ballet critic V. Svetlov as "A Cinderella, who was waiting for her prince in vain, who'd have found her pink satin boot and recognized her as the outstanding one among the equals", at the time of the arts' brilliant rise makes it one of the most important factors of the cultural life. The ballet theater turned into a center, most of the creative intelligent people are gathered around and mostly all the head painters were associated with: K.A. Korovin, A.N. Benois, L.S. Bakst, M. Dobuzhinsky, S. Y. Sudeyikin, N. K. Roerich, B. I. Anisfeld. The role of the artist's concept in the play has changed with their appearance. From now, the painter became a choreographer's co-author, who prompted, sometimes dictated the choice of the expressive means to the painter, and, moreover, "interrupted" his plastic thinking. There is a striving for the music's harmonious unity in the ballet performances, in the dance and visual decisions. When E. Tsurits was writing about the fact, that in "The Russian Ballet" was seen much more than a choreographic theater, she was right. It became an expression of the new aesthetics, which included the new ballet forms, the new music and new painting; became an "aesthetic system", which has an impact on a wide range of cultural areas" [4, c. 80]. However, in addition to the theatrical and decorative art, whose place is already rather clearly determined by the criticism, at the crossroads of the two phenomena, a number of reforms was carried out by M. Fokin, A. Gorsky, A. Pavlova,

T. Karsavina, V. Nijinsky, who has raised the ballet's level to a new quality; on the brink of the century the intensive development of the major fine arts drew the borders of a new, little-researched theme, which was associated with the works of easel character and dedicated to the Russian ballet.

The picturesque canvases, the graphic sheets, the sculptural little figures, depicting the famous ballet dancers give a rich base for thinking over the dance art's subject, despite being scattered throughout the various private art collections, still outside the zone of the close attention. No doubt, the reason for the creating of works dedicated to the ballet was the ballet itself, as the performances lured so much attention to the artists' work, that their theatrical work stopped to be treated like an accidental phenomenon. On the other hand, the artistic creativity was developed in the time of the era's mainstream and naturally reflected its most characteristic processes. On the brink of the century, the artistic life's creative atmosphere itself was distinguished by the breadth of the interests, and the desire to find the new aesthetic criteria of time caused the appearance of such a phenomenon as "ballet". The constant search for the poetic content, which doesn't appear in the surroundings, the artists find in the ballet as in the kind of art, which has a very specific language, as if it was closed in its aesthetic sphere and in fundamental contrary to everything ordinary.

Ideals of the ballet are the harmony and the beauty of the human body, which are expressed in the endless Harlequins and Colombines, in motifs of dance and plastic poses, is a certain cultural and aesthetic rule in the masters' biography of such a significant, but brief artistic period.

Finally, it is necessary to search for the artists' special interest in the theme of dance in the choreography itself, which has always been associated not only with the musical creativity, that is close to it, but also with the fine arts. The plastic - visual features of the visual arts, which are graphics, painting, sculpture and ballet, determined the boundaries and the possibilities of their interaction, in which the corporeality and the materiality are expressed most clearly and visibly. The generality of the artist's and the choreographer's creative processes is obvious, which create the visible images of the play and the work of art, although the work of art is created outside the visual view, but the dance is being performed in front of the audience. The desire of artists to communicate with a mass audience actively and their inclination to the creation of a spectacular-saturated image, which can influence the viewer with a

special emotionality's measure – all these things allow us to notice a strong closeness between them. The fine arts and the ballet have a lack of words, which is also the common feature of the connection between them; they use the similar expressive means to create an artistic image. The ballet lives in an obvious communication with the painting, the sculpture and the graphics, it experiences their influence and it also influences them. The choreography uses the elements of the fine arts – the color, the plastic sculpture, the lighting effect, and, in their turn, the masters of the fine arts are eager to capture the beauty of the ballet art, because the dance lives only while being performed, but the painting and sculpture can be inherited by the descendants.

To sum up, it was the closeness of the plastic arts that attracted the artists to the ballet, which could interact and enrich each other in the historical context of the time, inspire the hopes for a truly creative co-authorship. It may seem that the artist sets too limited frames and refers to the iconographic material, associated with the dance's fixation and often with the image of an artist, despite the fact that there are a lot of dance's shades, but there is only one the flesh and appearance of the image. Nevertheless, the semantics of the ballet theme in the artistic culture on the brick of the XIX-XX centuries is multifaced, it unites the masters who has the different artistic style, colorful palette, favorite compositional methods of the image building and the approaches to the theme's embodiment.

Thus, the artists who work on a ballet artist's or choreographer's portrait, which deserves a separate consideration as a special ballet's genre in the art, can capture a figure in a growth or a half-figure; their attention can be focused only on the face, the artist can be shown in the process of the dance or outside it. Such task requires its decisive methods and the image, it considers the ballet plastics and the harmony, which are the subject of the attention, especially in the story-telling composition of the portrait, which is closer to the spirituality and which uses the model (the face, the half-figure, the figure in height) as the means for its reflection. The searches of the artists in the portrait are mostly connected with the psychological aspect and the study of the ballet artists' personality. The short-term sketch can grasp the instant state of the ballet motion and can interfere into the movement mechanism of the classical dance. The sculptural material, due to its plastic features, can perfectly express the pantomime side of the dance, and the picturesque canvas or watercolor and pastel sheets convey all the beauty, all the festivity of the stage performance and its underside - the everyday

life of the ballet. In a huge kaleidoscope of the graphic, pictorial and sculptural works, one sees not just a creative chaos, but his own way to interpret the images of the dance.

The Dance as a Reflection in The Retrospective of The Artists "The World of Art"

The motives of the ballet are often found in the paintings of the graphic artists. "The World of Art" is one of the topics where the beauty is an area for the lyrical expression of the artists. The ballet is an ideal art for the embodiment of their artistic concept. It sees something consonant with their joys and sorrows, there are the moments of the complete spiritual rapprochement in it. As if they were afraid of the reality, of its rigidity and its daily routine, the "miriskusniki" tried to escape into the weirdness of the choreographic plot, in its infinity fantastic spaces. In the legends and tales of the romantic ballet, they often found the material for their compositions. In "The Ballet Pastors" and "The Apotheosis" (SRM, RAM) by S. Sudeyikin, in "The Ballets" by K. Somov there is an expression of the essence of one of the romantic trends. An escape from the reality in a world of dreams and fantasies. A.A. Evreinova remembered: "The Pierrots, the Harlequins, the crafty Colombines, depicted ... in a merry dance, almost hypnotically took me away from the unbearable reality ... When I woke up in the morning, I liked to say hello to my new tenants over the bed - the Sudeyikin's colorful heroes of the Harlequin" [2, op. 346]. The ballet compositions by S. Sudeyikin, which are so reminiscent of the paintings' atmosphere by A. Watto and F. Bushe, are constructed as a stage space on which a dreamy-phantom and dramatized action unfolds, where the characters live like in poems in a bliss of the insanity and disconnection. It is not an accident that the theme of the landscape arises with the images of male and female dancers, living in a full harmony with the surroundings. The nature is as a sensitive tuning fork in the works of the artist which meets the subtlest spiritual movements of a man. But the landscape of Sudeyikin performs not only a supporting role. The originality of the artist's works is that nature enters them together with the man as the main hero. They complement each other, gravitate toward a certain harmony, exist as a single valuable picture of the world. The motives of the lake with the floating swans often take place in the ballets, managed by Sudeyikin; they bring a poetic stream into them, they carry out the main theme of the dance's beauty and harmony. The softness in the performance of the figures and the

background is provided by the changeable states of the nature (morning or evening) and dissolves the contours in the airy and coldish haze; the pinkish-bluish pastel color gives a matt, slightly faded tone, gives a rise to a sad melancholic mood, a poetic understatement of the images, their desire, which is expressed better in a desolation than in standing out. All the picturesque means chosen by the artist create a slow rhythm of the dance, silently gliding movements of the heroes, which, with a little rustle, exist as if they were on the verge of the reality and the fiction.

"The Russian Ballet" (1930), "The Russian Ballet" (1930) called "Sylphide" (AMO) by K. Somov - these watercolor sheets, as well as the works by Sudeyikin, are interesting not only with the topic's image, but the artistic world outlook, expressed in them as expressed and formed by the past-time distance. That's why the topic of these works is not the ballet itself, but mostly an emotional memory of it. The dreamily enlightened image of the Sylphide dates us back to engravings of the XIX century, to the images of Taglioni and Istomina, to the romantic direction of that time in the dance. But the fundamental novelty of Somov's works lies in anything else, mostly in a striving to see the ballet plot - not unambiguously, not straightforwardly, but in the unity of the diverse qualities. Here Somov is interested not only by a combination of the fictional and the real, but by the borderline between the reality and the fantasy, that fragile moment when the dance becomes the reality. The dimness of the quieted hall creates a sense of a mystery, the dance flows under the poetic sound of music. Only for a moment the romantic heroes opened up their destinies for the audience, having the opportunity to live their only life quickly and go into the world of the ordinary prose forever. Somov could show the birth of the ballet performance gracefully, with a number of the direct observations, preserving a sense of mystery and a theatrical magic.

The echoes of the ballet theme in a different, much more subtle and complex refraction can be seen in the "Harlequins", "the Italian comedies" by A. Benois, "Columbines", "Harlequins", "Dames" and "Pieros" by K. Somov, where not a dance itself is shown, but its features, which have their appearance in such a dance. The ability to express a thought plasticly is the thing that distinguishes the ballet artist on stage. So, the works of Somov and Benois reveal the conditional world of the masquerade, convey the artistic expressiveness of the choreography, which consists of the plastic poses, the facial expressions and the gestures. By transferring the organic fusion of these elements in the image of their heroes, the artists persistently

search for the ways to discover their most intimate soul depths, as in the forms and the postures of the man, as in the ballet performance, the inner state of the images is revealed.

The other side has the characteristic tendency along with the indirect form of the dance's image on the brink of the century: the theatricalization of the easel painting itself, the introduction of the scenic moments to it. Just as the choreographer deals with the compositional arrangement of the artists on stage, the main performers and the corps de ballet, the artists of "The World of Art" depict the solemn royal walks, the peacefully moving ceremonies of the royal processions, decide the space as a scenic platform bounded by the scenes, and the figures are distributed according to the laws of beauty and harmony.

Another feature which is manifested in such works is attributed to the artists building the multi-figure compositions, as if they were in the spirit of the former searches made by M. Petin and L. Ivanov. It sounds like nostalgia, like an idealization of everything that has been left behind. They attach the fundamental importance to the structural similarity between the internal organization of a separate stage of the ballet performance and the figurative system of their paintings.

The Sketches of The Ballet Costumes in The Stage Design of The Dance

Another category of the ballet images' creation can relate to the works which are connected with the ballet performance's work on the design, in which the problem of the costume is solved in a motion and is inseparably connected with the stage image, that's why it touches the topic directly under consideration. The art of L.S. Bakst in this respect is the brightest example. Undoubtedly, Bakst was one of the most consistent artists-innovators of the ballet troupe by S. Diaghilev, in whose images the role of the reformation of the ballet costume is especially noticeable, as one of the most important achievements of the Fokin ballet. The Bakst's costume is always mobile, he accurately conveys the specificity of the ballet art, the basis of which is the movement. His characters are unstable in the clear relief of their poses, in the languishing and in the melodious plastic of an almost physically sensed body, the inviting power of the ballet image is completed. V. Svetlov characterized it as the following: "The pleasure you get from the performance is strong because its beauty does not remain fixed and frozen, but changes and moves every minute. The weaving and unweaving groups of

the male and female dancers, the constantly new and changeable contrasts and the rapprochement of the shades formed by their costumes - all this swaying movement, the flow of flowers are combined and settled with the most refined art, precise and at the same time bold" [5 p. 122]. It is easy to see that in most of the sketches the characters have a foot only on the one leg: "Harlequin" - the sketch of the ballet's costume "The Carnival" (1910), "The Silver Negro" (MIS), "The Odalisque" (collected abroad), "The Young Indian" (1910, private collection of Paris) – all the costumes' sketches for a ballet "Scheherazade," "St. Sebastian" (1911, AMO), etc. Emphasizing the main gravity of the body on the supporting leg, in the different versions bizarrely bending the other, from which the movement goes on, across the figure, hands and finally the head, the artist allows to understand the whole complex apparatus of the classical dance. His "vertical" costumes are as the exotic plants, starting their movement from the toe of the supporting leg, growing gradually up. There is a sudden feeling that Bakst doesn't compose the ballet costume in his imagination and then puts it on the dancer, but, on the contrary, he sets the task as the outline to capture the character of the dancing figure immediately, and, proceeding from the movement which was slightly rethought by his imagination, he simultaneously thinks over the costume, because his costumes are not partial, do not inspire us with the feeling of a long work on them and cause a feeling of a direct sketch from the nature. Bakst does not use the complicated pictorial transitions, but works as a local spot, because the transmission of the chiaroscuro heavies stops the movement. The elastic and musical line outlines the figure of Harlequin's costume in the ballet "Carnival" (1910). Throughout the refined, elegant movement, Bakst creates an image of an exquisitely inviting hero. Softly, like an inaudible breeze, smiling at us, standing on the pointe shoes of T. Karsavin's "Bride" -this is the sketch of the costume for the ballet "The Blue God" (1932, SCTM).

With all the ease of the transmitted movement, unlike "Harlequin", the specific shape of the ballerina can be guessed here. For Bakst, it is important not just to develop the look of a costume, it is equally important to create a ballet image of a specific artist in this costume. Another series of Bakst's costumes are suits, the movement of which develops not only one supporting leg, but both, or rather they do not have the support at all, but hang in the air; it is a reception that gives the artist the lightness and the weightlessness of the classical dance. "Kiarina" is the sketch of the

costume for the ballet "The Carnival" (1910, SPMA), "The Firebird" is the sketch of the costume for the ballet "The Firebird" (1916, MMA), etc; or the costumes, that find the scope and breadth, when the movement is transferred to them. Their compositional drawing develops the expressive, flight movements, as the most vividly expressing the elements of the very ballet movement, the floating. These are such like: "Echo", "Beotijka", "Two Boeotiki" – these are the costumes for the ballet "Narcissus" (1911, SPMA, Lobanov-Rostovsky's Collection, the USA). Let's look at the way Bakst portrays the movement. It's easy to see that his characters dance in a certain kind of the ballet of otherness, as if they feel the charm of the process. The exquisite head tilt, the half-opened eyes, the developing folds of clothes, the flying hair, a wave of hands with the beautifully curved brushes - all this in a true found and delicately sensed movement conveys the pulse of the dance itself, the very atmosphere of the artists' stay in the image. In the costumes of Bakst, it is difficult to catch the certain ballet movements, his dance is rather antique, coming from the school of A. Duncan. This is dictated, of course, by the content of the ballet itself, by the Fokin reforms of the emancipation of the body, but I still think that by its ornamental character, the sheet organization, and the interpretation of the draperies resembling the modernity, the goal of Bakst is to show the human body in some of the most beautiful and whimsical movements. Moreover, such provisions and angles cannot be obtained with the accurate reproduction of the classical ballet, since its poses and positions have rather strict rules. It can be assumed that Bakst intentionally leaves him to create the sheet of the smooth rhythmic elements. This is largely promoted by developing the surface of the sheet draperies. Twisting on the sheet several times, intertwining the bodies of the dancers, they further strengthen the sense of the flightiness of the dance. Covering the watercolors with a local spot of costumes, Bakst does not use the color in bodies, but he applies hatching to show off more boldly the sculptured and carnal beauty of figures.

Thus, through his inherent stylization, Bakst extracts the inaudible music not only from the composite construction of an elegant figure of the bodies and the draperies, but from the thin watercolor constructions, sounding differently, depending on the nature of these constructions, sometimes subtly tender, sometimes bright and contrasting, in this way transferring the special style and intonation of the Fokin's ballet.

The Ballet as a Performance and Action in The Format of The Serial Images

The ballet in the works of V. Serov and Z. Serebryakova is a new step in the development of the ballet theme in the fine arts of the late XIX - early XX century. The deep knowledge of the depicted material, the adherence to the principles of the realistic art, the virtuous mastery of the embodiment of the ballet images that distinguish the works of Serov and Serebryakova, all this allow us to consider their searches in the ballet theme separately from the artists who were the members of the World of Art. Although Serov's images appeared in 1906-1910, and Serebryakova's only in the 1920s, many of the members of "miriskusniki" created the ballet works later than Serov, the analysis of the ballet heritage of these masters after the group "miriskusniki" wasn't based on the chronological principles. Serov and Serebryakova not only differ from the masters which were already considered – all the artists are not alike to each other - but they also differ typologically. They do not belong to another time, but their artistic thinking over the ballet image and its creative embodiment is different from the aesthetic principles and the stylistic forms of "miriskusniki." In the works of Serov and Serebryakova, the question of the reflection of the ballet theme in the visual arts is appropriate to be considered with the French artist E. Degas, who was the most consistent and vivid researcher of it. This should not mean that the artist copied or simply borrowed something from Degas like a plot for the compositions, but it is indisputable that his art was studied and known. "Now there is a big exhibition here by Degas, my favorite artist, and I will certainly go" [1, c.114] - writes Z. Serebryakova. "The Blue Ballerinas" (SAM) by Serebryakova force to recall the images of "The Blue Dancers" (SPMA) by Degas, the association with which arises not from the same sound of the names of these works, but primarily on the plastic and color of their decisive method. In the rhythm of the corsage and packs, in the kaleidoscope of the naked spins and hands, illuminated by the bright light, and therefore absorbing all the color reflexes from the environment; in the pure pulsating spots of color from the intensely darkness in the shade and bright, almost bleached in the light, merging one into the whole – with the help of all these - the main emotional sound of the Serebryakova's images and Degas is concentrated. The ballet theme in the works of Serov artists and sometimes by Serebryakova is developed in the direction of the ballet portrait image. But if the portraits of Serebryakova are represented by the young and, sometimes, not well-known artists of the Petrograd corps-de-ballet or the children in

the ballet costumes, Serov created only the portraits of the eminent figures of the Russian choreographic school: A. Pavlova, T. Karsavina, V. Nijinsky, I. Rubinshtein, M. Fokin. The portrait images by Serebryakova depict the costume image, do not differ in the depth of the characteristics; the faces of the models seem to be idealized, but at the same time they retain the portrait features. The elusive and somewhat superficial spirituality in these portraits appears as in a hidden way behind an external theatrical mask, when the underlined turn or the inclination of the head, a flirtatious look here is quite natural, as well as during a concert performance. These cute and adorable models, which Z. Serebryakova often recalled, seem to be like each other, they have the features of the harmonic perfection's single theme of the ballet artist's appearance.

In the images of Serov, the idea of an individual personality, its highest value for the culture acquires the exceptional importance and becomes the starting point in his search. Serov avoids the complicated and detailed compositions, which are not uncommon in the works of "miriskuniki" and Serebryakova. Like L. Bakst (portrait of A. Pavlova in 1908, A. Duncan in 1908, V. Tsukki in 1917) and M. Dobuzhinsky (numerous pencil portraits of T. Karsavina, 1914-1923), he can find and put forward the close-up expressive artistic details in the guise of an artist, but he is the only to know how to remain extremely laconic at the same time. Impressing the artists during the performances of "The Russian Seasons", organized by S. Diaghilev, in the moments between the rehearsals, he doesn't only copy the model, but also creatively reinterprets, seeking in each ballet artist a characteristic and lasting. In his pencil sketches, there is not even a hint of an image of the scene, but the sensation of where it occurs is; Serov managed to show the externally poetic images so true, as well as the intense atmosphere of the rehearsals, the daily routine of the ballet. Wiping the perspiration from her face, T. Karsavina stopped with a towel in her hand - "The Portrait of T. Karsavina" (1909). And Pavlova froze in a motionless pose, still comprehending her role - "The Portrait of A. Pavlova" (1909, the State Tretyakov Gallery). V. Nizhinsky appeared in the hall, now he will enter the image and the class will begin - "The Portrait of V. Nijinsky (1909-1910, SPTM). The ballet is the work - this theme sounds in the works of Serov. In this respect, it is close to the images of Degas. But with all the similarity of this aspect, the ballet in Serov's work and the ballet in Degas's works are still different in the ways of reading the ballet theme. Serov painted portraits of the ballet artists, and Degas painted the portraits of the ballet classes, varying in numerous

the versions of the exercises at the machine and in the middle of the hall, the rehearsals on stage, which only occasionally turns to the motive of the stage performance. The ballet in the understanding of Serov is expressed through a specific and outstanding image of the ballet artist. The ballet in the work of Degas is developed from the small participants, starting their creative path to the experienced ballerinas. For Degas, the personality of the dancers is not important, even when he depicts a prima ballerina on stage, he does not give her the name. The ballet as a group of female attendants is devoted to the only business – to the dance, when the personal destinies of dancers remain outside the ballet class, outside the stage, finally, outside the attention of the artist. The ballet in First of all, Degas' work is a systematic hard and selfless work, which requires a tremendous strain of the physical strength. Serov's work is spiritual, it is more the work of creative thought over the role, so that the spiritual work will find the expression in the physical beauty of the dance. Unlike Serov, the ballet works of Degas show the work of the ballet movement, sometimes habitual, repeated, memorized by heart, mechanical, not requiring the intensive work of thought, but it is important, because it is a very hard work - this is the feature of this profession. In this respect, the ballet theme of Degas has more similarities with Serebryakova's theme. Her paintings vary and develop one main theme - the everyday life of dancers. Among the features of the ballet theme, Serebryakova includes a new feature - an image of the multi-figured compositions in the interior. In the artists of "The World of Art", these were the paintings-spectacles and the paintings-performances. Serebryakova's theme of ballet is often solved in the interior of the theatrical lavatories, even for the first time, where the ballet dancers make up and prepare for the exit.

