

Bilingual Teaching High School Students of Information Communication Technologies by Means of the Russian and English Languages at Schools of Tatarstan

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Abstract: Now a days the most important factor of functioning of integrated educational space in worldwide space becomes the process of mass international communications. Information technologies and English language knowledge provide an opportunity of rapid integration into information environment, allow to efficiently use modern education information resources. Consequently, there an objective necessity of development of Russian-English Bilingualism at school. The researchers of the study have developed a subject-oriented pattern of teaching of information communication technologies by means of the Russian and English languages at school. The principle of integration of a foreign language and subject content of classroom discipline was taken as a basis (Content And Language Integrated Learning) that has been widespread throughout Europe for the last years. Educational experiment on bilingual learning of information communication technologies has been realized for 5 years (years 2008-2013). In experiment 108 high school students of the 10th forms for whom the elective course “Information Communication Technologies” was developed and taught have participated. Two hypotheses have been put forward. Group 1: H_0^1 (bilingual learning does not effect on acquiring knowledge and skills of the learners on information communication technologies); H_1^1 (bilingual learning effects on acquiring knowledge and skills of the learners on information communication technologies). Group 2: H_0^2 (bilingual learning does not effect on acquiring knowledge and skills of the learners on English); H_1^2 (bilingual learning effects on acquiring knowledge and skills of the learners on English). According to the decision rule on the first group hypothesis for chi-square, the obtained results didn't give rise to dismissal of null hypothesis as $\chi^2_{emp} < \chi^2_{0.05}$ at error level 0.05. An alternative hypothesis has been confirmed. Therefore, it has been proved that bilingual teaching by means of the Russian and English languages does not effect on shaping knowledge and skills in English. In addition, the use of English in the process of teaching allows to increase the level of knowledge and in information communication technologies. It has been revealed that English language proficiency and use extend opportunities of the learner in the process of his information activity, grows him in intelligence experience.

Key words: Bilingualism, bilingual learning, subject-oriented pattern of bilingual learning, information communication technologies, principle of foreign language integration and subject content of classroom discipline

INTRODUCTION

At the same time with the development of information society it has been developing bilingualism which is considered as cognitive resource contributing to human communication. Today Foreign language proficiency in worldwide space is precondition for successful educational and professional activity, informal communication and cultural development. Modern society inseparably connected with information technologies.

Information Communication Technologies (here in after ICT) and English language proficiency enable to swift integrate into information environment, allow to promptly use modern information resources and educational resources as well therefore, an objective necessity of development of educational Russian-English Bilingualism at school exists.

The idea of multilingualism in other words “polygloty” (the term of YA. A. Komensky, XVII century) has the centuries-old history. Multilingualism was popular

in the age of Enlightenment. In tsarist Russia of XVIII century. there bilingual educational establishments existed (Smolny insitute, women's gymnasiums and boarding schools, simferopol popular school, Galiy, Ish-Bubi, Husainy madrasahs and others).

Bilingualism and multilingualism presence at school is considered to be a peculiarity of bilingual teaching if one of the adoptive languages is used as means of the teaching tool of the subjects/or subject areas.

Since, the early nineties of the 20th century. Bilingual teaching has been playing the leading role in education policy in many countries. One can say about formed national patterns of bilingual teaching such as Canadian, American, German and about all-European conception "Euro school" as well. They enable the knowledge to be available, serve as tools of growing a personality in intelligence experience and social adaptation form the environment of intercultural communication at school.

Russia is going through a period of actualization and further development of bilingual learning by means of Native and Foreign languages. At the present time, it plays the role of pedagogical means of international Russian education. As practice shows, at contemporary Russian schools Foreign language as a subject keeps remaining to be isolated from other subjects of non-language cycle. When implementing bilingual learning the leading factor is subject content while in other Foreign language teaching methods the subject content serves as an illustration of language structures under study.