For the first time, Serebryakova, like Degas, gets behind the scenes, opens the door to the creative laboratory, where the ballet images are born, but the artistic image of Serebryakova and Degas dance goes in different ways, although in many works it almost coincides. The numerous dance classes of Degas are a world where there is no applause and colors, a miracle light of a searchlight, but there is a hall salty from the spilled sweat, a monotonous, black-n-white picture of the daily training. Serebryakova's ballet lavatories are also a workshop with the daily, habitual preparatory work to the performance, but the emotional mood of the artist's works anticipates a feeling of the celebration and beauty. The ballet is the work, this is the accent in the works of the both artists, but in Degas's works the ballet is an ugly routine,

and in Serebryakova's ballet it is a poetic routine. In work, even if not as tense and complex as in the hall near the machine tool, but also necessary and important, they reveal their valuable qualities, receive the highest satisfaction of the Serebryakova's heroine. On the vertical and the horizontal formats: "The ballet lavatory. The snowflakes. The Nutcracker ballet" (1923, the Russian Museum), "The ballerinas in the restroom. The ballet "Paquita" (1922, collected by I. S. Zilberstein), "In the ballet restroom. The ballet "Fairy dolls", 1922, SCTM), "Girls - Sylphs. The ballet "Chopiniana" (collected by S.N. Serebryakov), etc., capturing the hours of preparation before going on stage, having the figures of only dressed and ready-made ballerinas employed in the first act, the artist seems to enjoy, drawing mentally the process of depicting the flexible ballet body in the finished image of the beauty and harmony.

The interest in the ballet theme on the brink of the century is not limited only to the work of the artists who were the members of "The World of Art", Serov and Serebryakova. The exhibitions, often organized by S. Diaghilev, were literally filled with works of the unknown artists dedicated to the Russian ballet. Here you can say the names: S. Sorin, M. Detoma, A. Mac and many others. It was an era that left behind a great spiritual legacy. The dancers and the choreographers: A. Pavlova, V. Nizhinsky, M. Fokin also created the works dedicated to the ballet in sculpture, graphics and painting. Their work in this area can be equated to the work of the professional artists. From this point of view, they prove to be of a fundamental interest, since their authors look at the problems of the ballet with their own eyes and through the other art.

The Ballet in Sculptural Interpretation and Category of Plasticity

The ballet at the end of the XIX century - the beginning of the XX century has found the most vivid embodiment not only in the painting and graphics, but also in the sculptural plastic, because it has its own, special, only inherent capabilities that distinguish its language from the language of the other fine arts. It contains the huge resources for developing the ideas for the ballet image. Of all the theatrical arts, the ballet is the closest to the sculpture, because the means of the artistic expressiveness both in ballet and in sculpture is the plastic beginning. The plastic category is the original category of both arts. It provides an opportunity to view the turn, the incline of the figures, the rhythm of the movement, talking to the viewer exclusively with the language of the plastic of the human body, always expressive and spiritual. Plastic is

inexhaustible, it can be deepened indefinitely, it contains a continuous vibration of the movement of forms, lines, volumes. Through the movement in the ballet and in the sculpture, the mental state of the model is revealed, it mainly becomes a means of recreating the spiritual atmosphere of the artistic image.

O. Roden in his article "The Renaissance of The Dance" said: "From the plastics' point of view, there is something to learn from these artists and draw from their art a lesson of grace" [3, c. 8]. In addition, the sculpture and ballet have a remarkable ability to capture the beauty of the movement in a voluminous and, therefore, in a particularly clear and convincing form. If you look at the creative heritage of the masters, you can say with a certainty that the sculptural works that captured the dance were solved with an understanding of the possibilities inherent in this art form. Just as in the painting, there are several genre lines in the sculpture treating the ballet theme. This are the portrait images, and the image of the figure in the growth at the time of the dance, and the imprint of the artist during the rest. In the terms of the spiritual interpretation of the ballet image, the emotionally-romantic direction is especially interesting. Like for "miriskusniki", for sculptors it was an uncharted world of poetry, in which the dance seemed to approach its natural language due to its embodiment in the material and received a sense of reality almost to the touch. The images of the romantic ballet in sculpture also became a favorite theme for the embodiment, because they are endowed with fantasy, mystic moods, the ability to transform into the rank of a wonderful idea by nature. The ballet images of P. Trubetskoi, M. Vrubel, S. Erzya (Nefedov) may not be the most ambitious in their heritage, but they reveal many of the ideological and creative features of the artists, their inner thought' sound. One can trace a certain similarity between the figurative principles of the works of these artists. They coincide in the main motives of creativity, in the interpretation of the ballet theme there is a combination of the fictional and the real. In the sculpture "The Dancer. Fantasy" (SRM), Vrubel was interested in the difficult turn of the head of a fantastic dancer at the moment of dancing. The quivering brush strokes are felt on the surface of the sculpture, the plaster itself prompts the movement of the masses, the appearance of the image. He seems to be born from the elements of the material and acquires a refined, beautiful form. The sculptural material plays an important role here and allows us to talk about the equal importance of both visual and tactile sensations. In the works of Trubetskoi: "A. Pavlov" (collected abroad),

"The Dancer"(SCTM), "The Dancer" (RAM), the comprehension of the image of the dance goes not so much through the image as through the dynamics of the technique, the intonation, the style of modeling. Behind the texture of the material, the movement of the stack sees the inner mood, the perception of the world, the work of the artist's thought. Contemplation of dance, like the movements of ballet pas, generates an instant state in the sensitive soul of Vrubel and Trubetskoi, which they are trying to show. The impressionist stylistics creates the subtle nuances of the movements of the ballet, as if not finished, being in their transitional hypostasis, halted at half-expression. Thus, the image of A. Pavlova in the work of Trubetskoi seems to live in a kind of dream, floating along the current, instinctively choosing movements where there is no need to make efforts to fulfill them, exists as a dream, a dream that quickly escapes the shadow, magically captivating and unattainable. The indirect movements of the sculptural forms in the "Dancer" of Vrubel form an endless stream of the magical-mystical dance. Even more unexpected are the ballet sculptures made of wood by S. Erzya. They stand out against the background of the above works, they are distinguished by an unconventional creative vision, defined by a philosophical artistic approach to the theme of dance. His "Ballerinas" are painted in the romantic tones and in this they are similar to the images of Vrubel and Trubetskoi.

But, unlike the improvisational movements of their dancers, the Erzya ballerinas demonstrate a certain movement, it is always the final point of the movement, its conclusion or beginning. Representing the ballet dancers A.Pavlov, M.Kseshinskaya in a pose called arabesque, Trubetskoi gives them a certain erasure: this is not arabesques, but a half-arabesque, as if a moment's reflection, while Erzya's "Ballerina" of 1930 (MRAM) presents an extremely clear scheme, a clear silhouette of this posture, its duration and completeness. The static category of the sculpture and the dynamic form of dance are combined in the synthetic structure of the plastic image reflecting the corporeality associated with the "sensation of the movement" or the perception of the information through the movement.

You can refer to a few names of sculptors and many their sculptural works. However, within the limits of our article, we do not have the opportunity for a detailed analysis of the problems of a selected topic containing the large and complicated questions and will confine ourselves to what has been said.

Conclusion

Having made a brief excursion into the history of the ballet in the fine arts, we can build a typology of artistic images that was formed at the turn of the XIX - XX centuries, get an idea of the masters and to some extent recreate the picture of the development of the topic, delineate the broad boundaries of the searches, and to reveal the problems that worried artists and were solved by them while they were working on them. There were the works before us, which were created primarily by the decorators to the works of the masters who worked directly on the ballet theme, from the dance motives to the ballet images depicting the outstanding masters of the Russian choreography, from the sketches of the artists "The World of Art", who anticipated the ballet as a theme in the visual arts to the actual ballet images in sculpture, which immortalized him. The fleeting moments, stopped by the artists, preserve for us the perennial images of Russian choreography, thus prolonging their "scenic" life. We, getting acquainted and studying the artworks that depict the ballet, discover the secrets of this old world, but eternally young art. The special perspectives of the material studies allowed us to consider the artistic achievements not only in the traditional art criterion, but in a multidimensional cultural field, an advanced picture of the spiritual interaction of artists and choreographers of one epoch.

Notes

1. Letters from Z.E. Serebryakova - T.B. Serebryakova. Paris (March 31, 1937) – Z.E. Serebryakova. Letters. Contemporaries about the artist. M., 1987, p. 114.
2. A.A. Evreinova. The Memories of Sudeyikin. 1956 - RGALI, p. 921, Op. 1. 346.
3. O. Rhoden. The revival of the dance – the studio 1912, No. 32-33. C. 8.
4. E. Surits. The Russian Seasons – The Theater. 1959, No. 11. P. 80.
5. The French criticism of the Russian ballet in the book: V. Y. Svetlov. The modern ballet. St. Petersburg, 1911, p. 122.

Abbreviations

STG - State Tretyakov Gallery

SRM - State Russian Museum

SCTM - State Central Theater Museum. Of Bakhrushin

PMFA - Pushkin State Museum of Fine Arts

MFA - Museum of Fine Arts. Stransburg

MRAM - Mordovian Republican Art Museum

MMA - Museum of Modern Art. New York

PTM - Petersburg Theatrical Museum

RSALA - Russian State Archive of Literature and Art

RAM - Ryazan Art Museum

AMO - Ashmolean Museum. Oxford.

The Role of Interactive Technologies in Providing the Quality of Studies at Higher School

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Abstract: The main goal of this article is a practical review of the most common interactive teaching methods in domestic and foreign educational practice. Using a system of methodical advice, the authors tried to share their long-term observations and the results of their pedagogical experiments in order to determine the manners of professional conduct, attitude and technique that turns a teacher into a successful professional. Teachers need to purposefully acquire active and interactive forms and technologies of the training: games, trainings, case studies, games design, creative techniques and many other techniques that develop the basic competence and meta-competence of the student, develop appropriate professional skills, create the preconditions for psychological readiness to implement mastered skills in actual practice.

Keywords: learning process, interactive teaching technologies, practice-oriented approach, basic competence of the student, quality of education, modern pedagogical technologies.

Problem statement. Currently, almost all developed countries have realized the need to reform their education systems so that students could really become the central figures of the learning process so that the cognitive activity of the learner is the focus of educators, researchers, developers of educational programs. It is the process of learning that is important, not teaching, as it used to be (and still is) in a traditional training. Therefore, in the education there is a question "How to achieve a guaranteed result in the learning process?". The didactics answer this question using teaching technologies.

Changing the vector of the educational process from a knowledge-based approach into a practice-oriented approach to the results of the educational process has inevitably led to the formulation of the problem of technologies and teaching methods by which this practice-orientation will be achieved. Active and interactive forms and methods of training play the primary role in achieving these goals. The student is to a greater extent a subject of educational activity in an active training than with a passive one and enters into a dialogue with the teacher, actively participates in the cognitive process, performing creative, searching and problem tasks.

Interactive teaching methods are the most appropriate for the learner - oriented approach, as they assume co-education (collective, cooperative learning), where both student and teacher are the subjects of the educational process. The teacher more often acts only as the organizer of the learning process, group leader, facilitator and the creator of conditions for the students' initiatives. Interactive learning is based on the students' own experience as well as on their direct interaction with the mastering area of professional experience. The training with the use of interactive educational technologies involves such a logic of the educational process which is distinctive from the usual one: the training goes not from the theory to practice but from the formation of the new experience to its theoretical understanding through application.

Research methods. In the article for realization of the put tasks it was used complex methods of research: theoretical and empirical analysis of philosophical, psychological, pedagogical, sociological literature to determine the state of developed

of problem of the role of interactive technologies in providing quality education in higher school; structurally system analysis – with the purpose of theoretical and practical ground of problem; terminology analysis – for determination of basic base concepts of research; inductions and deductions, systematizations and generalizations – for the selection of basic methods and technologies of studies with the purpose of upgrading education at higher school.

Objectives. The main goal of this article is a practical review of the most common interactive teaching methods in domestic and foreign educational practice. Using a system of methodical advice, the authors tried to share their long-term observations and the results of their pedagogical experiments in order to determine the manners of professional conduct, attitude and technique that turns a teacher into a successful professional.

Presentation of the basic material. These problems are of interest primarily for post-graduate students, students of master's educational programs and training programs of the management of educational institutions, managers of higher education. These students, adults and motivated people who already work and study in higher educational institutions, consciously build their future educational and management career, seek to gain not theoretical knowledge but real competence that are able to provide them with the opportunity to solve complex problems and demonstrate a high level of modern pedagogical technologies.

One of the major challenges of modern high school is the commitment to quality and excellence. Being one of the central figures in achieving this goal, the teacher has to achieve it through the improvement of collective and individual incentives, the mastery of a new style of conduct and certain professional and cultural values. His success, the ability to integrate excellence into his own consciousness and practice depends on the ability to master modern technologies in the learning process. Taking this into account, the main goal of higher education is the training of a qualified teacher of the appropriate level and profile who is competitive in the labor market, competent, fluent in the profession and skills, oriented in related areas, ready for permanent professional growth, social and professional mobility.

One of the ways to solve this problem is to upgrade higher education, to transfer of attention from the learning process to its result, to focus the content and organization

of training on the competence approach and to search for effective mechanisms for its implementation [6].

Analyzing the essence of the traditional and widespread educational process in higher education institutions, it should be noted that it consists of the transmission of knowledge from the teacher to the students. The teacher is a key figure in it. He/she defines learning objectives, its content in accordance with the program and also chooses fairly traditional forms and methods of teaching: lectures, seminars, practical classes, controls the quality of the training. It is necessary for students to master the knowledge that is passed to them, that is, attending the classes, speaking at seminars, performing practical tasks, passing exams and tests. A passive position of the student often has a subordinate nature in relation to the position of the teacher. The training can not be considered effective with such a passive position of the student. The traditional one-sided communication, the knowledge transmission can be justified only in case of insufficient information that could be found independently, or inability to receive it not from the teacher but in a different way.

The existing organization of the educational process in higher education seems quite logical, thoughtful and holistic and has satisfied (or almost satisfied) the needs of the society with the specialists who have been trained. However, the numerous interviews of the authors with students and teachers of Kyiv National Taras Shevchenko University, Vinnytsya National Pirogov Memorial Medical University have demonstrated the discontent of both teachers and students with learning outcomes. The main complaint of teachers is that students do not study whereas students insist on inadequate content and methods of "learning their queries and needs."

So, today we are talking about the need for changes of the forms and methods of teaching. An alternative to the traditional one can be the organization of the learning process where the efforts of the parties involved in it are aimed at ensuring the student's learning process. The activity of the teacher in this case is guided not by his own actions but by the actions and the activity of the trainee. The position of the teacher is becoming fundamentally different - he does not transmit knowledge but creates learning conditions for the student to be able to work using his own experience in various ways, which allows him to operate with various forms of knowledge. Undoubtedly, such a change of emphasis requires a change in the position not only of the teacher but also of the position of the student: the position of the information

receiver is transformed into the position of the creator of one's own knowledge. It is possible to think and construct knowledge itself because both experience and knowledge are acquired in the course of real processes that produce thoughts and actions. Therefore, a specially organized process of multilateral communication in learning involves not only the teacher but also the activity of each subject of the educational process. Such communication involves not just allowing students to say something, which is as well important, but also their knowledge and experience into the learning process. Traditionally, in most universities, when students try to bring their own knowledge or experience into the discussion of the material the teachers often leave it at the level of information and do not allow to change the structure of the subject of the discussion, disrupting the habitual communication model "teacher's opinion-student's supplement". The principles of multilateral communication are often violated because the students' knowledge only takes part in it as much as they complement the teaching process. Therefore, the following issues can be considered characteristic features of teaching, organized as a multilateral communication:

1. Students master specific knowledge and skills better if they are allowed to approach the object of knowledge through their own experience, independent intellectual activity, discussion of the results with other participants in the learning process.

2. Students learn better if the teacher actively supports the way of their learning. This works better when there is a field between them (students) and the subject of study that includes verbal and non-verbal actions.

3. Students learn better if the teacher, firstly, structures the subject for easy mastering, and, secondly, accepts and includes in the discussion the students' opinions which do not coincide with his own.

Consequently, the organization of interactive training most fully meets the specified requirements and characteristics, allows to switch from one-sided to multilateral communication, the interactive learning is the interaction of people involved in the educational process: the interaction between the teacher and students and between the students themselves. It is the inclusion of interactive teaching methods in the educational process of higher education that allows you to remove most of the problematic moments in the training of a modern specialist, contributes to the full achievement of the main goal of higher education. Together with professional

competence, the formation of the student's intellectual autonomy with the presence of a developed social competence should be considered to be this goal.

The intellectual autonomy of the student is the ability of the student to "build" his own knowledge on the basis of previous experience and those communications that occurred in the process of building this knowledge. The process of obtaining professional knowledge and the formation of a certain intellectual autonomy is going on more or less successfully in a modern institution of higher education (but there is a tendency of deterioration due to a deepening discrepancy between modern requirements to a specialist and a real ability to operate with existing knowledge among university graduates). As for the development of social communication it should be mentioned that in the existing system of higher education it is envisaged that the social skills of students are formed on their own. It is recognized that an expert should not only be intellectually autonomous and be able to think independently, but he also needs to live among people and cooperate productively with them, though it is not moved further the recognition of this fact. Therefore, the task of higher education is to ensure that students develop social skills in organizing the educational process.

In the literature it is difficult to find an article, a monograph or a textbook on the problems of teaching in higher education where it is not mentioned about interactive teaching methods and that they need to be widely introduced into the educational process. But it is difficult to find a consistent analysis of the methods of organizing interactive learning, the discovery of the mechanisms of the influence of such methods on the individual cognitive process, the identification of factors that ensure the effectiveness of interactive teaching methods in the university and promote the development of communicative and other social skills. Therefore, it is necessary to give guidelines and recommendations to the teacher on the effective organization of each of the interactive teaching methods in order to improve the teacher's planning process.

Today's practice is marked not only by high technologies but also by the complexity of the requirements for the specialists who provide it. Modern requirements for the specialist give rise to new approaches to its preparation. It is possible to distinguish the following tendencies which are typical for the majority of pedagogical technologies in the world:

- special attention to the formation of practical professional and general skills while the theoretical part of the training is still relevant;
- a significant increase of the proportion of self-study (independent) academic work in the total amount of time allotted for training in a university;
- the transition to technology the focus of which is not only the formation of a specialist (no one refuses this), but also the personality of the learner. No wonder that among the requirements for a modern specialist his personal qualities occupy one of the leading places. And by personal qualities in this case we mean the specific qualities of a specialist in relation to work.

A special feature of modern changes is the understanding of professionalism, which is inextricably linked not only with purely professional knowledge and skills but also with the overall high level of mental development. The indicator of the general mental development of an individual is the intellectual value which is manifested as structuredness, categorizing, generality, flexibility, efficiency of knowledge necessary for making effective decisions; as intellectual initiative in the unity of cognitive and motivational components that determine the willingness of a specialist for independent intellectual activity; as self-organization and self-regulation [1, p. 26].

The transition to personality-oriented technologies is understood as a transition to such education where the learner's personality is the focus of the teachers', the psychologists' attention, where learning activities, not teaching ones, become the leading in the tandem "he who teaches is the one who learns" in order to turn the usual formula of education "teacher-textbook-student" to a "student-textbook-teacher ". In the conditions of such training, the one who teaches begins to play a new role and perform a new function in the educational process. While in the traditional system of teaching the teacher along with the textbook were the main and most competent sources of knowledge and the teacher was also a subject that controlled knowledge, in a new position he acts more as an organizer of independent active cognitive activity of the trainee, as competent consultant and assistant. His professional skills should be aimed not just at controlling knowledge and skills but also at diagnosing the activities of students with the aim of the in time assistance to solve the difficulties in the perception and use of knowledge in a qualified manner. In addition, the process of organizing the knowledge obtaining is becoming an important factor, therefore, new methods of teaching are emerging and are being transformed. From the above one

can single out the following objective and subjective factors for the successful implementation of pedagogical co-creation of the teacher and students in the pedagogical process.

First of all, this is the optimal use of the dialogical forms of students' education; the introduction of elements of creative training in higher education; the problem of the educational process on the basis of creative teaching and professional tasks; the preferential application of pedagogical means of indirect management, oriented to the optimal self-realization of the individual; the application of the group form of training; the creation of a psychological atmosphere of mutual respect and equality among the participants in the educational process; the formation of an appropriate motivation for co-creation among the partners in communication; the transformation of the teacher's psychological position: turning him from the information carrier to a consultant and the organizer of the learning process; the change of the students' orientation from "apprenticeship" to "partnership" [2, p. 87].

A decisive condition for the successful implementation of the joint work of the teacher and student is the organization of higher education on the basis of the dialogue. In the 21st century the dialogic culture becomes a new worldview of human and, accordingly, the basis for the achievement of a democratic model for the development of modern society. Education, aimed at creating conditions for the full development of the individual potential, is able to respond to the "challenges" of modern society, if it is probably based on a dialogic culture [3]. The key in the understanding of the psychological basis of interactive methods is the concept of interaction which is better known as interpersonal or social interaction in Russian and Ukrainian psychological literature. Social interaction is considered to be an integral part of communication and joint activities which form an inseparable unity. People do not just communicate in the process of performing social functions, they always communicate in some activity, "about" it [1, p. 27].

Interactive communication provides an opportunity to attract people to actively seek solutions in a difficult situation, to solve problems where one person's efforts and knowledge may not be enough. There are two common mistakes regarding "dialogical relations" without which a joint search for truth is practically impossible:

1) students think that they know something, i.e. have some truths; the truth is not born and is not in the head of an individual, it is born between people who are seeking the truth together;

2) people claim to have a ready-made truth; there is no ready-made truth, it is what is revealed through the relations among people [3].

Thus, the implementation of interactive teaching methods in the educational process allows to solve urgent needs in the training of a new type of specialist who is adequate to the requirements of modern society, a specialist who is able to seek a solution in cooperation with colleagues using an active exchange of knowledge. Interactive methods can be divided into groups, where 1) one of the parties of communication is a teacher and 2) communication occurs between students [listeners] [3]. The first group includes lectures with included conversations, discussions, problem lectures, seminar-discussions, question-answer seminars, discussions with provocative questions, consultations (especially with distance learning), work through the site-course.

To the second - conversations, discussions, round tables discussions, brainstorming, group solving of specific situations, business, role and didactic games, business simulations, projects and panel exercises. They can be used as separate methods and all together (for example, in a business game).

It is very important to pay attention to the fact that interactive teaching methods will not be effective unless the objective laws of their use are taken into account. This is, in particular:

1) motivation of educational activity. If the student does not want to learn, does not want to work hard, if he is not interested in the subject matter or if mental work does not bring satisfaction, interactive techniques can cause only irritation by the need to actively do something, prepare, think. Thus, to ensure the effectiveness of the use of interactive methods in the learning process it is necessary to ensure the deepening of the motivation for learning, its development, a reorientation to active cognition;

2) the gradual introduction of interactive methods in the learning process.

This methodology should be possessed not only by the teacher, the student should also be able to communicate, discuss, work in a team. This skill does not come by itself, it is formed gradually, in the process of learning. The consistent introduction

of interactive methods (from simple to complex and expanded) from the first year of study to the last one will allow to use of the whole range of methods;

3) interactive methods are not designed to master basic theoretical knowledge. Such knowledge is acquired by students individually in lectures, in the process of working with textbooks, relevant sources of information. They serve as a base for didactic communication. In the absence of students' basic knowledge (even in a part of students), interactive methods lose their meaning, because when solving problems or situations and in business games the participants use not professional knowledge but household ones that were formed before or outside the classroom. At first glance, the task or problem can be solved on an intuitive level, but students can not analyze the course of solving a problem, the impact of a decision on a positive solution and, therefore, can not turn a decision into knowledge about achieving a solution. This does not allow the use of achievements to solve new problems (since the link "the essence of the problem - the solution path" has not been established), does not promote the ability to compare problems to see hidden similarities or differences, and also forms or reinforces students' confidence in the fact that the intuition is the main issue that will solve problems without profound professional knowledge. Therefore, interactive methods should be used in combination with other methods of knowledge formation, with active independent work of students to acquire knowledge;

4) the skills can not be produced simultaneously, so the occasional introduction of the interactivity into the learning process will not give the desired effect. In order to form the ability to analyze problems, find and highlight their essence, build an algorithm of the solution, work collectively, make decisions and execute them, it is not enough to organize brainstorming or to offer a business game once or twice. The use of interactive methods should constitute a certain system, technology, have an adequate implementation logic, an algorithm for increasing complexity. It is necessary to plan the use of interactive methods in advance during teaching a certain academic discipline. In addition, it is important to coordinate such planning with teachers of other disciplines so that the increase in complexity goes simultaneously. Such coordination of the teaching methodology will allow to organize large-scale complex interdisciplinary business games at the end of the training where students can use various professional knowledge and skills;

5) the principle of the relevance of knowledge and their connection with modern socio-economic life of the country and the world must be surely observed. It is impossible to achieve activity and interest of students offering them obsolete situations, cut off the life, imaginary data, conditional circumstances, the tasks whose solutions are described in textbooks;

6) the effective implementation of interactive teaching methods directly depends on the degree of teachers' proficiency, on the depth of their professional knowledge, on the desire to move away from traditional methods and on the focus on the final result - the training of a qualified specialist (and not just the formation of knowledge of their subject);

7) the existence of the partnership between: teachers and students, the lack of authoritarian imposition of one's own opinion, the position on the part of the teacher.

So, modern high school, as scientific studies show, has to solve a double task: to form professional knowledge and skills and to train the students to perform their professional functions. These problems can be solved through the development of social competence in them, which is understood as the ability to communicate and cooperate, to plan, to make choices, to make decisions, to take responsibility for the consequences, to regulate conflicts and to increase one's competence [4]. The analysis gives us grounds to say confidently that interactive methods play a leading role in the implementation of the task of the student-centered learning in higher education and in solving problems of quality teaching. They do not cancel and do not substitute the classical methods of training, but naturally and essentially complement them. In our opinion, such innovation of the educational process where old (approved) and new, (created with the requirement of time) teaching methods are naturally combined, allows to organize the current process of training of specialists in higher education effectively.

Interactive methods allow to fruitfully implement the educational and developmental functions of the pedagogical process. They contribute to the active formation of students' knowledge through independent work and collective discussion, develop and improve intellectual skills, productive and creative thinking and also allow to form professional social qualities of future specialists actively. For the teacher this training organization is an effective way of receiving a feedback, which contributes to the ability to effectively adjust the process of mastering knowledge and skills and to

organize counselling for students. The complexity of the implementation of interactive teaching methods requires from the teacher to thoroughly understand the methods of their organization that is not only the general issues but each individual method and their integrated use. The teacher should not only be able to adapt these methods to his subject, his discipline, and also to be able to work for the overall result - the training of a modern professional who can realize himself in difficult socio-economic realities.

Conclusions. Thus, modern trends in the development of higher vocational education determine a fundamental change in the approaches to the organization of the educational process in higher education. The introduction of a system of multilevel education, the creation of a unified educational space, the implementation of a competence approach, necessitate a new approach to the organization of the training. Teacher of high school needs to perform not only the function of a translator (transmitter) of scientific knowledge, but to be able to choose the best strategy of teaching, to use modern educational technologies aimed at creating a creative atmosphere of the educational process. Changing of the vector of the educational process from a knowledge-based approach to a practice-oriented one to the results of the educational process has inevitably led to the formulation of the problem of technologies and teaching methods by which this practice-orientation will be achieved.

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The Role of the Upper Secondary Degree School in the Process of Preparing the Student for Engaged Activities

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Abstract: The presented text refers to the continuation for the presentation of results of studies intended to analyze activities undertaken by school with regard to the preparation of students for the changing labor market. The studies conducted reveal that the selection of the field of study or the profession is an open question also for students in the technical school. The studies confirm that many students of the technical school perceive that the field of study they have selected is not compliant with their interests. Thus, supporting the student in the process of shaping the path of professional career is a responsible task also for technical schools. This text constitutes the second part of considerations on school activities with regard to supporting the student with professional career planning.

Keywords: student, teacher, inspiring, didactic process, professional career planning.

Rola szkoły ponadgimnazjalnej w procesie przygotowania ucznia do zaangażowanego działania

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Streszczenie: Niniejszy tekst stanowi kontynuację prezentacji wyników badań, mających na celu dokonanie analizy działań, podejmowanych przez szkołę w zakresie przygotowania uczniów do zmieniającego się rynku pracy. Przeprowadzone badania

pokazują, iż wybór kierunku kształcenia, czy zawodu jest kwestią otwartą także dla uczniów w technikum. Badania potwierdzają, iż wielu uczniów technikum stwierdza, iż kierunek, jaki wybrali nie jest zgodny z ich zainteresowaniami. Wspieranie zatem ucznia w procesie kształtowania ścieżki kariery zawodowej stanowi odpowiedzialne zadanie także dla szkół technicznych. Niniejszy tekst jest drugą częścią rozważań na temat działań szkoły na rzecz wspomaganie ucznia w planowaniu kariery zawodowej.

Słowa kluczowe: uczeń, nauczyciel, inspirowanie, proces dydaktyczny, planowanie kariery zawodowej.

Wstęp

Inspirowanie ucznia szkoły ponadgimnazjalnej do zaangażowanego uczestnictwa w procesie dydaktycznym stanowi jeden z ważniejszych elementów jego przygotowywania do rynku pracy. Otwartość na różne źródła informacji, przyjmowanie różnorodnych ról w zadaniach dydaktycznych, realizowanych metodą projektu, elastyczność w dostosowywaniu się do sposobów realizacji tych zadań, kształtuje w uczniu postawy oczekiwane na współczesnym rynku pracy. „W procesach edukacyjnych ma miejsce uczenie się dobrej pracy indywidualnie i w zespołach. Z zasady połączone jest z samokształceniem w pełnym tego słowa znaczeniu lub kierowanym”.¹ W tym kontekście ważną rolę pełni szkoła, której zadaniem jest kształtowanie aktywnych postaw samokształceniowych oraz otwartości na permanentne doskonalenie.

U. Jeruszka stwierdza, iż kształcenie ustawiczne „(...) nie jest przygotowaniem do życia, lecz stanowi integralną część życia. Uwzględnia przemiany czasu, wartości rynku oraz rytm indywidualnej egzystencji.”² Znaczenie edukacji całościowej podkreśla także St. M. Kwiatkowski „Szkoła jest tylko jednym ze środowisk wychowawczych – obok rodziny, grup rówieśniczych, organizacji społecznych - które mają wpływ na uczniów. Takie cechy jak np. wyróżnienie EQF *przejmowanie odpowiedzialności za własne kształcenie* lub też *świadome modyfikowanie swojego*

¹ St. Kaczor, Praca w społeczeństwie obywatelskim, [w:] R. Gerlach (red.), *Edukacja i praca. Konteksty – wyzwania – antynomie*, Wydawnictwo Uniwersytetu Kazimierza Wielkiego, Bydgoszcz 2008, s. 70

² U. Jeruszka, Przemiany w sferze pracy we współczesnym świecie w kontekście potrzeby edukacji permanentnej, [w:] R. Gerlach (red.) *Edukacja i praca, konteksty-wyzwania-antynomie*, Wydawnictwo Uniwersytetu Kazimierza Wielkiego, Bydgoszcz 2008, s. 278

zachowania są kształtowane zarówno w szkole, jak i poza nią, i to w procesie uczenia się przez całe życie”³

Zaangażowana aktywność jednostki na rynku pracy determinuje jej sytuację zawodową. Warto podkreślić, iż „(...) wymogi w zakresie kompetencji i kwalifikacji znacznie wzrosną we wszystkich zawodach i na wszystkich poziomach zatrudnienia, a popyt na wyższe i bardziej wyspecjalizowane umiejętności będzie się sukcesywnie zwiększał.”⁴ Dotyczy to zarówno krajowego, jak europejskiego rynku pracy. W tym, kontekście rola całożyciowego doskonalenia zyskuje szczególne znaczenie. *Karta praw podstawowych Unii Europejskiej*⁵ w art. 15 *Wolność wyboru zawodu i prawo do podejmowania pracy* stwierdza, iż „Każdy ma prawo do podejmowania pracy oraz wykonywania swobodnie wybranego lub zaakceptowanego zawodu.”⁶ W dalszych zapisach wymienionego artykułu czytamy „Każdy obywatel Unii ma swobodę poszukiwania zatrudnienia, wykonywania pracy, korzystania z prawa przedsiębiorczości oraz świadczenia usług w każdym Państwie Członkowskim”⁷ Omawiane swobody obywatelskie, wynikające z Członkostwa Polski w Unii Europejskiej poszerzają perspektywy zawodowe współczesnych absolwentów szkół ponadgimnazjalnych.

Ważnym zatem zadaniem szkoły jest wyposażanie ucznia w umiejętności planowania ścieżki kariery zawodowej, która współcześnie jest pasmem indywidualnych wyborów, wynikających często z następujących na rynku pracy zmian. „Trudno dziś wspinać się po szczeblach kariery zawodowej w jednej organizacji. Brak ciągłości w pracy zawodowej, często przymus lub chęć emigracji, zwiększony nacisk na mobilność zawodową – wszystkie te elementy zmuszają jednostkę do ciągłego dostosowywania się do potrzeb rynku pracy”⁸

³ St. M. Kwiatkowski, Europejskie Ramy Kwalifikacji – nowe wyzwanie dla systemu edukacji, [w:] R. Gerlach, *Praca człowieka w XXI wieku. Konteksty-wyzwania-zagrozenia*, Wydawnictwo Uniwersytetu Kazimierza Wielkiego, Bydgoszcz 2008, s. 246

⁴ I. Kust, Doradca zawodowy w kontekście wdrażania podstawy programowej kształcenia ogólnego oraz zawodowego [w:] I. Kust, J. Michalak-Dawidziuk (red. nauk.), *Kształcenie i wychowanie dla rynku i rozwoju*, Wydawnictwo Wyższej Szkoły Menedżerskiej w Warszawie, Warszawa 2013, s. 148

⁵ *Karta praw podstawowych Unii Europejskiej* (Dz. Urz. UE z 2012/C 326/02)

⁶ Art. 15 ust. 1 *Karty praw podstawowych Unii Europejskiej* (Dz. Urz. UE z 2012/C 326/02)

⁷ Art. 15 ust. 2 *Karty praw podstawowych Unii Europejskiej* (Dz. Urz. UE z 2012/C 326/02)

⁸D. Kukła, *Współczesne społeczeństwo w kontekście kreowania rynku pracy* [w:] Szkoła, Zawód, Praca, Nr 11/2006 Bydgoszcz 2016, s. 67

Niewątpliwie w procesie kształtowania ścieżki kariery ważną rolę odgrywa doradca zawodowy, warto jednak podkreślić znaczenie nauczyciela, realizującego proces dydaktyczny, w trakcie którego uczeń może nabywać określone umiejętności i kompetencje. W tym kontekście jego rola jest kluczowa. Stąd zaangażowanie, kreatywność, kompetencje komunikacyjne nauczyciela stanowią podstawę tworzenia dydaktyki, wspomagającej proces kształtowania w uczniach postaw niezbędnych na aktualnym rynku pracy, ale także koniecznych na studiach. Warto podkreślić, iż „Polska, obok Finlandii, Japonii, Meksyku, Portugalii, Słowacji, Stanów Zjednoczonych, Szwecji, Turcji, Węgier i Włoch należy do grupy państw, w których ponad $\frac{3}{4}$ uczniów szkół średnich może, po ich ukończeniu, ubiegać się o przyjęcie na uniwersytet.”⁹ Przykładem może być technikum, często skupiające młodzież, która wybrała drogę kształcenia prowadzącą do uzyskania zawodu już na poziomie szkoły ponadgimnazjalnej. Wybór ten spowodowany jest niejednokrotnie sytuacją materialną rodziny, jej poziomem wykształcenia lub niepełną strukturą. Jednakże uczelnie, poprzez prowadzenie kształcenia także w trybie niestacjonarnym - umożliwiają studentowi łączenie nauki z pracą. Perspektywa ta dla wielu absolwentów szkół ponadgimnazjalnych, w tym także technikum, okazuje się bardzo atrakcyjna.

Zatem szkoła ponadgimnazjalna ma bardzo ważne zadanie wykreowania w uczniu aktywnej postawy charakteryzującej się zaangażowaniem w podejmowane przez ucznia zadania zarówno na rynku pracy, jak i w procesie dalszego kształcenia oraz całościowego doksztalcania i doskonalenia. Jest to ważne w kontekście wielokrotnych zmian zawodów, jakie współczesny rynek pracy wymusza na jednostce. „Nie oznacza to, że proces podejmowania pierwszej decyzji o wyborze zawodu należy bagatelizować. Przez całe życie w mniejszym lub większym stopniu wykorzystuje się wiedzę i umiejętności uzyskane w trakcie uzyskiwania kwalifikacji do wykonywania pierwszego zawodu. Stanowią one bazę, którą w trakcie życia osoba stale wzbogaca.”¹⁰

⁹ U. Sztanderska, E. Drogosz-Zabłocka, B. Minkiewicz i in. (red.), *Edukacja dla pracy. Raport o rozwoju społecznym. Polska 2007*, Program Narodów Zjednoczonych ds. Rozwoju, Warszawa 2007, s. 18

¹⁰ J. Michalak-Dawidziuk, Znaczenie rodziny w [procesie dokonywania wyboru zawodu przez uczniów [w:] I. Janicka, M. Znajmiecka-Sikora (red.), *Rodzina i kariera Równoważenie czy konflikt ról?* Wydawnictwo Uniwersytetu w Łódzkiego, Łódź 2014, s. 154

Szkoła ponadgimnazjalna a przygotowanie ucznia do zaangażowanego działania – w świetle wyników badań

W okresie od stycznia do kwietnia 2017 r. przeprowadziłam badania, których celem było pozyskanie wiedzy na temat działań nauczycieli, mających na celu inspirowanie uczniów do zaangażowania w proces dydaktyczny. Badania zostały przeprowadzone w trzech warszawskich szkołach, funkcjonujących w dzielnicach: Mokotów i Ochota, tj. w:

- Zespole Szkół Hotelarsko – Gastronomiczno -Turystycznej, ul. Krasnołęcka 3,
- Zespole Szkół Nr 3 im. 2 Armii Wojska Polskiego, ul. Fr. Joliot Curie 13,
- Zespole Szkół Nr 4 im. Eugeniusza Kwiatkowskiego, ul. Szczęśliwicka 46.

W badaniach uczestniczyło 113 uczniów IV klas wymienionych szkół, w tym 73 dziewczęta i 40 chłopców. W podziale na poszczególne szkoły udział uczniów w badaniach przedstawiał się następująco:

- Zespół Szkół Hotelarsko – Gastronomiczno - Turystyczny, ul. Krasnołęcka 3: ogółem 44 uczniów, w tym 28 dziewcząt i 16 chłopców,
- Zespół Szkół Nr 3 im. 2 Armii Wojska Polskiego, ul. Fr. Joliot Curie 13: ogółem 22 uczniów, w tym 12 dziewcząt i 10 chłopców,
- Zespół Szkół Nr 4 im. Eugeniusza Kwiatkowskiego, ul. Szczęśliwicka 46: ogółem 47 uczniów, w tym 33 dziewcząt i 14 chłopców.

W badaniach zastosowano metodę sondażu diagnostycznego, technikę - ankietę. Do przeprowadzenia badań opracowałam kwestionariusz ankiety.

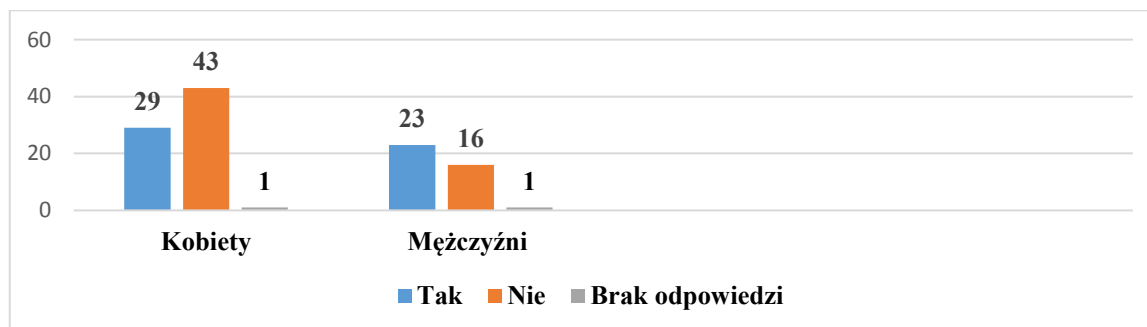
W celu zbadania podjętego tematu sformułowałam następujące pytania badawcze:

- Czy w trakcie nauki w szkole nauczyciele inspirują uczniów do poszerzania wiedzy? Jeśli tak, to w jakiej formie?
- Czy inspirujące formy, jakie stosują nauczyciele spowodowały wzrost świadomości uczniów znaczenia nauki? Jeśli tak, to w jakim stopniu.
- Czy inspirujące formy, stosowane przez nauczycieli zwiększyły zaangażowanie uczniów w naukę? Jeśli tak, wskaz w jakim stopniu.
- Czy uczniowie uczą się zgodnie ze swoimi zainteresowaniami? Jeśli tak, to w jakim stopniu.

Na pytanie dotyczące *inspirowania uczniów do poszerzania wiedzy przez nauczycieli*, na ogólną liczbę 113 uczniów IV klas wymienionych szkół, 52 uczniów, w tym 29 kobiet i 23 mężczyzn udzieliło odpowiedzi twierdzącej, 59 badanych, w tym 43 kobiet i 16 mężczyzn udzieliło odpowiedzi przeczącej. Dwóch respondentów, w tym 1 kobieta i 1 mężczyzna nie udzielili odpowiedzi. Warto zauważyć, iż relacje występujące między odpowiedziami *tak* i *nie* przedstawiają się diametralnie różnie w obu grupach respondentów. W grupie kobiet przeważały odpowiedzi negatywne – 43 odpowiedzi, podczas gdy twierdzącej udzieliło 29 osób. Różnica zatem wynosiła 14 odpowiedzi. W grupie mężczyzn w relacje, występujące między odpowiedziami przedstawiały się odwrotnie niż w grupie kobiet tj. odpowiedzi pozytywne dominowały (23) nad odpowiedziami negatywnymi (16). Zatem kobiety wykazują większe zaangażowanie do inspirowania uczniów w poszerzanie wiedzy.

Jednym z elementów mających wpływ na występowanie sześciuosobowej różnicy, między skrajnymi odpowiedziami, może być stopień zaangażowania uczniów w proces nauczania. Niewątpliwie jednak udzielone odpowiedzi wskazują na różne postawy nauczycieli w badanych szkołach.