MATERIALS AND METHODS

In compliance with contemporary approach, bilingual learning at school includes on the one hand, subject learning and learner's acquiring subject proficiency on the basis of interrelated use of two languages (native and foreign) as a tool of educational activity. On the other hand, it includes Foreign language learning in the process of acquiring certain subject knowledge at the expense of interrelated use of two languages (Native and Foreign) and mastering Foreign language as a tool of educational activity.

When defining functions and features of the content of bilingual learning we proceed from the fact that it is a part of general education and operates as enriching towards basic one.

Bilingual learning at school is based on contemporary general didactic principles (Salekhova, 2006; Salekhova *et al.*, 2014; Kharisov and Kharisova, 2014). Fundamental principle of bilingual learning ICT is the principle of content and language integrated learning that has become widespread throughout Europe (Coyle,

2007; Marsh, 1994. This principle is based on the so called idea "Thresholds Theory", developed by J. Cummins that explains the interrelation between person's cognitive capability and bilingualism level (Cummins, 2000). Provided well developed linguistic competence, fit with the age of linguistic competence in two languages (developed by bilingual competence), bilingual learners gain visible cognitive advantages over their peers monolinguals. Practical realization of the principle is implemented through applying the following strategies.

Using various methods of information presentation while teaching material in foreign language (web-quests, sub castes, authentic texts, video materials) that promote creating artificial language environment an developing creative thinking.

Comprehensive support of the learner, intensity and amount of which has been reduced when developing learning skills of mastering foreign language that favor decreasing cognitive and linguistic load in learning a subject in a Foreign language that enables the learners without assistance to do tasks by virtue of efficient process organization of bilingual language backup as linguistic cliché and terminological dictionary.

Learners' active interaction in educational process that is stimulated by carrying out tasks with lack of information, reasoning or not clear inference.

Using multicultural component that gives opportunity to introduce the learners to various approaches to coverage the same subject content in different educational and methodic cultures and introduces to the history of development and study of one or another notion or phenomenon.

Development of thinking skills from memorization, comprehension and application to analysis, estimation and independent synthesis by means of using various tasks and issues and also regular exercises on verbalization of thinking in foreign language using here language patterns demonstrated by teacher.

Realization of teaching on the basis of principles of content and Foreign language integration enriches the learners with knowledge and skills in a subject, improves the understanding subject content, involves into cognitive activity, intensifies the interaction in the process of communication, develops essential language skills. Application of this principle enables to learn foreign language without extra classes as it acts as means of learning.

The strategic goal of realization of the developed pattern is the formation of learner's Information Language Competence (ILC) that is understood as the student's readiness and ability to use Russian and English for

efficient carrying out information activity. It has been developed criteria and activities for determining levels of ILC (Batrova and Salekhova, 2013).

In the process of bilingual teaching, we used interview, lectures, student's self-studying of learning literature, independent computer practice, discussions. Local computer network means, availability of interactive board, internet access allowed to efficiently use the idea of duplication of research method. Many subjects were studied by learners independently by means of educational texts on ICT. Most of their time the students spent in front of the computers thinking to themselves, expressing thoughts and communicating in written form in Russian and English. In case of single-purpose text manipulation particular attention was turned to subject-oriented communication. In these conditions, earnest of text manipulation success was the sufficient level of information awareness in subject, text studying helped to acquire knowledge and allowed to systematize theoretical knowledge acquired when bilingual learning.

Solving subject communication problems was based on preparatory language training connected, first of all with the skills to differentiate and comprehend subject terminology. For this purpose, it was needed for the students to learn basic language cliché to proper know punctuation marks to put; it helps to segment a phrase, to stress the meaning of some components to rightly understand symbols peculiar for ICT to know how to work with graphic material to have practice in text summarization and annotation.

In the process of bilingual learning, it was used the project method that to the utmost, corresponds to the tasks of person-oriented education (Borisova *et al.*, 2003). In the course of learners' project activity close interaction of the Native and English languages was going on (information-based work, notion and reality analysis, obtained data processing, reference-information activity, speech preparation and others). The suggested topics of projects were: What is dangerous for network user? How is a picture displayed on the computer screen? What is the future of IT? and others. The learners were using made by themselves subject glossaries in the course of taking elective course. They were suggested auxiliary materials for writing speech texts to defend the project. In the process of students' defending projects full or partial bilingual communication was taking place in particular, the students were playing on the situation "accompanying by interpreter".