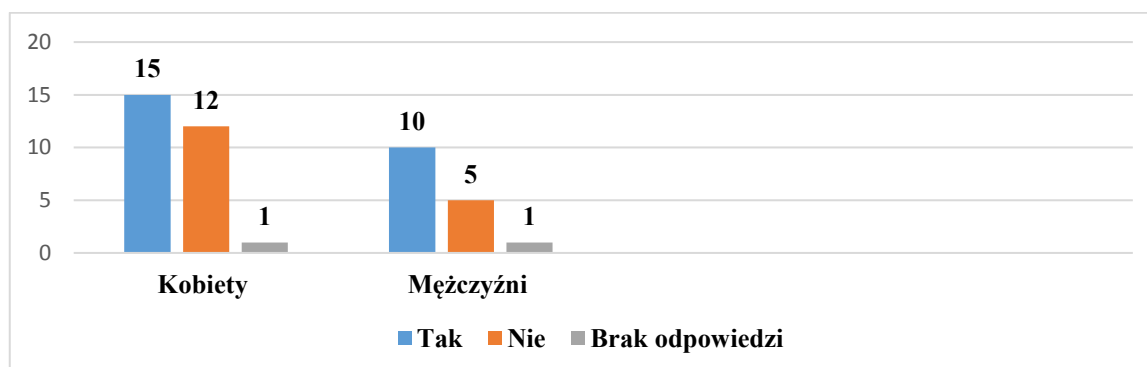
Wykres nr 1 Opinia uczniów na temat inspirującej roli nauczyciela do poszerzania wiedzy w trakcie ich nauki



Źródło. Opracowanie własne

Poniższe wykresy prezentują odpowiedzi, jakie uczniowie poszczególnych szkół udzielili na pytanie nr 1.

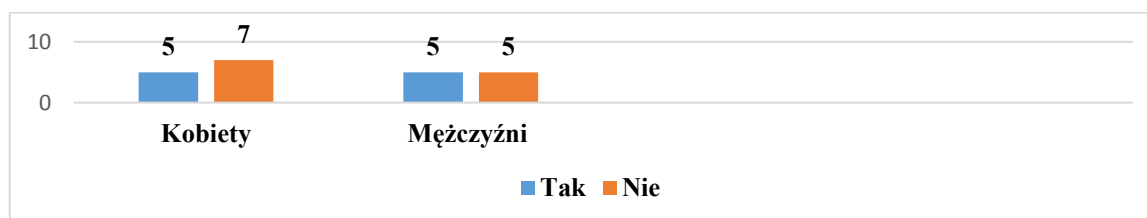
Wykres nr 2 Opinia uczniów Zespołu Szkół Hotelarsko – Gastronomiczno - Turystycznego na temat inspirującej roli nauczyciela do poszerzania wiedzy w trakcie nauki



Źródło. Opracowanie własne

W Zespole Szkół Hotelarsko – Gastronomiczno – Turystycznym odpowiedzi twierdzące dominowały zarówno w grupie kobiet (15 osób), jak i mężczyzn (10 osób). Różnie między grupą, która udzieliła odpowiedzi twierdzącej, jak i przeczącej wynosiła 3 zarówno wśród kobiet, jak i mężczyzn. Także zarówno wśród badanych kobiet, jak i mężczyzn po 1 osobie nie udzielono odpowiedzi.

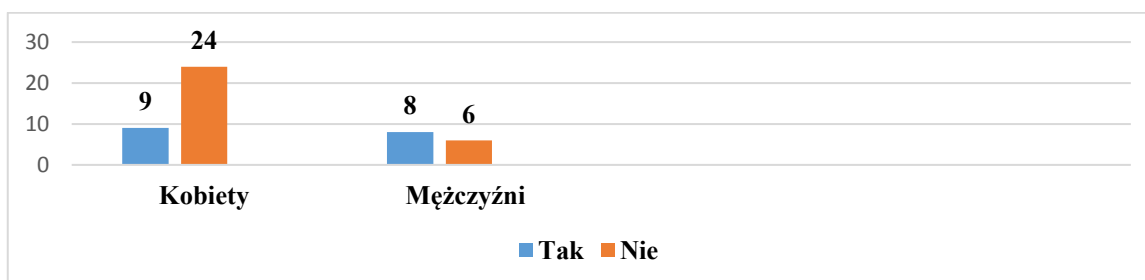
Wykres nr 3 Opinia uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego na temat inspirującej roli nauczyciela do poszerzania wiedzy w trakcie nauki



Źródło. Opracowanie własne

W Zespole Szkół Nr 3 im. 2 Armii Wojska Polskiego udzielone odpowiedzi nie różniły się znacząco – w grupie kobiet różnica w odpowiedziach – twierdzącej (5 osób) i przeczącej (7 osób) - wynosiła 2 osoby. W grupie mężczyzn liczba odpowiedzi *tak* i *nie* wynosiła po 5 respondentów. Warto jednak zaznaczyć, iż na ogólną liczbę 22 uczniów, uczestniczących w szkole w badaniach odpowiedzi przeczące (12) przeważały nad twierdzącymi (10).

Wykres nr 4 Opinia uczniów Zespole Szkół Nr 4 im. Eugeniusza Kwiatkowskiego na temat inspirującej roli nauczyciela do poszerzania wiedzy w trakcie nauki



Źródło. Opracowanie własne

W Zespole Szkół Nr 4 im. Eugeniusza Kwiatkowskiego na ogólną liczbę badanych – 47 uczniów – jedynie 17 osób wskazało odpowiedź *tak*, 30 osób wskazało odpowiedź *nie*. Szczególnie zauważalna różnica w relacjach między odpowiedziami *tak* i *nie* była zauważalna w grupie kobiet i wynosiła 9 – 24. W grupie mężczyzn różnica ta była znacznie mniejsza tj. 2 osoby (6 – 8).

Na ogólną liczbę 113 uczniów IV klas omawianych szkół respondenci wskazali następujące formy, stosowane przez nauczycieli, w celu inspirowania badanych uczniów do nauki:

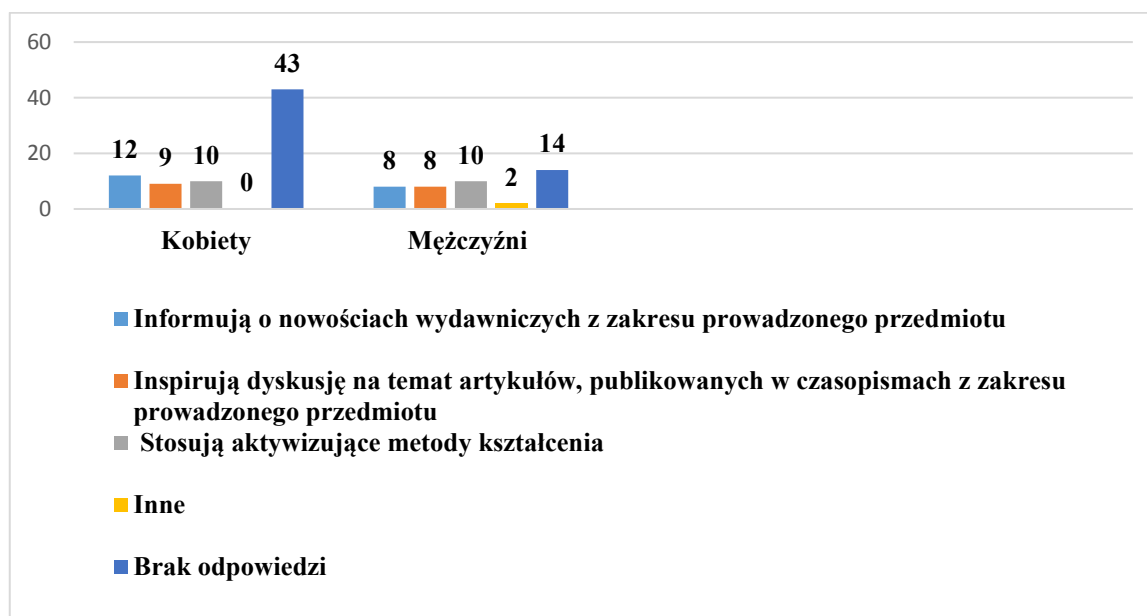
- a) *informują o nowościach wydawniczych z zakresu prowadzonego przedmiotu* – 20 osób, w tym 12 kobiet i 8 mężczyzn,
- b) *inspirują dyskusję na temat artykułów, publikowanych w czasopiśmie z zakresu prowadzonego przedmiotu* – 17 osób, w tym 9 kobiet i 8 mężczyzn,
- c) *stosują aktywizujące metody kształcenia* - 20 osób, w tym 10 kobiet i 10 mężczyzn,
- d) *inne* – 2 mężczyzn,
- e) *brak odpowiedzi* – 57 osób, w tym 43 kobiety i 14 mężczyzn.

Uzyskane wyniki potwierdzają stosowanie przez nauczycieli wielu metod w celu inspirowania uczniów do nauki. Jednakowy ilościowy wynik (po 20 osób), wskazujący odpowiedzi a) i c) pozwala wnioskować, iż nauczyciele *informują o nowościach wydawniczych z zakresu prowadzonego przedmiotu* oraz *stosują aktywizujące metody kształcenia*.

Niewiele mniejsza grupa (17 osób) potwierdziła, iż nauczyciele *inspirują dyskusję na temat artykułów, publikowanych w czasopiśmie z zakresu prowadzonego przedmiotu*. Sumując te grupy uzyskujemy wynik 57 osób. W badanej grupie także 57 osób nie udzieliło odpowiedzi. Zatem odpowiedzi badanej grupy w tej kwestii podzieliły się na połowę.

Uzyskany wynik potwierdza zarówno stopień zaangażowania uczniów w proces uczenia się, koncentracji na lekcjach, stosunku do nauczyciela, ale także umiejętności komunikacyjnych nauczycieli, otwartości na wykorzystywanie metod i materiałów dydaktycznych, aktywizujących uczniów na lekcjach i poza nimi.

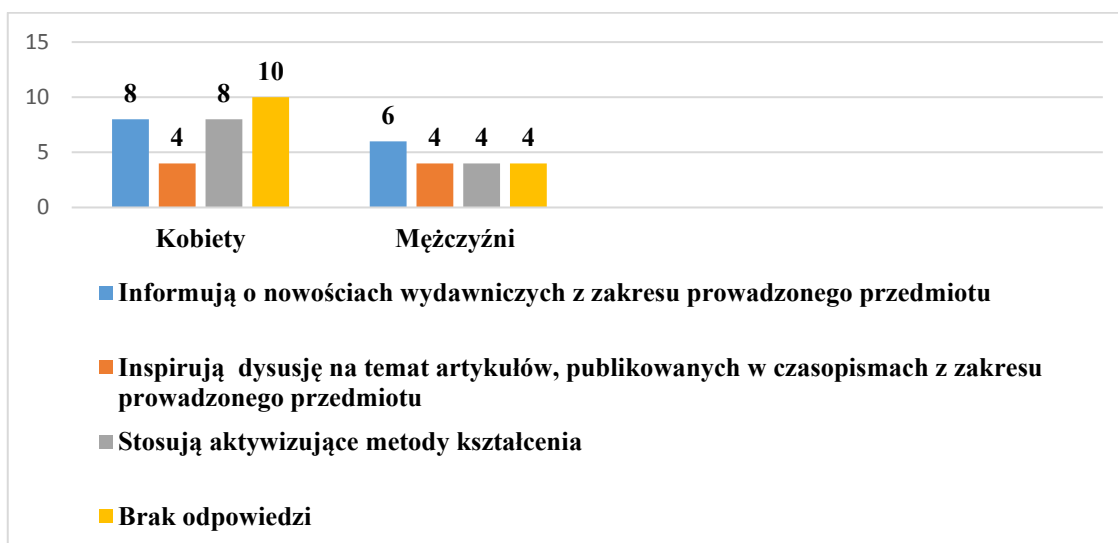
Wykres nr 5 Formy, w jakich nauczyciele inspirują badanych uczniów do nauki
(można było wskazać max. dwie odpowiedzi)



Źródło. Opracowanie własne

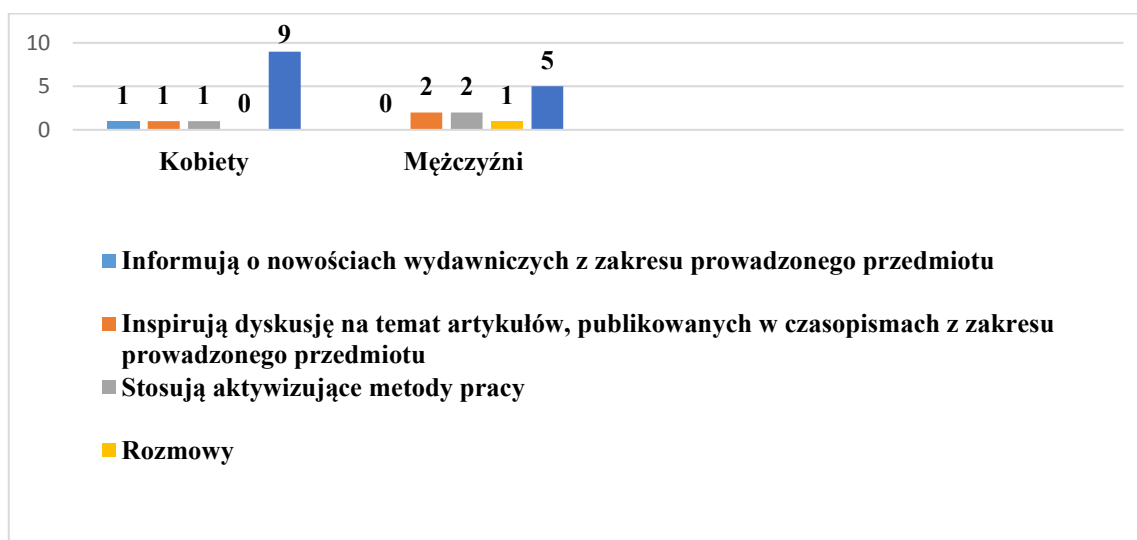
Na ogólną liczbę 44 badanych uczniów w Zespole Szkół Hotelarsko – Gastronomiczno – Turystycznej 14 uczniów stwierdziło, iż nauczyciele *informują o nowościach wydawniczych z zakresu prowadzonego przedmiotu*, 8 respondentów uważa, iż nauczyciele *inspirują dyskusję na temat artykułów, publikowanych w czasopiśmie z zakresu prowadzonego przedmiotu*, 12 uczniów stwierdziło, iż nauczyciele *stosują aktywizujące metody kształcenia*. Nie udzieliło odpowiedzi na to pytanie 14 uczniów.

Wykres nr 6 Formy, w jakich nauczyciele inspirują do nauki uczniów Zespołu Szkół Hotelarsko – Gastronomiczno - Turystycznego (można było wskazać max. dwie odpowiedzi).



Źródło. Opracowanie własne

Wykres nr 7 Formy, w jakich nauczyciele inspirują do nauki uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego (można było wskazać max. dwie odpowiedzi).



Źródło. Opracowanie własne

Na 22 uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego uczestniczących w badaniach, 1 potwierdził, iż nauczyciele *informują o nowościach wydawniczych z zakresu prowadzonego przedmiotu*, po 3 respondentów stwierdziło,

iż nauczyciele *inspirują dyskusję na temat artykułów, publikowanych w czasopiśmie z zakresu prowadzonego przedmiotu* oraz *stosują aktywizujące metody kształcenia*, jeden uczeń stwierdził, iż nauczyciele prowadzą z uczniami rozmowy.

Nie udzieliło odpowiedzi na to pytanie 14 uczniów. Uwzględniając fakt, iż spośród badanych szkół, grupa badawcza omawianej szkoły jest najmniej liczna uzyskany wynik pozwala na wysnucie przypuszczenia, iż nauczyciele stosują inspirujące uczniów do nauki metody kształcenia.

Wykres nr 8 Formy, w jakich nauczyciele inspirują do nauki uczniów Zespół Szkół Nr 4 im. Eugeniusza Kwiatkowskiego (można było wskazać max. dwie odpowiedzi)



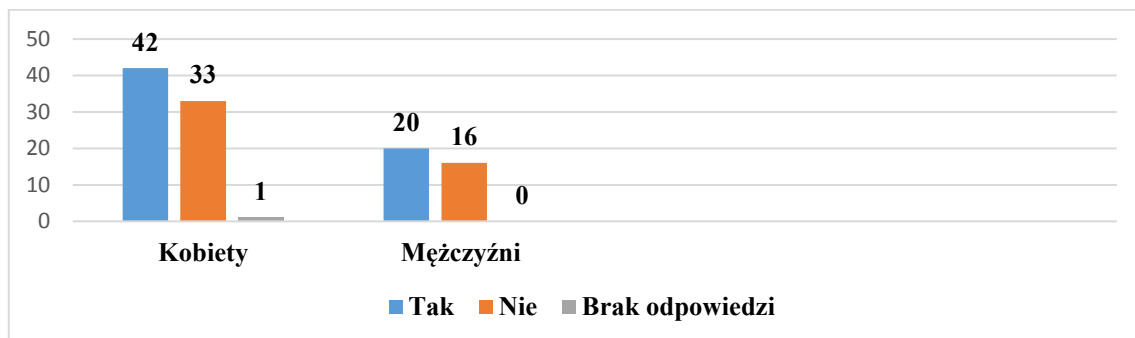
Źródło. Opracowanie własne

Na ogólną liczbę 33 badanych uczniów w Zespole Szkół Nr 4 im. Eugeniusza Kwiatkowskiego 5 uczniów stwierdziło, iż nauczyciele *informują o nowościach wydawniczych z zakresu prowadzonego przedmiotu*, 6 respondentów potwierdziło, iż nauczyciele *inspirują dyskusję na temat artykułów, publikowanych w czasopiśmie z zakresu prowadzonego przedmiotu*, 5 respondentów, stwierdziło, iż nauczyciele *stosują aktywizujące metody kształcenia*.

Jeden z badanych uczniów w odpowiedzi *Inne* wpisał następującą opinię: *to świetni ludzie, są moją inspiracją*. W grupie badanych liczną grupę – 29 osób - stanowili uczniowie, którzy nie udzielili odpowiedzi.

Na ogólną liczbę 113 badanych uczniów IV klas technikum, 62 osoby potwierdziły, że podjęły naukę zgodnie z zainteresowaniami, 49 uczniów wskazało odpowiedź przeczącą, a 1 osoba nie udzieliła odpowiedzi. W obu grupach płci dominowały odpowiedzi twierdzące – odpowiednio 42 (kobiety) i 20 (mężczyzn). Mniej liczne grupy wskazały odpowiedź przeczącą – 33 (kobiety) i 16 (mężczyzn). Uzyskany wynik wykazuje liczną grupę uczniów, którzy finalizując naukę w technikum stwierdzają, niezgodność z swoimi zainteresowaniami wybranego kilka lat wcześniej kierunku kształcenia. Analizując wyniki badań - 33 kobiet oraz 16 mężczyzn – należy stwierdzić, iż skala problemu jest duża.

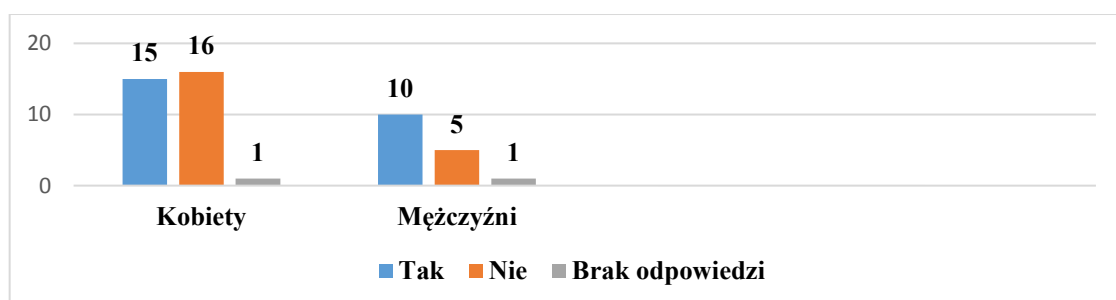
Wykres nr 9 Odpowiedzi uczniów na temat zgodności wyboru kierunku nauki z ich zainteresowaniami



Źródło. Opracowanie własne

Poniżej prezentuję wyniki badań dotyczące pytania 3 w podziale na poszczególne szkoły.

Wykres nr 10 Odpowiedzi uczniów Zespołu Szkół Hotelarsko – Gastronomiczno – Turystycznego na temat zgodności wyboru kierunku nauki z ich zainteresowaniami



Źródło. Opracowanie własne

Na ogólną liczbę badanych 44 uczniów Zespołu Szkół Hotelarsko – Gastronomiczno – Turystycznej 25 udzieliło odpowiedzi *tak*, 21 odpowiedzi *nie*, 2 osoby nie udzieliły odpowiedzi. Niewielka różnica (4) między dwiema skrajnymi odpowiedziami potwierdza poważną skalę problemu - osób w szkołach technicznych, które nie są usatysfakcjonowane wyborem kierunku kształcenia.