RESULTS

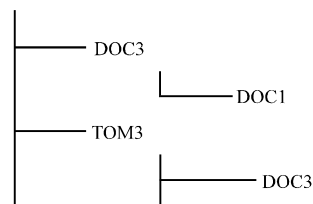
The educational experiment was conducted on the basis of high school No. 9 specialized on the English language learning in Kazan, high school No. 8 specialized

on certain subject learning in Kazan and lyceum No. 1 in Zelenodolsky municipal region of Tatarstan. This experiment took 5 years (2008-2013) and included three stages: ascertaining, formative and controlling. Control Groups (CG) and Experimental Groups (EG) were assigned. Totally, 108 students participated in the experiment. The aim of the educational experiment was realization the pattern of bilingual teaching high school students of ICT, oriented on developing ILC of the learners (Batrova, 2013; Rybalko, 2008).

The results of the ascertaining stage showed that the initial knowledge level of the students in ICT and in English was not high. For estimating the level of knowledge the compiled tests were used. See below the test for estimation the level of acquired knowledge in "Information and ICT" in forms 8 and 9 that included the questions on materials of the following categories: coding and processing information (text, graphic, numerical, multimedia), hardware, files and file system, software.

Test

The catalogue tree A/:



Define full file name Doc3.

- A:/DOC3
- A:/DOC3/Doc3
- A:/ DOC3/Doc1
- A:/TOM3/Doc3

Devices provided information transformation and other operation of devices:

- Processor
- Coprocessor
- System unit
- Motherboard

For slide show the teacher applied the program:

- MS Excel
- MS Word
- MS Power Point
- AdobePhotoShop

For text documents one uses the program:

- MS Excel
- MS Word

- MS Power Point
- AdobePhotoShop

The fragment of electronic table in mapping mode of formula. What do the results of calculation equal to in cell C3? _____

	A	B	C
1	2		
2	= B3+1		
3	= A2+A1	= A1*2	= A3*A2

The basic parts of computer:

- System unit, monitor, keyboard
- System unit, monitor, keyboard, mouse
- System unit, monitor, keyboard, mouse, columns
- System unit, monitor, mouse
- By switching the computer off the information is erased
- On floppy disk
- On hard disk
- On CD-ROM disk
- In operating memory

In dot-graphic word processor an image is created from:

- Lines
- Circumferences
- Rectangles
- Pixels

The following tasks were suggested to estimate the level of English knowledge

Fill in the gaps:

First name ----- Last name -----
 Country ----- City ----- Form -----
 Age ----- E-mail ----- ICQ -----

Translate into English:

Make up all types of questions:

My brother plays computer games every day.

Find odd word:

Games: volley-ball, walk, badminton, football
 Computers: notebook, printer, laptop, PC
 Nature: wood, river, mountain, sweets, tree

Table 1: The results of the students of CG and EG on ICT at ascertaining stage of educational experiment

Knowledge levels	The results of the students in (%)			
	EG		CG	
	2009-2010	2010-2011	2009-2010	2010-2011
Very low	0	9	6	4
Low	53	43	41	30
Intermediate	47	48	47	57
Advanced	0	0	6	9

Table 2: The results of the students of CG and EG on English at ascertaining stage of educational experiment

Knowledge levels	The results of the students in (%)			
	EG		CG	
	2009-2010	2010-2011	2009-2010	2010-2011
Very low	0	0	0	17.5
Low	35	26	35	65.0
Intermediate	47	65	53	17.5
Advanced	18	9	12	0.0

Table 1 and 2 here the test results of students of CG and EG are given. One can see from the table that in CG and EG low and intermediate levels of knowledge on ICT. After applying χ^2 , we've obtained that characteristics of the compared data in CG and EG coincide with significance level 0.05, accepted in educational experiments.