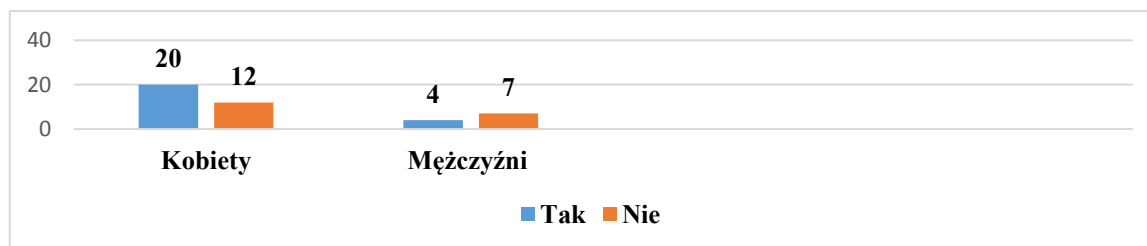
Wykres nr 11 Odpowiedzi uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego na temat zgodności wyboru kierunku nauki z ich zainteresowaniami



Źródło. Opracowanie własne

Na ogólną liczbę 22 badanych uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego 13 osób potwierdziło wybór kierunku nauki zgodny z zainteresowaniami, natomiast 9 zaprzeczyło. Relacje między odpowiedziami twierdzącymi i przeczącymi w obu grupach płci są takie same tj. odpowiedzi twierdzące przeważają nad przeczącymi (kobiety: 7-5, mężczyźni: 6-4). Liczba osób, które nie potwierdzają wyboru kierunku nauki z zainteresowaniami jest poważna.

Wykres nr 12 Odpowiedzi uczniów Zespołu Szkół Nr 4 im. Eugeniusza Kwiatkowskiego na temat zgodności wyboru kierunku nauki z ich zainteresowaniami



Źródło. Opracowanie własne

Na ogólną liczbę badanych 47 uczniów Zespołu Szkół Nr 4 im. Eugeniusza Kwiatkowskiego 24 uczniów potwierdziło zgodność wybranego kierunku nauki z

zainteresowaniami, 19 udzieliło odpowiedzi przeczącej. Rozkład odpowiedzi *tak* i *nie* w obu grupach płci rozkładają się odwrotnie tj. wśród kobiet dominującą grupę stanowiły odpowiedzi twierdzące (odpowiednio: 20 - 12), natomiast w grupie mężczyzn przeczące (odpowiednio: 4 -7).

Reasumując decyzje kobiet o wyborze kierunku kształcenia w technikum były trafniejsze niż mężczyzn.

Na pytanie dotyczące stopnia zaangażowania uczniów w proces kształcenia - na ogólną liczbę 113 uczniów - udzielono następujących odpowiedzi:

- a) bardzo wysokim - 11 osób, w tym 5 kobiet i 6 mężczyzn,
- b) wysokim - 19 osób, w tym 13 kobiet i 7 mężczyzn,
- c) średnim - 42 osoby, w tym 29 kobiet i 13 mężczyzn,
- d) niskim - 8 osób, w tym 2 kobiety i 6 mężczyzn,
- e) bardzo niskim – 6 osób, w tym 5 kobiet i 1 mężczyzna.

Nie udzieliło odpowiedzi 26 osób, w tym 19 kobiet i 7 mężczyzn.

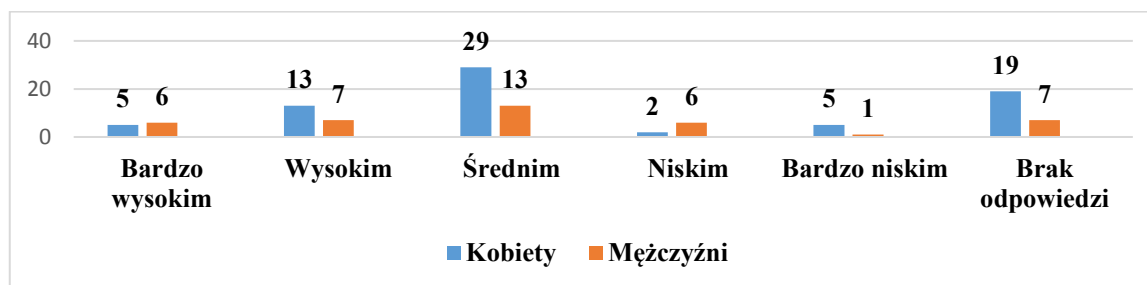
Wśród badanych dominująca grupa to osoby, które deklarowały *średni* stopień zaangażowania w proces kształcenia (42 osoby). Na drugim miejscu byli respondenci, którzy nie udzielili odpowiedzi (26 osób). Niechęć udzielenia odpowiedzi na to pytanie mogła być spowodowana faktem, iż badania były przeprowadzane wśród uczniów klas maturalnych, którzy nie byli skłonni do wypowiedzania się na ten temat.

Analizując kolejne grupy warto zauważyć, iż kolejne – trzecie - miejscu zajęła grupa uczniów (19 osób), która deklarowała zaangażowanie w proces kształcenia w stopniu *wysokim*, a następnie 11 – osobowa grupa respondentów wskazująca stopień *bardzo wysoki*. Ogółem grupa, która wskazała stopień *średni*, *wysoki* i *bardzo wysoki* liczyła 73 uczniów, w tym 47 kobiet i 26 mężczyzn.

Grupy które wskazały stopień *niski* (8 uczniów, w tym 2 kobiety i 6 mężczyzn) oraz *bardzo niski* (6 osób, w tym 5 kobiet i 1 mężczyzna) łącznie liczyły 14 osób, w tym po 7 kobiet i mężczyzn.

Uzyskany wynik potwierdza, iż dominująca liczba uczniów w znacznym stopniu angażuje się w proces kształcenia.

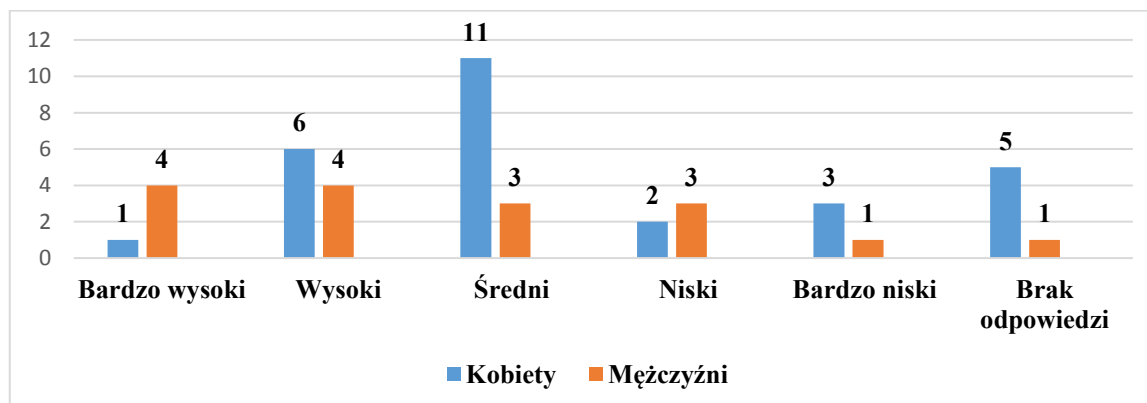
Wykres nr 13 Deklaracje uczniów, na temat stopnia ich zaangażowania w proces kształcenia



Źródło. Opracowanie własne

Poniżej prezentuję analizę wyników badań, dotyczących pytania nr 4 w podziale na poszczególne szkoły.

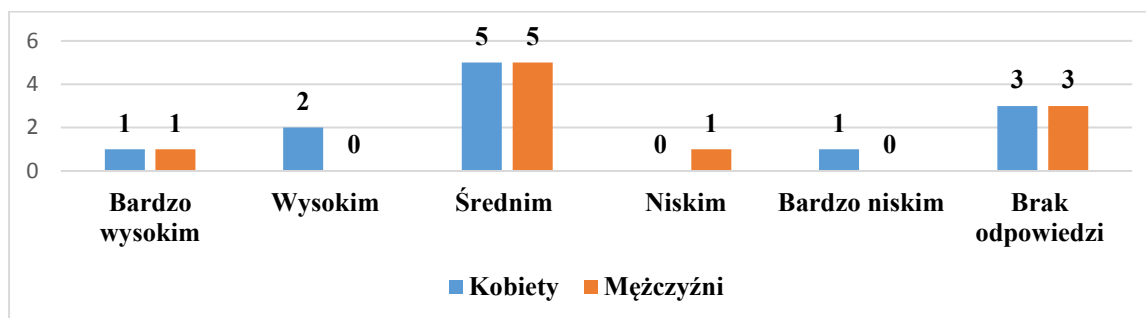
Wykres nr 14 Deklaracje uczniów Zespołu Szkół Hotelarsko – Gastronomiczno – Turystycznego na temat stopnia ich zaangażowania w proces kształcenia



Źródło. Opracowanie własne

Na ogólną liczbę 44 badanych uczniów w Zespole Szkół Hotelarsko – Gastronomiczno – Turystycznym stopień *bardzo wysoki* wskazało - 5 osób, *wysoki* - 10 osób, *średni* - 14 osób, *niski* - 5 osób, *bardzo niski* – 4 osoby. Nie udzieliło odpowiedzi 6 osób. Na uwagę zasługuje wynik uzyskany w grupie *bardzo wysoki*, gdzie większość stanowili mężczyźni. Podobna relacja – gdzie większość stanowili mężczyźni – wystąpiła w grupie odpowiedzi *niski*. Na uwagę zasługuje także fakt, iż najliczniejszą grupę – zarówno wśród kobiet, jak i mężczyzn – stanowiły respondenci, którzy deklarowali *średni* stopień zaangażowania w proces kształcenia.

Wykres nr 15 Deklaracje uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego na temat stopnia ich zaangażowania w proces kształcenia

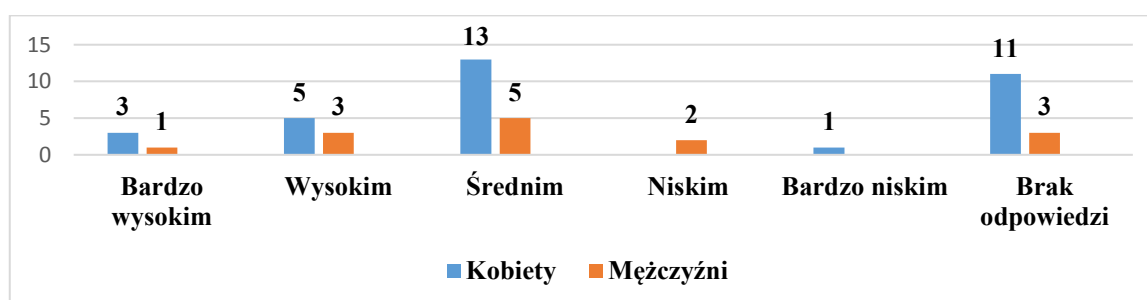


Źródło. Opracowanie własne

Na ogólną liczbę badanych 22 uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego najliczniejszą grupę (10 osób) stanowili uczniowie, którzy deklarowali *średni* stopień zaangażowania w proces kształcenia, 6 respondentów nie udzieliło odpowiedzi, po dwie osoby wskazało stopień *bardzo wysoki* i *wysoki*, po 1 osobie deklarowały stopień *niski* i *bardzo niski*.

Podobnie jak w Zespole Szkół Hotelarsko – Gastronomiczno – Turystycznym dwie pierwsze (liczebnie) grupy to uczniowie, którzy deklarowali *średni* stopień zaangażowania w proces kształcenia oraz nie udzielili odpowiedzi. Potwierdza to przypuszczenie, iż niechęć do udzielenia odpowiedzi nawet w mniej licznie grupie występuje w stopniu znacznym.

Wykres nr 16 Deklaracje uczniów Zespołu Szkół Nr 4 im. Eugeniusza Kwiatkowskiego na temat stopnia ich zaangażowania w proces kształcenia



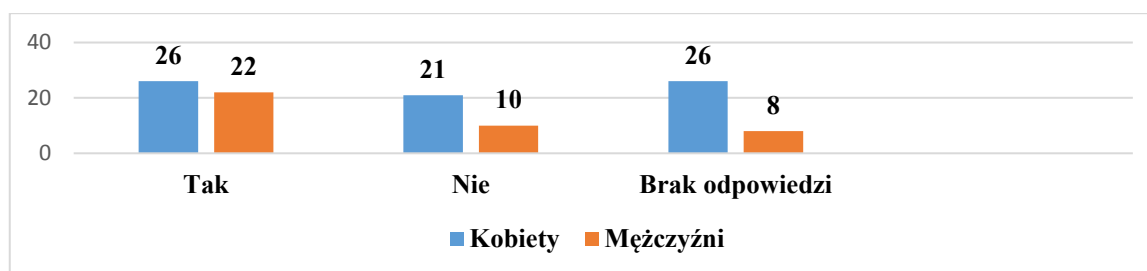
Źródło. Opracowanie własne

Na ogólną liczbę 47 badanych uczniów Zespołu Szkół Nr 4 im. Eugeniusza Kwiatkowskiego - podobnie jak we wcześniej analizowanych wynikach – najliczniejszą

grupę stanowili uczniowie, którzy w *średnim* stopniu deklarowali zaangażowanie w proces kształcenia. Warto zauważyć, iż w grupach, które wskazały odpowiedzi w stopniu *średnim*, *wysokim* i *bardzo wysokim* dominowały kobiety. Jednocześnie żadna z badanych kobiet nie wskazała odpowiedzi w stopniu *niskim*. Warto zauważyć, iż żaden z badanych mężczyzn nie wskazał odpowiedzi w stopniu *bardzo niski*, natomiast jedna kobieta wskazała tę odpowiedź.

Na ogólną liczbę 113 badanych uczniów 48 potwierdziło wpływ inspirujących form, stosowanych przez nauczycieli na podniesienie ich świadomości znaczenia nauki, przeciwnego zdania było 31 uczniów, nie udzieliło odpowiedzi 34 respondentów. W każdej grupie odpowiedzi dominującą liczebnie były kobiety.

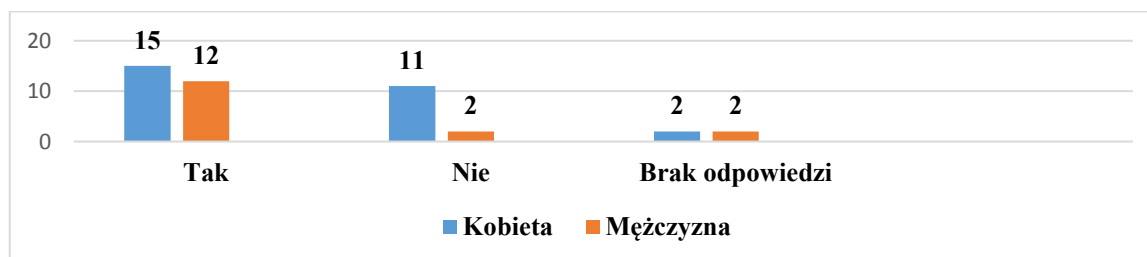
Wykres nr 17 Opinie badanych uczniów na temat wpływu form inspirujących, stosowanych przez nauczycieli na podniesienie ich świadomości znaczenia nauki



Źródło. Opracowanie własne

Poniżej prezentuję wyniki badań, dotyczących pytania nr 5 w podziale na poszczególne szkoły.

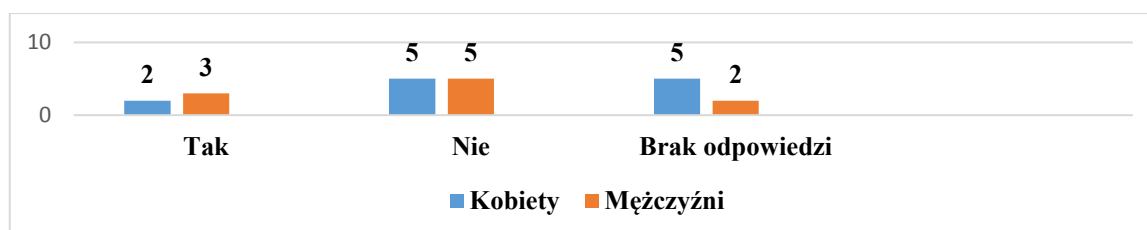
Wykres nr 18 Opinie uczniów Zespołu Szkół Hotelarsko – Gastronomiczno - Turystycznej na temat wpływu form inspirujących, stosowanych przez nauczycieli na podniesienie ich świadomości znaczenia nauki



Źródło. Opracowanie własne

Na ogólną liczbę 44 uczniów Zespołu Szkół Hotelarsko – Gastronomiczno – Turystycznej, 27 potwierdziło wpływ form inspirujących, stosowanych przez nauczycieli na podniesienie ich świadomości znaczenia nauki, 13 uczniów nie potwierdziło tego stanowiska, 4 osoby nie udzieliły odpowiedzi. W każdej grupie odpowiedzi dominowały kobiety.

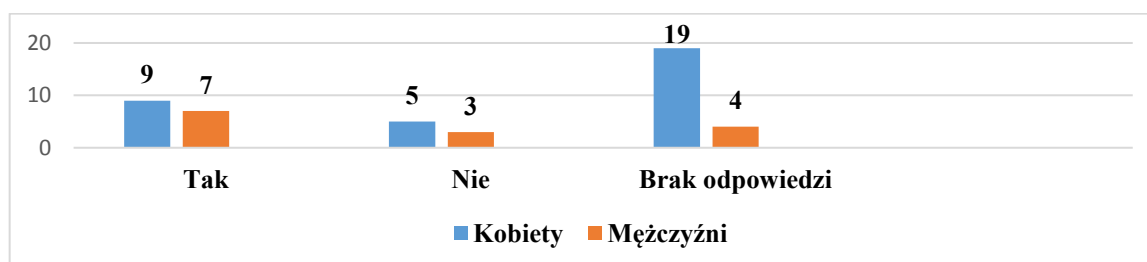
Wykres nr 19 Opinie uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego na temat wpływu form inspirujących, stosowanych przez nauczycieli na podniesienie ich świadomości znaczenia nauki



Źródło. Opracowanie własne

Na ogólną liczbę 22 uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego, 5 osób potwierdziło wpływ form inspirujących, stosowanych przez nauczycieli na podniesienie ich świadomości znaczenia nauki, 10 uczniów nie potwierdziło tego stanowiska, 7 osób nie udzieliło odpowiedzi. W każdej z grup odpowiedzi relacje odpowiedzi kobiet i mężczyzn przedstawiały się odmiennie: w grupie odpowiedzi *tak* dominowali mężczyźni (2 - 5), w grupie odpowiedzi *nie* – liczebność odpowiedzi zarówno wśród kobiet, jak i mężczyzn była identyczna (po 5 osób), wśród respondentów, która nie udzieliła odpowiedzi dominowały kobiety (5 – 2).

Wykres nr 20 Opinie uczniów Zespołu Szkół Nr 4 im. Eugeniusza Kwiatkowskiego na temat wpływu form inspirujących, stosowanych przez nauczycieli na podniesienie ich świadomości znaczenia nauki



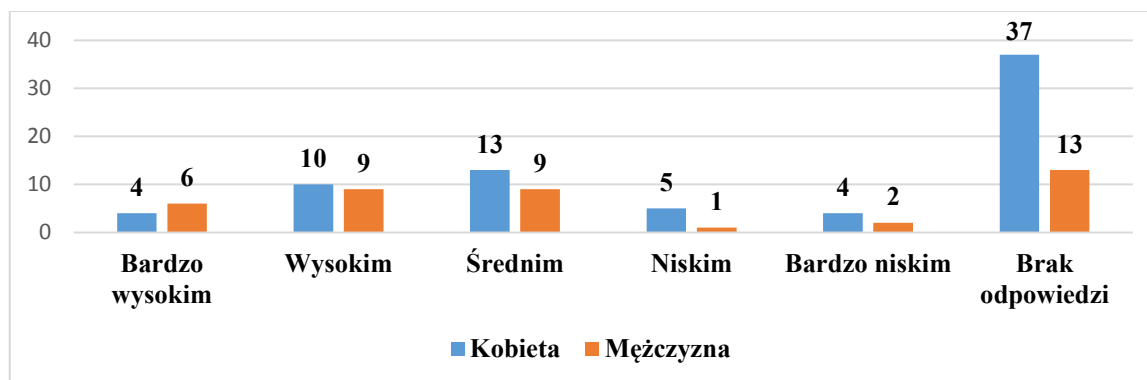
Źródło. Opracowanie własne

Na ogólną liczbę 47 uczniów Zespół Szkół Nr 4 im. Eugeniusza Kwiatkowskiego, 16 uczniów potwierdziło wpływ form inspirujących, stosowanych przez nauczycieli na podniesienie ich świadomości znaczenia nauki, 8 uczniów nie potwierdziło tego stanowiska, 23 osób nie udzieliło odpowiedzi. W każdej z grup odpowiedzi dominowały kobiety.

Na pytanie o stopień wpływu na uczniów inspirujących form, stosowanych przez nauczycieli - na ogólną liczbę 113 badanych uczniów – 10 wskazało odpowiedź w *bardzo wysokim*, 19 w *wysokim*, 22 w *średnim*, po 6 w *stopniu niskim i bardzo niskim*. Najliczniejszą grupę (50 osób) stanowili uczniowie, którzy nie udzielili odpowiedzi.

Warto jednak zauważyć, iż porównując grupy respondentów, którzy wskazali odpowiedzi w stopniu *średnim*, *wysoki*, *bardzo wysokim* oraz grupy, które wskazały odpowiedzi w stopniu *niskim* i *bardzo niskim* liczebnie zdecydowanie przeważała grupa I tj. odpowiedzi w stopniu *średnim*, *wysoki*, *bardzo wysokim* – relacje liczbowe obu grup wynosiły odpowiednio - 51 osób, (w tym 27 kobiet i 24 mężczyzn) - 12 osób, w tym 9 kobiet i 3 mężczyzn.