One can see from the table that in CG and EG low and intermediate levels of knowledge on English. The calculation of the criteria χ^2 allows to conclude that characteristics of the compared data in CG and EG coincide with significance level 0.05. The tasks of formative stage are laid down:

- To realize bilingual teaching of ICT by means of the Russian and English languages
- To select, adopt and structure teaching material according to constantly increasing level of ILC of the students
- To organize training on basis of wide application of IT
- To control the current level of students' level of knowledge

For solving these tasks we have worked out the program of the elective course "Information and Communication Technology (ICT)" for form 10, aimed at realization of bilingual learning and expected on 72 h. The program includes such topics as: types of computer, parts of a computer, input devices, output devices, storage devices, networks, the internet, word processing, databases and spreadsheets, future trends. The Russian-English-based tutorial of the same name that

contains exercises and tasks on discipline and also diagnostic materials were worked out.

When implementing the controlling stage of the educational experiment, we made a decision on comparing the results of acquiring by students from EG and CG knowledge, skills on ICT and English independently. Thus, two hypotheses have been differentiated. The first group of hypotheses:

- Hypothesis H_0^1 : Bilingual learning does not effect on acquiring knowledge and skills of the learners on ICT
- Hypothesis H_1^1 : Bilingual learning effects on acquiring knowledge and skills of the learners on ICT

The second group of hypotheses:

- Hypothesis H_0^2 : Bilingual learning does not effect on acquiring knowledge and skills of the learners on English
- Hypothesis H_1^2 : Bilingual learning effects on acquiring knowledge and skills of the learners on English

For hypothesis testing we used diagnostic materials containing tasks aimed at testing of level of content knowledge, language skills and habits, basic communication skills, cognitive skills and habits, educational skills and habits of the student.

According to the rule of decision-making for chi-square criterion, the obtained result for the 1st year of study did not cause declination of null hypothesis as $\chi^2_{emp} < \chi^2_{0.05}$ ($3.3 < 5.99$). That is bilingual learning does not effect on acquiring knowledge and skills of the learners on information communication technologies and it means that knowledge on ICT in CG and EG has been acquired equally. It has been proved that the null hypothesis ($0.12 < 5.99$) is justified.

For estimation the degree of feature connection (as the connection of acquiring Foreign language competence with acquiring information competence) we have used the factor of Spearman's rank. The factor of Spearman's rank was calculated:

$$R = 1 - \frac{6 \times \Sigma(D^2)}{n \times (n^2 - 1)}$$

Where:

n = The quantity of ranking features (indices, learners)
D = The difference between ranks on two variables of the learner

ΣD^2 = The sum of squares of rank differences. The Spearman's factor is varied from -1 to 1

For Spearman's factoring indices values of English terminology knowledge on ICT and indices of fulfilling

final laboratory work on ICT were ranked. As the result, we have obtained the correlation coefficient $R = 0.74$ that is average to 1. The results of calculations show that there visible connection between the considered variables exists, the formation of foreign language competence depends strongly on the formation of information competence and vice versa. As a result of EG values ranking for years 2010-2011, we obtained coefficient that is average also to 1.

Then, we figured out that ILC of 35.3% of learners from EG was formed in the 1st year of study and 26% of learners in the 2nd year of study.

CONCLUSION

Data obtained from the processed results of educational experiment corroborate the hypothesis that bilingual learning by means of the Russian and English languages has effect on formation of the students' knowledge and skills on the English language in so doing, the use of the English language in the process of education allows to provide the required quality of students' knowledge and skills on ICT. It has been proved that there exists the presented link between formation of the foreign language competence and the information competence of the learner, that the learner's English proficiency broadens opportunities in the process of his information activity, grows him in intelligence experience.

RECOMMENDATIONS

The research was performed in terms of implementation "The plan of activities on realization of the Program of competitive recovery FGAOU VPO "K(P) FU" among the leading world scientific-educational centers for 2013-2020".

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