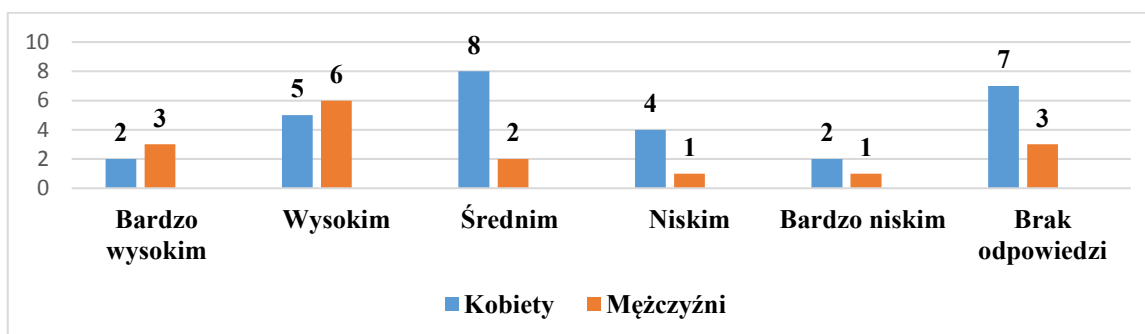
Wykres nr 21 Opinie badanych uczniów na temat stopnia inspirowania ich stosowanych przez nauczycieli form pracy ich w wyniku



Źródło. Opracowanie własne

Poniżej prezentuję uzyskane wyniki, dotyczące stopnia wpływu na uczniów inspirujących formy pracy stosowanych przez nauczycieli.

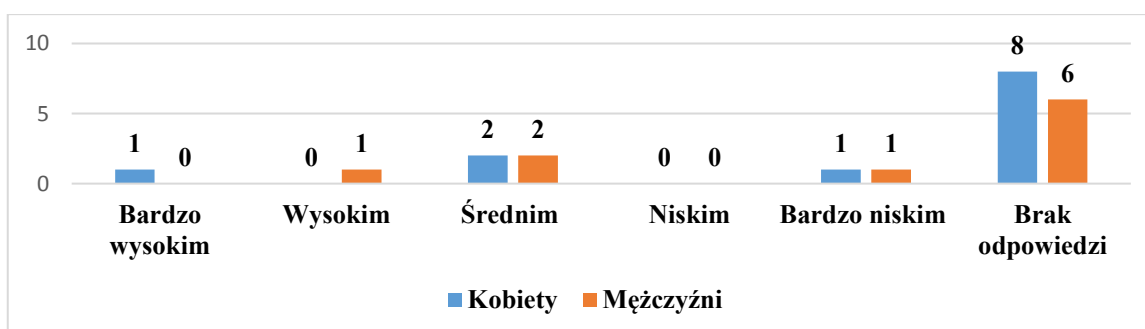
Wykres nr 22 Opinie uczniów Zespołu Szkół Hotelarsko – Gastronomiczno - Turystycznej na temat stopnia wpływu inspirujących form pracy stosowanych przez nauczycieli



Źródło. Opracowanie własne

Na ogólną liczbę 44 uczniów Zespołu Szkół Hotelarsko – Gastronomiczno – Turystycznej najliczniej respondenci wskazali odpowiedź w stopniu *wysokim* (11 osób), następną grupą to uczniowie, którzy wskazali odpowiedź w stopniu *średnim* (10 osób), także 10 osób nie udzieliło odpowiedzi, po 5 osób wskazało odpowiedź w stopniu *bardzo wysokim* i *niskim*, w stopniu *bardzo niskim* wskazały 3 osoby. Poza grupami, które wskazały odpowiedź w stopniu *bardzo wysokim* i *wysokim* w pozostałych grupach występowała przewaga liczbowa kobiet.

Wykres nr 23 Opinie uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego na temat stopnia inspirowania ich przez formy pracy stosowane przez nauczycieli

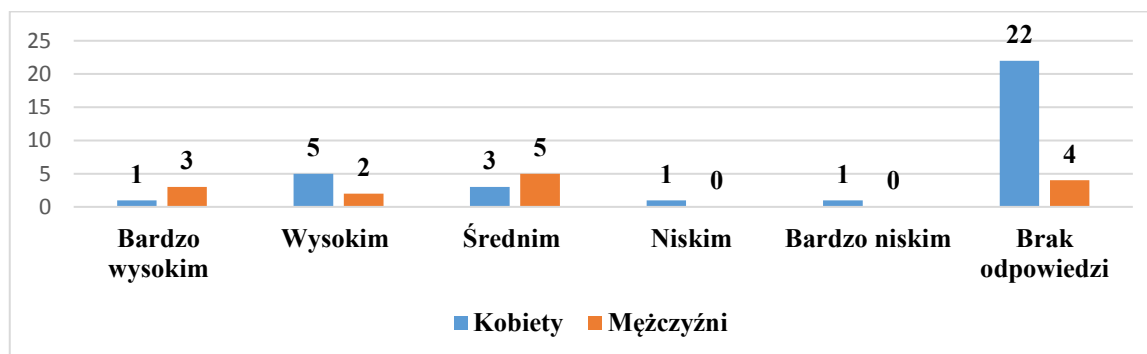


Źródło. Opracowanie własne

Na ogólną liczbę 22 uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego najliczniejszą grupę stanowili respondenci, którzy nie udzielili odpowiedzi (14 osób), 4 osoby wskazały odpowiedź w stopniu *średnim*, 2 w stopniu *bardzo niskim*, po jednej

osobie w stopniu *bardzo wysokim* i *wysokim*. Żaden z badanych uczniów nie wskazał odpowiedzi w stopniu *niskim*.

Wykres nr 24 Opinie uczniów Zespołu Szkół Nr 4 im. Eugeniusza Kwiatkowskiego na temat stopnia inspirowania ich poprzez stosowane przez nauczycieli formy pracy



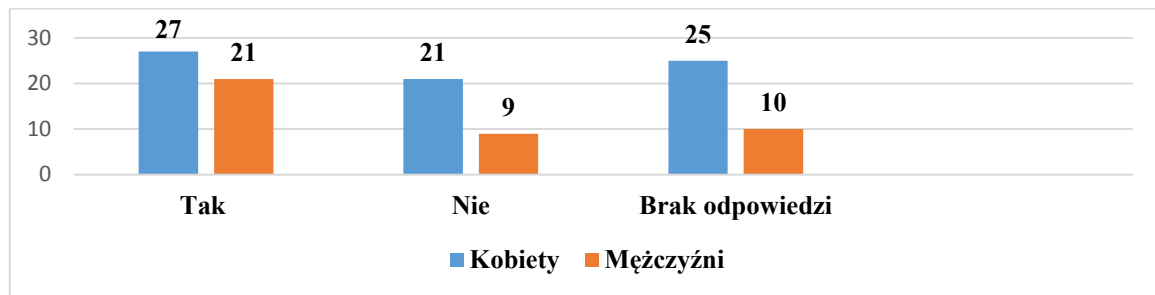
Źródło. Opracowanie własne

Na ogólną liczbę 47 uczniów Zespołu Szkół Nr 4 im. Eugeniusza Kwiatkowskiego poza najliczniejszą grupą uczniów (26 osób), która nie udzieliła odpowiedzi, 8 uczniów wskazało odpowiedź w stopniu *średnim*, 7 odpowiedzi w stopniu *wysokim*, 4 w stopniu *bardzo wysokim*, po jednym uczniu odpowiedź w stopniu *niskim* i *bardzo niskim*.

Na pytanie dotyczące wpływu form inspirujących na zwiększenie zaangażowania uczniów w naukę - na ogólną liczbę 113 badanych uczniów - 48 respondentów wskazało odpowiedź twierdzącą, 30 przeczącą oraz 35 nie udzieliło odpowiedzi. Uzyskany wynik potwierdza potrzebę stosowania form i metod inspirujących młodzież do większego zaangażowania w naukę. Liczne grupy tj. grupa, która udzieliła odpowiedzi przeczącej oraz grupa, która nie udzieliła odpowiedzi stanowią ważny sygnał dla środowiska pedagogicznego oraz powód do podjęcia analizy przyczyn uzyskanego wyniku.

Reasumując należy stwierdzić, iż przyczynami tej sytuacji są tendencje do schematycznego działania pedagogicznego, w tym braku otwartości na różnorodne materiały, które z powodzeniem mogą być wykorzystywane w procesie dydaktycznym.

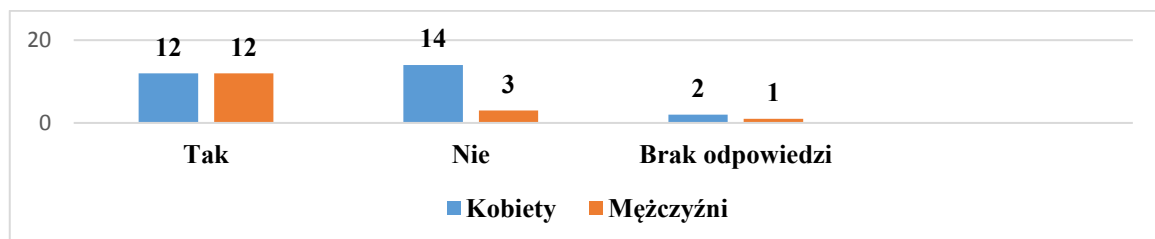
Wykres nr 25 Opinia badanych uczniów na temat wpływu inspirujących form pracy na zwiększenie zaangażowania w naukę



Źródło. Opracowanie własne

Poniżej prezentuję powyższe wyniki badań w podziale na poszczególne badane szkoły.

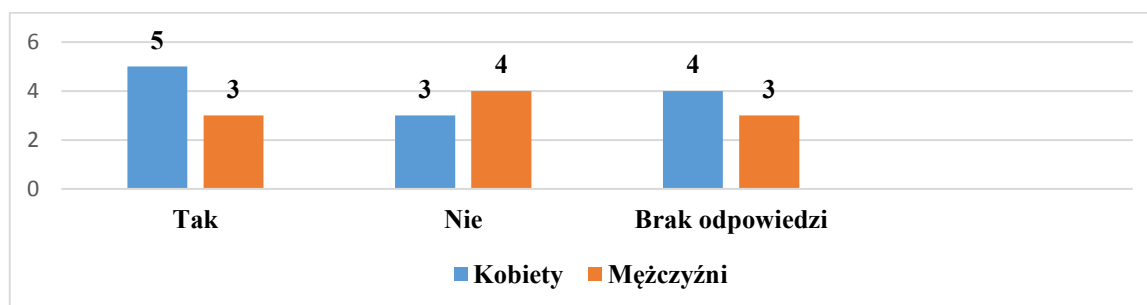
Wykres nr 26 Opinia uczniów Zespołu Szkół Hotelarsko – Gastronomiczno - Turystycznej na temat wpływu inspirujących form pracy na zwiększenie zaangażowania w naukę



Źródło. Opracowanie własne

Na ogólną liczbę 44 uczniów Zespołu Szkół Hotelarsko – Gastronomiczno - Turystycznej uczestniczących w badaniach 24 osoby potwierdziły wpływ form inspirujących na zwiększenie ich zaangażowania w naukę, 17 respondentów było przeciwnego zdania, 3 osoby nie udzieliły odpowiedzi. Warto podkreślić, że w grupie badanych, którzy wskazali odpowiedź twierdzącą liczebność w grupie kobiet i mężczyzn wynosi po 12 osób. W obu pozostałych grupach występowała przewaga liczebna kobiet tj. w odpowiedzi przeczącej relacje wynosiły 14 – 3 oraz w grupie brak odpowiedzi – 2 – 1.

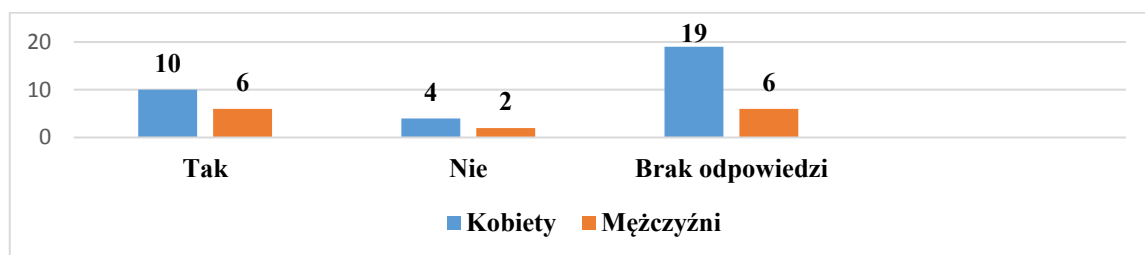
Wykres nr 27 Opinia uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego na temat wpływu inspirujących form pracy na zwiększenie zaangażowania w naukę



Źródło. Opracowanie własne

Na ogólną liczbę 22 badanych uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego 8 uczniów wskazało odpowiedź *tak*, 7 respondentów wskazało odpowiedź *nie*, oraz 7 nie udzieliło odpowiedzi. W grupach odpowiedzi *tak* i brak odpowiedzi liczebnie przeważały kobiety, natomiast w grupie odpowiedzi *nie* przeważali mężczyźni.

Wykres nr 28 Opinia uczniów Zespołu Szkół Nr 4 im. Eugeniusza Kwiatkowskiego na temat wpływu inspirujących form pracy na zwiększenie ich zaangażowania w naukę



Źródło. Opracowanie własne

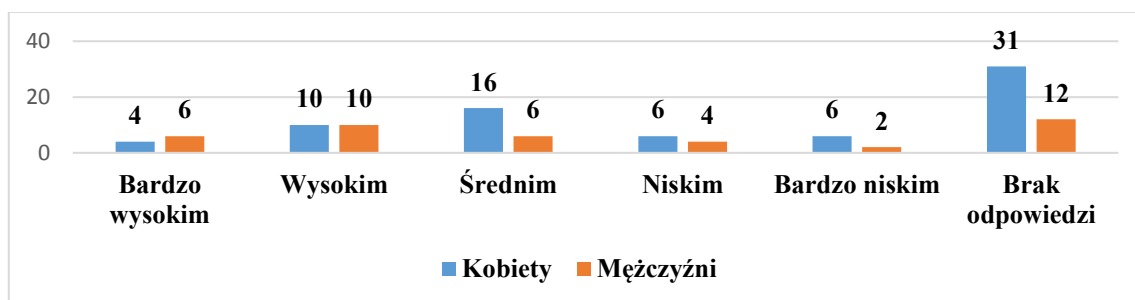
Na ogólną liczbę 47 uczniów Zespołu Szkół Nr 4 im. Eugeniusza Kwiatkowskiego 16 respondentów wskazało odpowiedź *tak*, 6 odpowiedź *nie*. 25 osób nie udzieliło odpowiedzi. We wszystkich trzech grupach odpowiedzi występowała liczebna przewaga kobiet.

Na pytanie dotyczące stopnia wpływu form inspirujących na zwiększenie zaangażowania uczniów w naukę – na 113 badanych uczniów - najliczniejszą grupę stanowili uczniowie, którzy nie udzielili odpowiedzi – łącznie 43 respondentów, w

drugiej kolejności - 22 uczniów, którzy wskazali odpowiedź w stopniu *średnim*, 20 w stopniu *wysokim*, po 10 uczniów wskazało odpowiedź w stopniu *niskim* i *bardzo wysokim* oraz 8 respondentów w stopniu *bardzo niskim*.

Uzyskane wyniki badań pokazują, iż stosowane przez nauczycieli formy inspirujące do nauki, w poważnej części – 42 uczniów (suma grup, które wybrały odpowiedzi w stopniu *średnim*, *wysokim* i *bardzo wysokim*) inspirują badanych do zwiększonego zaangażowania w naukę. Grupa 18 - osobowa respondentów, to uczniowie, którzy wskazali odpowiedź w stopniu *niskim* i *bardzo niskim*. Niewątpliwie grupa 43 uczniów, którzy nie udzielili odpowiedzi stanowi ważny sygnał dla nauczycieli, dotyczący jakości ich codziennej pracy.

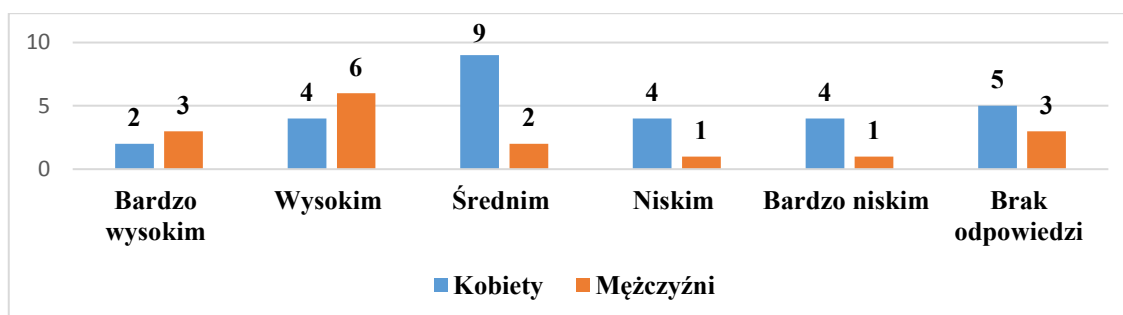
Wykres nr 29 Deklaracje uczniów na temat stopnia wpływu inspirujących form pracy na zwiększenie ich zaangażowania w naukę



Źródło. Opracowanie własne

Poniżej prezentuję przedstawione wyżej wyniki badań w podziale na badane poszczególne szkoły.

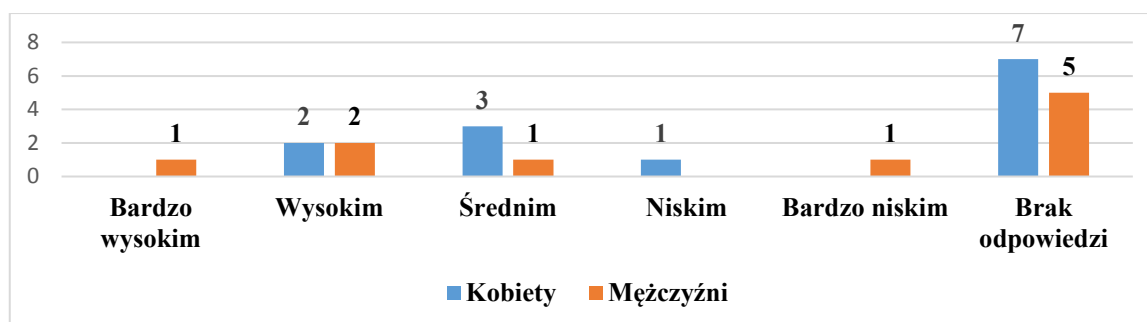
Wykres nr 30 Odpowiedzi uczniów Zespołu Szkół Hotelarsko – Gastronomiczno - Turystycznej na temat stopnia wpływu inspirujących form pracy na zwiększenie ich zaangażowania w naukę



Źródło. Opracowanie własne

Na ogólną liczbę 44 uczniów, uczestniczących w badaniach w Zespole Szkół Hotelarsko – Gastronomiczno - Turystycznej najliczniejszą grupę stanowili uczniowie, którzy wskazali odpowiedź w stopniu *średnim*. Druga grupa to uczniowie, którzy wybrali odpowiedź w stopniu *wysokim*, po 5 osób wskazało odpowiedź w stopniu *bardzo wysokim*, *niskim* i *bardzo niskim*. Grupa 8-osobowa nie udzieliła odpowiedzi.

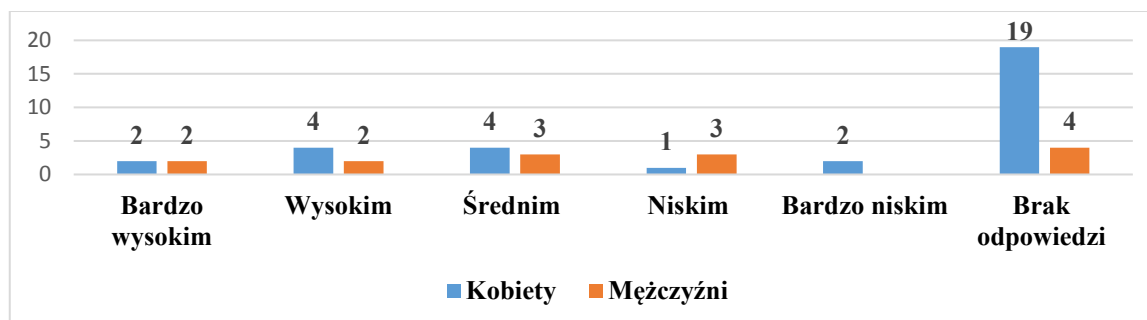
Wykres nr 31 Odpowiedzi uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego, na temat stopnia wpływu inspirujących form pracy na zwiększenie ich zaangażowania w naukę



Źródło. Opracowanie własne

Na ogólną liczbę 22 uczniów Zespołu Szkół Nr 3 im. 2 Armii Wojska Polskiego, którzy uczestniczyli w badaniach najliczniejszą grupę (12 osób) stanowili uczniowie, którzy nie udzieliли odpowiedzi, na drugim miejscu byli uczniowie, którzy wskazali odpowiedź w stopniu *wysokim* i *średnim* (po 4 osoby). Po jednej osobie uczniowie wskazali odpowiedź w stopniu *bardzo wysokim*, *niskim* i *bardzo niskim*.

Wykres nr 32 Odpowiedzi uczniów Zespołu Szkół Nr 4 im. Eugeniusza Kwiatkowskiego na temat stopnia wpływu inspirujących form pracy na zwiększenie ich zaangażowania w naukę



Źródło. Opracowanie własne

Na ogólną liczbę 47 uczniów Zespołu Szkół Nr 4 im. Eugeniusza Kwiatkowskiego najliczniejszą grupę stanowili uczniowie, którzy nie udzielili odpowiedzi. 7 uczniów wskazało odpowiedź w stopniu *średnim*, 6 w stopniu *wysokim*, po 4 respondentów wskazało odpowiedź w stopniu *bardzo wysokim* i *niskim*, 2 uczniów wskazało odpowiedź w stopniu *bardzo niskim*.

Podsumowanie

Przeprowadzone badania potwierdziły, iż opinia badanych uczniów na temat *inspirowania ich przez nauczycieli do poszerzania wiedzy* jest podzielona – na 113 respondentów 66.67% uczniów udzieliło odpowiedzi negatywnej, 58.76% pozytywnej. 2.26% nie udzieliło odpowiedzi. Uzyskany wynik sygnalizuje ważną kwestię we współczesnej dydaktyce, tj. niewielkie zaangażowanie nauczycieli we wskazywanie uczniom alternatywnych źródeł wiedzy, którymi są nie tylko Internet, ale także specjalistyczne czasopisma, czy też literatura.

Fakt ten potwierdza także wynik uzyskany w następnym pytaniu, w którym respondenci zostali zapytani o metody stosowane przez nauczycieli. Grupa badanych jednakowo procentowo - 22.6% - wskazała odpowiedzi: *informują o nowościach wydawniczych z zakresu prowadzonego przedmiotu oraz stosują aktywizujące metody kształcenia*. Grupa 19.21% stwierdziła, iż nauczyciele *inspirują dyskusję na temat artykułów, publikowanych w czasopismach z zakresu prowadzonego przedmiotu*. Najliczniejszą grupę - 64,41% - stanowili uczniowie, którzy nie udzielili odpowiedzi. Tak wysoki procent osób, które nie udzieliły odpowiedzi, może sugerować, iż wśród respondentów wielu jest rozczarowanych taką postawą nauczycieli. Jednocześnie może sugerować, iż młodzież funkcjonująca na co dzień w wirtualnym świecie informacji oczekuje od nauczyciela wskazówek w zakresie alternatywnych – poza Internetem - źródeł wiedzy.

Na uwagę zasługuje fakt, iż na pytanie o zgodność podjętego przez uczniów kierunku kształcenia z zainteresowaniami 70.06% badanych udzieliło odpowiedzi twierdzącej. Niepokojącym jednak stanem rzeczy jest fakt, iż aż 55.37% uczniów technikum nie podjęła nauki zgodnie ze swymi zainteresowaniami. Wynik ten potwierdza konieczność wzmocnienia systemu doradztwa zawodowego na każdym etapie kształcenia, także w technikum.

Powyższy wynik, może mieć poważny wpływ zarówno na zaangażowanie ucznia w proces kształcenia, jaki i wyniki w nauce.

Wyniki przeprowadzonych badań dotyczących stopnia zaangażowania uczniów w proces kształcenia wykazały, iż większość czyli 47.76% respondentów wskazało *średni* stopień, 20.9% uczniów wskazało stopień *wysoki*, a 12.43% stopień *bardzo wysoki*. Kolejne grupy wskazały stopień *niski* - 9.4% badanych uczniów oraz *bardzo niski* 6.78% respondentów. Bardzo liczna grupa uczniów - 29.35% - nie udzieliła odpowiedzi. Badania wskazują, iż uczniowie zaangażowani są w proces kształcenia, mimo, iż znaczna ich część uczy się niegodnie ze swoimi zainteresowaniami. Wyniki przeprowadzonych badań potwierdzają wysoką świadomość uczniów o znaczeniu nauki, a tym samym dojrzałości w rozumieniu procesu rozwoju edukacyjnego.

W ramach przeprowadzanych badań zapytano uczniów technikum o wpływ inspirujących form, stosowanych przez nauczycieli na podniesienie ich świadomości znaczenia nauki. 54.24% badanych udzieliło odpowiedzi twierdzącej, natomiast 35.03% nie potwierdziło tego stanu rzeczy. Zatem mimo, iż większość badanych uczniów nie potwierdza, ich *inspirowania przez nauczycieli do poszerzania wiedzy* to potwierdzają ważną rolę nauczycieli w procesie kształtowania ich postawy do całościowego uczenia się.

Jednocześnie na pytanie o stopień wpływu inspirujących form, stosowanych przez nauczycieli na podniesienie świadomości uczniów znaczenia nauki - aż 56.5% badanych nie udzieliło odpowiedzi. Uzyskany wynik może oznaczać brak takiego wpływu na badanych uczniów. Jednocześnie wśród uczniów, którzy udzielili odpowiedzi najliczniejszą grupę - 24.2% badanych – stanowili uczniowie, którzy wskazali odpowiedź w stopniu *średnim*, 20.9% w stopniu *wysokim*, 11% stopniu *bardzo wysokim*. Pozostałe dwie grupy - po 6.6.% - stanowili uczniowie, którzy wskazali odpowiedzi w stopniu *niskim* oraz *bardzo niskim*.

W ramach przeprowadzonych badań zwrócono się z pytaniem do respondentów o wpływ form inspirujących na zwiększenie zaangażowania uczniów w naukę. Ponad połowa badanych - 54.24% - udzieliła odpowiedzi twierdzącej, 33.9% przeczącej. Podobnie jak w pytaniu o wpływ inspirujących form, stosowanych przez nauczycieli na podniesienie świadomości uczniów znaczenia nauki także i w tym pytaniu wystąpiła przewaga uczniów, która udzieliła odpowiedzi twierdzącej. Oznacza to, iż nauczyciele – w opinii badanych uczniów – wspomagają ich w procesie kształtowania świadomych postaw edukacyjnych – tak ważnych w życiu dorosłym. Liczna grupa badanych - 38.42% - nie udzieliła odpowiedzi.

Niestety podobnie jak w pytaniu o *stopień wpływu inspirujących form, stosowanych przez nauczycieli na podniesienie świadomości uczniów znaczenia nauki*, także i w pytaniu, dotyczącym *stopnia wpływu form inspirujących na zwiększenie zaangażowania uczniów w naukę* dominująca grupa - 48.59% - nie udzieliła odpowiedzi. Uzyskany wynik – podobnie jak pierwszym przypadku - może oznaczać brak takiego wpływu na badanych uczniów.

24.86% badanych wskazała odpowiedź w stopniu *średnim*, 22.6% w stopniu *wysokim*, po 11.3% badanych wskazało odpowiedź w stopniu *niskim* i *bardzo wysokim* oraz 9.04% w stopniu *bardzo niskim*.

Zaprezentowane wyniki badań wskazują na szczególną rolę nauczyciela we współczesnej edukacji. Aktywizowanie ucznia zdominowanego przez świat wirtualny jest zadaniem niezwykle trudnym. Jednakże badania potwierdziły także wysokie oczekiwania uczniów wobec szkoły. Opinie jakie respondenci wyrazili w trakcie badań potwierdzają ich dojrzałość, umiejętność krytycznego myślenia, a także refleksję nad procesem edukacyjnym w jakim uczestniczą.

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Akty prawne

Karta praw podstawowych Unii Europejskiej (Dz. Urz. UE z 2012/C 326/02).

Stres w Pracy Nauczyciela a Jego Dialogiczne Relacje z Uczniem

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w Warszawie, Polska

Abstrakt: Niniejszy artykuł prezentuje wyniki badań, dotyczących pracy nauczyciela w dynamicznie zmieniającym się otoczeniu, w tym w szczególności udzielają odpowiedzi na pytanie: w jakim stopniu stres, wynikający z funkcjonowania w permanentnej zmianie hamuje postawę dialogiczną nauczyciela wobec ucznia? Jednocześnie wyniki badań dostarczają także wiedzy, w zakresie wartości, jakie badani nauczyciele stawiają sobie jako nadrzędne. Niniejszy tekst prezentuje część wyników badań, przeprowadzonych w roku szkolnym 2016/17. Jest to ostatnia część prezentowanych wyników badań, stanowiąca jednocześnie podsumowanie badań przeprowadzonych w roku poprzedzającym kolejną reformę systemu oświaty w Polsce.

Słowa kluczowe: nauczyciel, uczeń, praca, zmiana, stres.

Wstęp

Współczesny człowiek funkcjonuje w sytuacji permanentnej zmiany społecznej. „Zmian społeczna jest rozumiana jako różnica między stanem tego samego systemu społecznego w dwóch różnych momentach. Oznacza więc przejście od jednego stanu systemu do drugiego.”¹ Każda zmiana - zarówno pozytywna, jak i negatywna - powoduje w jednostce traumę. Zmiana, będąca cechą charakterystyczną współczesnego świata powoduje, iż jednostka funkcjonuje w sytuacji stałej niepewności. „Niepewność dotycząca przyszłości w czasach ponowoczesnych staje się trwałym elementem życia. Podobnie jak dziś nie można zagwarantować trwałego i stabilnego miejsca pracy, nie ma dawnej pewności co do utrzymywania się koniunktur gospodarczych, trwałości rodziny, niezawodności kolegów i przyjaciół, pozostawania przez lata w zdrowiu. Świat jest w ciągłym ruchu, w wirze nieustannych zmian,

¹ J. Szempruch, *Pedeutologia, Studium teoretyczno-pragmatyczne*, Impuls, Kraków 2013, s. 292

raptownych zwrotów, redefiniowania znaczeń. Zygmunt Baumann określa to płynną nowoczesnością, której istota powoduje, że jesteśmy jakby w ciągłej podróży, nieustannie poszukując drogowskazów, których jest za mało, a w dodatku ich oznaczenia bywają zawodne.”²

Toczący się proces zmian ma wpływ na funkcjonowanie szkoły. Od 1999 r. wdrażane są w Polsce kolejne reformy systemu edukacji, których zadaniem jest dostosowywanie kształcenia i wychowania do wyzwań, jakie niesie współczesny świat. Wdrażane zmiany mają charakter bardzo głęboki - odnoszą się zarówno do struktury systemu oświaty, jak i planów i programów kształcenia, metod nauczania, systemów egzaminów uczniów, awansu zawodowego nauczycieli, systemu doskonalenia nauczycieli, nadzoru pedagogicznego. Kolejne reformy systemu oświaty – dotyczyły m. in. wydłużenia okresów ubiegania się o kolejne stopnie awansu zawodowego, reaktywowania szkolnictwa zawodowego.

Od 1 września 2017 r. wdrażana jest reforma systemu edukacji, która m.in. ponownie zmienia strukturę systemu edukacji. Z dotychczasowego systemu 6 – letniej szkoły podstawowej, 3 – letniego gimnazjum oraz 3 letniego liceum, następuje powrót do wcześniej obowiązującej (przed 1999 r.) struktury tj. 8 – letniej szkoły podstawowej i 4 – letniej szkoły średniej.

Zmiany te oznaczają zarówno dla uczniów, jak i nauczycieli permanentny stan niepewności, skutkujący wysokim stopniem stresu. Sytuacja ta ma wpływ na relacje między nauczycielem i uczniem.

Poniżej prezentuję wyniki badań, jakie przeprowadziłam w roku szkolnym 2016/17 tj. w roku poprzedzającym, wdrażaną od 1 września 2017 r. reformę systemu edukacji w Polsce.

Prezentacja wyników badań

Na przełomie listopada i grudnia 2016 r. przeprowadziłam badania, których celem było uzyskanie wiedzy w zakresie opinii nauczycieli na temat:

- *stopnia w jakim stres hamuje postawę dialogiczną nauczyciela wobec ucznia,*
- *wartości nadrzędnych w pracy nauczyciela.*

² M.J. Szymański, *Socjologia edukacji. Zarys problematyki*, Impuls, Kraków 2013, s. 119

Badaniami zostali objęci nauczyciele z trzech szkół, działających w Warszawie w dzielnicy Praga tj.:

- Zespołu Szkół nr 40 im. Stefana Starzyńskiego ul. Objazdowa 3 (w skład którego wchodzi: XX Liceum Ogólnokształcące im. Bolesława Chrobrego i Technikum Mechaniczne Nr 35 im. Stefana Starzyńskiego),
- Zespołu Szkół Nr 112, ul. Otwocka 3
oraz
- Zespołu Szkół Muzycznych im. Stanisława Moniuszki, ul. Kawęczyńska 23/25.

W badaniach uczestniczyło ogółem 61 nauczycieli, w tym 40 kobiet i 21 mężczyzn. W podziale na poszczególne szkoły grupa badawcza przedstawiała się następująco:

- Zespół Szkół nr 40 im. Stefana Starzyńskiego ul. Objazdowa 3 - 27 nauczycieli, w tym 17 kobiet i 10 mężczyzn,
- Zespół Szkół Nr 112, ul. Otwocka 3 – 19 nauczycieli, 14 kobiet i 5 mężczyzn,
- Zespół Szkół Muzycznych im. Stanisława Moniuszki, ul. Kawęczyńska 23/25 – 15 nauczycieli, w tym 9 kobiet i 6 mężczyzn.

W badaniach zastosowano metodę sondażu diagnostycznego. Zastosowaną techniką była technika ankiety. Do przeprowadzenia badań wykorzystano kwestionariusz ankiety badawczej.

Analiza wyników badań

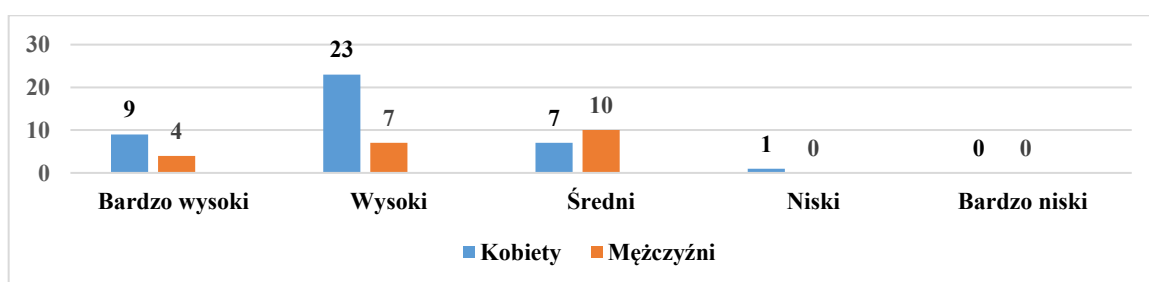
Problem badawczy nr I. *W jakim stopniu stres hamuje postawę dialogiczną nauczyciela wobec ucznia?*

Uzyskane wyniki badań potwierdzają, iż stres w wysokim stopniu hamuje postawę dialogiczną nauczyciela wobec ucznia. Opinię taką wyraziło 30 respondentów, w tym 23 kobiety i 7 mężczyzn. Stopień *średni* wskazało 17 badanych, w tym 7 kobiet i 10 mężczyzn, oraz stopień *bardzo wysoki* 13 badanych, w tym 9 kobiet i 4 mężczyzn.

Analiza wyniku pokazuje, iż kobiety najliczniej wskazały stopień *wysoki* (23 osoby) podczas gdy mężczyźni stopień *średni* (10 osób). Można przypuszczać, iż mężczyźni są bardziej odporni na stres niż kobiety. Jednocześnie zarówno w odpowiedzi – stopień *wysoki* i *średni* - odnotowuje się tą samą liczbę odpowiedzi w obu grupach płci (po 7 osób). Odpowiedź - stopień *bardzo wysoki* - wskazała druga,

pod względem liczebności, grupa kobiet tj. 9 osób, podczas gdy wśród mężczyzn stopień *bardzo wysoki* wskazało jedynie 4 mężczyzn (najmniej liczna grupa odpowiedzi wśród mężczyzn). Jedynie jedna kobieta wskazała stopień niski. Nikt z badanych nie wskazał odpowiedzi stopień *bardzo niski*. Oznacza to, iż stres ma poważny wpływ na budowanie relacji nauczyciel – uczeń. Postawa nauczyciela charakteryzująca się otwartością na dialog jest podstawowym elementem współpracy w procesie edukacyjno-wychowawczym. Stąd uzyskany wynik może niepokoić.

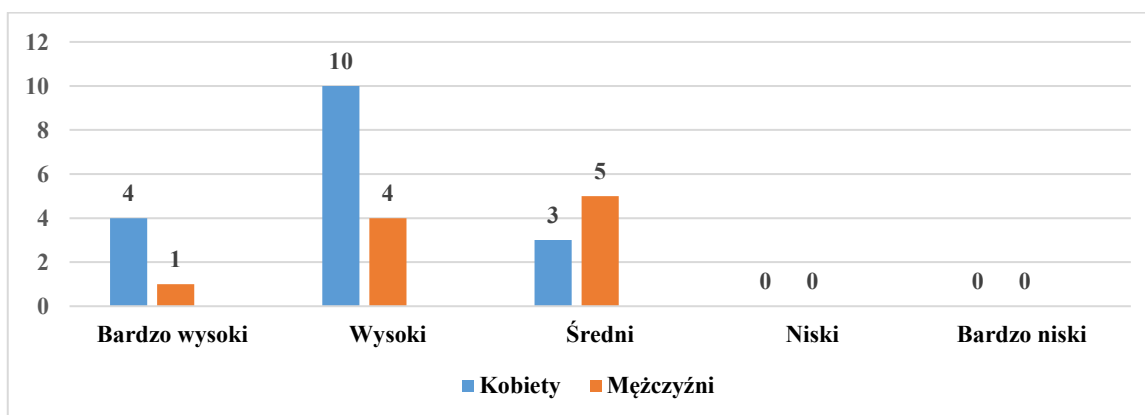
Wykres nr 1. Stopień, w jakim stres hamuje postawę dialogiczną nauczyciela wobec ucznia w opinii badanych nauczycieli



Źródło. Badania własne

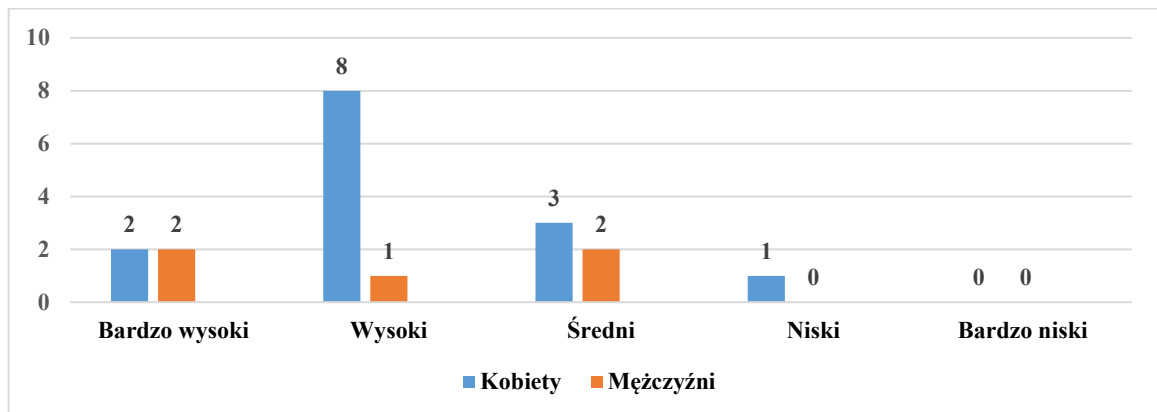
Uzyskane wyniki w podziale na poszczególne szkoły prezentuje się następująco.

Wykres nr 2. Stopień, w jakim stres hamuje postawę dialogiczną nauczyciela wobec ucznia w opinii nauczycieli Zespołu Szkół nr 40 im. Stefana Starzyńskiego



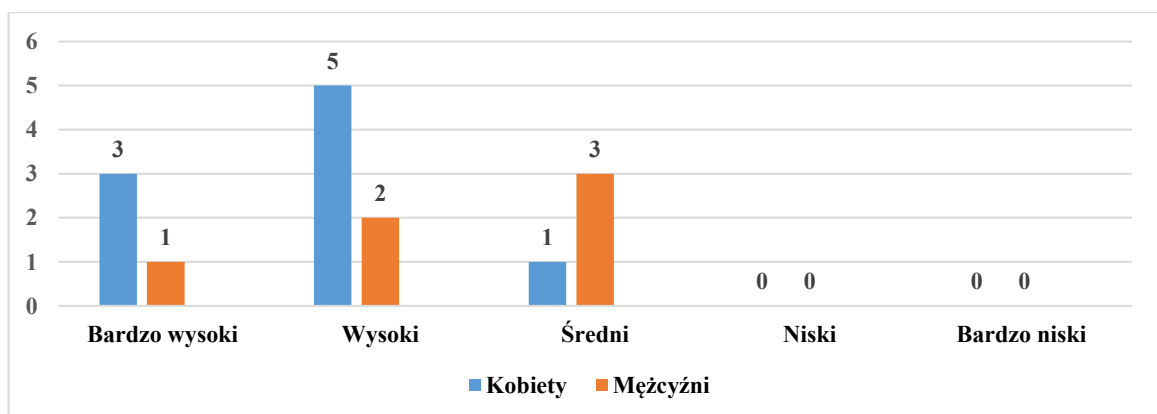
Źródło. Badania własne

Wykres nr 3. Stopień, w jakim stres hamuje postawę dialogiczną nauczyciela wobec ucznia w opinii nauczycieli Zespołu Szkół Nr 112



Źródło. Badania własne

Wykres nr 4. Stopień, w jakim stres hamuje postawę dialogiczną nauczyciela wobec ucznia w opinii nauczycieli Zespołu Szkół Muzycznych im. Stanisława Moniuszki



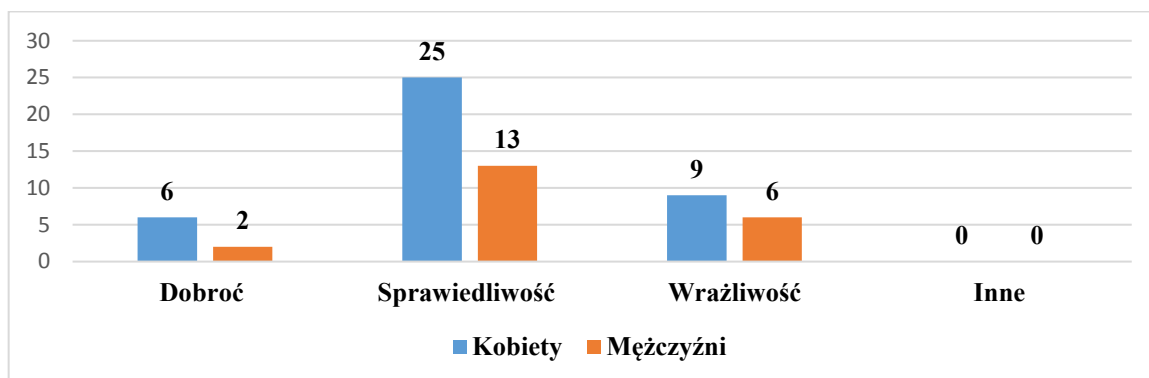
Źródło. Badania własne

Problem badawczy nr II. Jakie wartości nauczyciel uznaje w swej w pracy za nadrzędne?

Na 61 respondentów najliczniejsza grupa badanych (38 osób, w tym 25 kobiet i 13 mężczyzn) wskazała *sprawiedliwość*, jako nadrzędną wartość w pracy nauczyciela. Cecha ta jest podstawową cechą w pracy nauczycielskiej - zarówno w procesie dydaktycznym, wyrażanym w ocenianiu ucznia, jak również w procesie wychowawczym – podczas wyrażania opinii o uczniu na tle grupy. Brak obiektywności i stronniczość w pracy nauczyciela z uczniem podważa zaufanie ucznia do nauczyciela. Tym samym uniemożliwia dialogiczne relacje między tymi podmiotami.

W grupie odpowiedzi *dobroć* i *wrażliwość* występuje ta sama liczba odpowiedzi – po 6 osób – w grupie kobiet i mężczyzn. Jednocześnie jedynie 2 mężczyzn wskazało *dobroć*, a 9 kobiet *wrażliwość*.

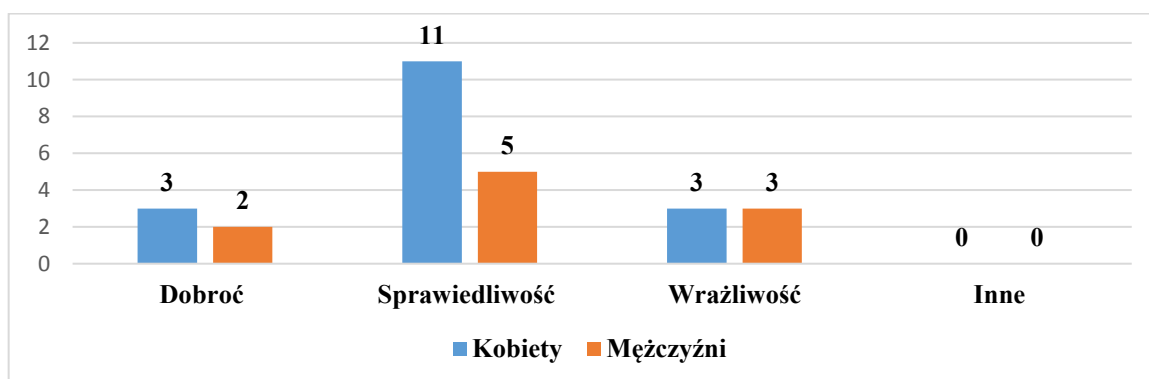
Wykres nr 5. Wartości nadrzędne w pracy nauczyciela w opinii badanych nauczycieli



Źródło. Badania własne

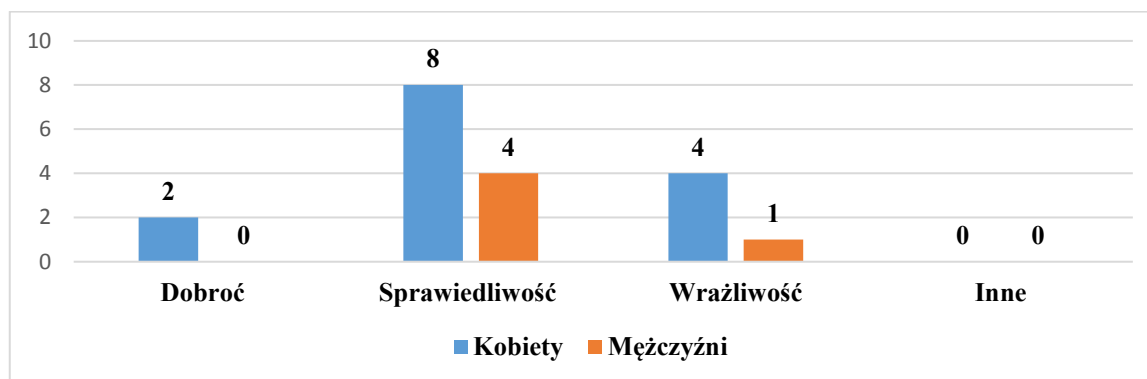
Uzyskane wyniki w podziale na poszczególne szkoły prezentuje się następująco.

Wykres nr 6. Wartości nadrzędne w pracy nauczyciela – w opinii badanych nauczycieli w Zespole Szkół nr 40



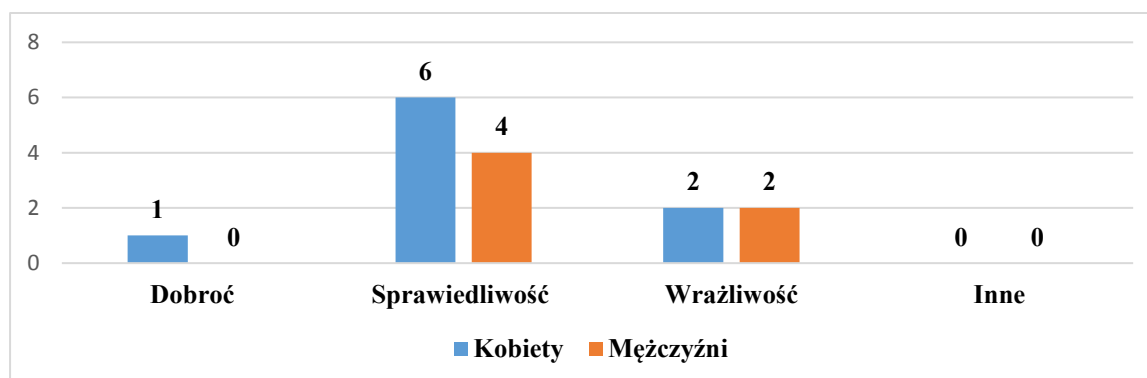
Źródło. Badania własne

Wykres nr 7. Wartości nadrzędne w pracy nauczyciela w opinii badanych nauczycieli Zespołu Szkół Nr 112



Źródło. Badania własne

Wykres nr 8. Wartości nadrzędne w pracy nauczyciela w opinii badanych nauczycieli Zespołu Szkół Muzycznych im. Stanisława Moniuszki



Źródło. Badania własne

Podsumowanie

Zaprezentowane wyniki badań stanowiły próbę pozyskania wiedzy w zakresie opinii nauczycieli na temat:

- stopnia w jakim stres hamuje postawę dialogiczną nauczyciela wobec ucznia,
- wartości nadrzędnych w pracy nauczyciela.

Wyniki badań wskazują, iż stres w *wysokim stopniu* hamuje postawę dialogiczną nauczyciela wobec ucznia. Dominująca część badanych wskazała tę odpowiedź (30 osób). Druga pod względem liczebnym grupa to nauczyciele, którzy wskazali *średni* stopień (17 osób). Najmniej liczną grupę stanowili respondenci, którzy wskazali stopień *bardzo wysoki* (13 osób). Rozkład odpowiedzi w podziale na płeć przedstawia się następująco:

- *kobiety*: 23 wskazały stopień *wysoki*, 9 *bardzo wysoki* oraz 7 *średni*.
- *mężczyźni*: 10 stopień *średni*, 7 *wysoki* oraz 4 *bardzo wysoki*.

Jednocześnie badania wykazują, iż wartościami, jakie nauczyciel uznaje w swej pracy za nadrzędne są:

- sprawiedliwość – 38 osób,
- dobroć – 8 osób,
- wrażliwość – 15 osób.

Rozkład odpowiedzi w podziale na płeć przedstawia się następująco:

- *kobiety*: 25 wskazały *sprawiedliwość*, 6 *dobroć* oraz 9 *wrażliwość*
- *mężczyźni*: 2 wskazało *sprawiedliwość*, 13 *dobroć* oraz 6 *wrażliwość*.

Przedstawione wyniki badań ukazują złożoność sytuacji współczesnego nauczyciela. Proces permanentnej zmiany na świecie, ma poważny wpływ na funkcjonowanie systemu edukacyjnego, w tym także na pracę nauczyciela. „Obecna rzeczywistość jest nacechowana zatem brakiem stabilizacji zawodowej, która w dłuższej perspektywie może skutkować wieloma negatywnymi emocjami, w tym między innymi frustracją i poczuciem beznadziejności.”³

Jednocześnie badania pokazują, iż nauczycieli – mimo złożoności następujących procesów – wykazują wysoki stopień zaangażowania w pracę, cierpliwość, kreatywność i dyspozycyjność.

Tabela nr 1. Opinia nauczycieli na temat cechy charakteryzującej ich codzienną pracę⁴

Lp.	Nazwa szkoły	Odpowiedzi uzyskane w poszczególnych szkołach w oparciu o liczebność wskazań				
		1.	2.	3.	4.	5.
1.	zespół szkół nr 112 w Warszawie	zaangażowanie	cierpliwość	kreatywność	dyspozycyjność	permanentne doskonalenie zawodowe

³ I. Kust, *Prekariat - stereotypy i rzeczywistość*, [w:] A. Kryniecka (red.) *Stereotypy a kształtowanie świadomości człowieka*, Kresowa Agencja Wydawnicza, Białystok 2017, s. 66.

⁴ J. Michalak-Dawidziuk, *Samorealizacja, poświęcenie i dialogiczność, jako wartości nadrzędne w pracy nauczyciela* [w:] A. Solak, J. Bluszcz, *Personalizm pracy ludzkiej. Współczesne konotacje*, Wydawnictwo Akademii Pedagogiki Specjalnej, Warszawa 2017, s. 251.

2.	zespół szkół nr 40 im. stefana starzyńskiego w warszawie	poświęcenie	dyspozycyjność	dążenie do samorealizacji i cierpliwość	kreatywność	-
3.	zespół szkół muzycznych im. stanisława moniuszki w warszawie	permanenne doskonalenie	cierpliwość	zaangażowanie	-	-

Źródło. Opracowanie własne

Zaprezentowane wyżej wyniki badań pokazują „(...) świadomość respondentów znaczenia zaangażowania i poświęcenia w pracy pedagogicznej.”⁵ Można wysnuć wniosek, iż wyniki ww. badań potwierdzają tym samym postawę nauczycieli charakteryzującą się otwartością na dialog i współpracę.

Nauczyciel staje przed różnorodnymi wyzwaniami zarówno w sferze funkcjonowania organizacyjnego szkoły, współdziałania ze środowiskiem, jak i współdziałania wewnątrzszkolnego – z innymi nauczycielami oraz uczniami. Każdy z wymienionych obszarów wymaga od nauczyciela profesjonalizmu i empatii. Przykładem ważnych problemów z którymi nauczyciel zmierza się w swej pracy pedagogicznej jest m. in. nierówność społeczna, która występuje w środowisku szkolnym. Pojęcie to pojmowane jest jako „(...) różnice w dostępie do szeroko rozumianych dóbr, są nieodłącznym elementem wszelkich ustrojów społeczno-ekonomicznych, stając się jednym z wyznaczników relacji międzyludzkich”.⁶

„Nierówności są wytwarzane oraz podtrzymywane społecznie przez rozwiązania i procesy systemowe, a także działania dystrybucyjne zarówno jednostkowe, jak i zbiorowe”.⁷

Dysproporcje wśród uczniów o różnym statusie ekonomicznym stają się coraz częściej silnym polem polaryzacji wśród uczniów.

⁵ Tamże.

⁶ J. Szempruch, *Pedeutologia, Studium teoretyczno-pragmatyczne*, Impuls, Kraków, 2013, s. 302.

⁷ G. Therborn, *Nierówność, która zabija*, Przekład P. Tomanek, PWN, Warszawa 2015, s. 66.

Także poważnym wyzwaniem jest Internet. „Większe szanse? – Tak, głównie w zakresie łatwego i szybkiego dostępu do ogromnych ilości informacji, jakiego nie miały poprzednie pokolenia, żyjące w warunkach deficytu informacji. Zatracenia? Również tak. Mark Bauerlein, autor książki *The Dumbest Generation: How the Digital Age Stupefies Young Americans and Jeopardizes Our Future* (Bauerlein, 2009) (w tłumaczeniu: *Najbardziej tępe pokolenie. Jak życie w epoce cyfrowej ogłupia młodych Amerykanów i naraża na szwank naszą przyszłość*), który stwierdza, że młodzi ludzie nie mają pojęcia o niczym i ocenia pokolenie sieci jako obraz żywiołowej, nieskrępowanej ignorancji”.⁸

Być może współdziałanie w grupie jest najbardziej adekwatną formą pracy współczesnego nauczyciela, funkcjonującego w złożonym dynamicznie zmieniającym się otoczeniu.

„Uczenie się razem w grupach może trafiać się w wielu różnych drogach (środek), całe istnienie przekonywane moce, i całe proponowanie (ofiarowanie) czegoś od którego my może pożyczać.

„Uczenie się razem w grupach może przebiegać wieloma różnymi drogami, całe posiadane moce i słabości oraz wynik wspólnego wysiłku stanowi wartość, z której my możemy coś wypożyczyć dla siebie”.⁹

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⁸ R. Nowakowska-Siuta, Maszyny i ludzie. O źródłach podmiotowości, perspektywach dialogu i technologicznym po(d)stępie w edukacji szkolnej, [w:] D. Jankowska, M. Grzelak-Klus (red.) *Pedagogika dialogu. Dialog jako droga rozumienia i samorozumienia*, Wydawnictwo Akademii Pedagogiki Specjalnej, Warszawa 2016, s. 144.

⁹ G. Cain, R.N. Cain, *Strengthening and enriching your professional learning community. The art of learning together*, ASCD, Alexandria, Virginia USA, 2010, s. 22.

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The Development of Voluntary Activities Among Young People in Azerbaijan

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Abstract: This article provides a brief analysis of the main areas of volunteering among young people in Azerbaijan.

Keywords: volunteer, volunteering, civil society and youth.

Развитие волонтерской деятельности в молодежной среде в Азербайджане

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Аннотация: В данной статье проведён краткий анализ основных направлений волонтерской деятельности в молодежной среде в Азербайджане. Указаны приоритетные направления в этой деятельности.

Ключевые слова: волонтеры, волонтерская деятельность, гражданское общество, молодежь.

В XXI веке наличие развернутого добровольческого движения – такой же существенный признак развития страны как поддержание демократических свобод, соблюдение прав человека, забота государства о пенсионерах, детях, людях с ограниченными возможностями. Добровольцы с точки зрения закона Азербайджанской Республики – физические лица, осуществляющие благотворительную деятельность в форме безвозмездного выполнения работ, оказание услуг (доровольческой деятельности) (1). На сегодняшний день институт волон-

теров распространен во многих странах мира, становясь все более значимым педагогическим ресурсом развития общества. Во Всемирной Декларации Добровольчества, принятой в январе 2001 года (объявлено годом Добровольцев), отмечается, что добровольчество – фундамент гражданского общества, оно приносит в жизнь потребность в мире, свободе, безопасности, справедливости. В Декларации особо подчеркивается, что волонтерство является добровольным выбором, отражающим личные взгляды и позиции, активное участие гражданина в жизни человеческих сообществ. Оно должно способствовать улучшению качества жизни, личному процветанию и углублению солидарности людей. (д).

Формирование гражданской деятельности молодежи в процессе волонтерской деятельности представляет собой процесс овладения правилами и нормами общепринятых отношений между индивидом и обществом. Сущность формирования гражданской активности молодежи в процессе волонтерской деятельности определяется социокультурной спецификой становления и развития качеств, необходимых личности для полноценного включения в общественную жизнь и социально-политические процессы, для выполнения гражданского долга и гражданских обязательств, реализации всего спектра функций гражданского участия, как на уровне государственных структур, так и деятельности общественных объединений и организаций. Волонтерство позволяет познакомиться с большим кругом самых разных групп населения, как правило, интересных и активных людей. При организации даже небольшой акции приходится контактировать и с государственными органами, и с некоммерческими организациями, инициативными людьми города и часто с бизнесом, если необходимы дополнительные средства. В ходе такой работы складывается партнерские отношения, завязываются знакомства, есть возможность увидеть работу данных организаций изнутри, получить необходимый опыт и рекомендации совершенно бесплатно. Волонтерская работа постоянно формирует вызовы для ее участника, поэтому, выполняя ее, он развивается. Кроме того, добровольческая деятельность позволяет знакомиться с очень разнообразными сферами жизни, о которых студенты могли и не подозревать. Границы их жизненного пространства значительно расширяются. Волонтерские детские и молодежные объединения привлекательны для современных школьников и студентов, обеспечивая им возможность свободного общения и интересных дел со сверстни-

ками. Реальное участие в жизни общества не проходит для молодежи бесследно, приобретенный опыт ложится в основу той позиции, которую будет занимать человек в течение всей жизни. Именно волонтерское объединение создает многомерную образовательную социокультурную среду развития и социального и профессионального становления молодежи (3, с. 142).

На сегодняшний день уровень развития волонтерской деятельности в Азербайджане по сравнению со странами Европы остается крайне низким. История волонтерского движения в Азербайджане отличается от зарубежной в первую очередь подходом к организации процесса работы волонтеров. Например, в период, когда Азербайджан входил в состав СССР, решающую роль в процессе социализации подрастающего поколения играло участие молодых людей в общественно-полезном труде. С этой целью организовывалась работа в учебно-производственных комбинатах, молодежных производственных бригадах, лагерях труда и отдыха и др. В то же время, к концу советского периода, к 1980-м годам, добровольчество стало терять свое изначальное значение. Так, «добровольцы» ехали на целину и получали за свою работу зарплату, а «добровольность» работы на субботниках и уборках часто была связана с общественным принуждением. С распадом СССР отлаженный механизм организации общественно-полезного труда молодежи перестал действовать.

На Западе давно сложилось мощное идеологическое и финансовое обеспечение разных форм благотворительности. Например, по данным ООН на 2012 год, в Англии добровольной помощью занимаются 24% молодежи, в Германии - 23%, а во Франции - 19%. Сегодня во Франции 19% взрослого населения хотя бы раз в жизни участвовали в волонтерских акциях. Из них 60% регулярно участвуют в добровольческой работе, отдавая ей более 20 часов в месяц. 46% опрошиваемых сказали, что они стали волонтерами, потому что они чувствуют в себе большое желание помогать другим. Каждый третий немец является волонтером, посвящая работе в добровольческих ассоциациях, проектах и группах взаимопомощи более 15 часов в месяц (4, с. 32).

В Азербайджане, в отличие от стран Европы, уровень развития добровольчества остается низким. Так проведенным социологическим исследованиям в Азербайджане волонтерской деятельностью занимаются только лишь около 10 % населения, в основном это молодежь, большая часть из которой – студенты, что объясняется наличием достаточного количества свободного време-

ни и повышенной мобильностью. Что касается семейного волонтерства, то в Азербайджане оно проявляется только на уровне отдельных акций, но не как системная работа. Для его развития нужны программы работы с семьями и, конечно же, пропаганда этого важного вида социальной активности. Виртуальное волонтерство в благотворительности до сих пор довольно редко практиковалось в Азербайджане, однако в последнее время его значимость растет. Так, существуют отдельные проекты с участием онлайн-волонтеров. Крупнейшим из них, пожалуй, можно назвать Википедию. В написании статей для этого масштабного ресурса участвует масса азербайджанских пользователей. Привлечение к волонтерству людей с ограниченными возможностями – тоже пока еще довольно экзотическая форма добровольчества для Азербайджана. Такие люди, как и дети, у нас обычно воспринимаются только как нуждающиеся в поддержке. Но нередко людям с ограниченными возможностями самим есть чем поделиться с обществом. Кроме того, Азербайджанское добровольческое движение имеет несомненные особенности. Это связано с тем, что: 1) не определен статус добровольца в обществе; 2) не разработаны системные методы привлечения населения к добровольческой деятельности; 3) добровольческое движение отличается стихийностью, спонтанностью, нестабильностью; 4) недостаточно развита положительная пропаганда добровольчества (5).

В настоящее время в числе приоритетных направлений, стоящих перед добровольческим движением, специалисты в данной сфере выделяют расширение добровольческого пространства - поиск форм и методов совместной деятельности социозащитных учреждений, общеобразовательных школ, органов правопорядка, служб занятости, учреждений культуры, трудовых коллективов как участников добровольческого движения.

Основные реализуемые направления деятельности молодежных волонтерских организаций, созданных в Азербайджане в период 2005-2015 гг., охватывают практически все основные области жизнедеятельности (социальная сфера, образование, культура, экология, безопасность, здравоохранение и др.). В качестве приоритетных направлений деятельности для большинства волонтерских организаций можно выделить следующие: работа с социально незащищенными слоями населения, работа с детьми и молодежью; создание и дальнейшая реализация проектов, направленных на решение проблем местных

сообществ; пропаганда идей здорового образа жизни; предотвращение конфликтов; развитие идей терпимости в обществе.

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