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COMMUNICATIVE COMPETENCE DEVELOPMENT AS SUCCESS FACTOR FOR SPECIALISTS OF INFORMATION TECHNOLOGY

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Abstract

Modern information technology has made life easier, increased the levels of international trade and interaction. Among other fields of activity, they are used in medicine and for looking for ways to mitigate the effects of climate change with regard to monitoring, data collection, changes in the supply chains and control of transport and power supply. All of it brought the IT to be on-fire specialty. However, it is not enough to have a couple of IT specialists for creation of modern products in the IT field. Large and professional team working as a unit is absolutely essential. Such interaction would be impossible without effective social skills. Skills of communication with employees, responsible executives, partners and clients are very important. Communicative competence of an expert is important for formation of credibility, management approach and enhancing of personal effectiveness. Possessing such a competence, the professionals working together at the same project give the best results. Efficiency of the whole process increases too. The purpose of this study was the development of communicative competence of the IT specialists using teamwork method. Comparative analysis has shown the significant growth of the indices, which level was on a mark below the average. These statistically significant results of the mathematical data analysis allow asserting that the educational technology is effective and suggests that the development of communicative competence of the IT specialists is possible to realize in conditions of post-graduate education.

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Keywords: IT specialists, communicative competence, communication, information technologies.

1. Introduction

Modern information technology has made life easier, increased the levels of international trade and interaction (Nath & Liu, 2017). Among other fields of activity, they are used in medicine and for looking for ways to mitigate the effects of climate change with regard to monitoring, data collection, changes in the supply chains and control of transport and power supply (Pattinson, 2017); and also in education (Boguslavskii & Neborskii, 2016; Boguslavsky & Lelchitsky 2017). All of it brought the IT to be on-fire specialty. However, it is not enough to have a couple of IT specialists for creation of modern products in the IT field. Large and professional team working as a unit is absolutely essential. This type of work is achieved by repeated interaction of its members with each other. Neither more nor less than competent communication helps to link together experts in various areas. Sometimes people working on the same product belong to different countries and do not even know each other. However, they have to engage and interact promptly with a team of disparate specialists. Such interaction would be impossible without effective social skills.

Skills of communication with employees, responsible executives, partners and clients are very important. Communicative competence of an expert is important for formation of credibility, management approach and enhancing of personal effectiveness. Possessing such a competence, the professionals working together at the same project give the best results. Efficiency of the whole process increases too.

Some time ago knowledge in the field of software development provided serious competitive advantage to the specialist working in the field of information technology (IT). However, nowadays the reality of modern social life has slightly changed indicators of an IT specialist success (Aesaert, Voogt, Kuiper & Braak, 2017). In modern conditions the ability to demonstrate personal knowledge, to give reasons for opinions and ideas, to present correctly the results of activities in writing and speaking is an important factor. Active development of information technologies, as well as their implementation and massive investments in this area (Dong & Netten, 2017), allow receiving of new specialties and new types of professional activities in the field of information technology. Now the developer should be able not only create, implement and adapt a product, but to carry out its support and promotion. And application programmer must be ready to manage the organization activities (Misnevs & Demiray, 2017). All these suggest that the actual conditions have provided the requirements thanks to which the level of development of professional competence with professional communication became the mandatory characteristic of an IT specialist. This, in particular, will depend on the involvement of stakeholders in the projects (Butt, Naaranoja & Savolainen, 2016).

2. Problem Statement

If we consider the types of activities of the IT specialists, we can identify definite communicative group. For example, in the case of development and deployment of information systems programmers, designers, analysts and principal of the organization would be communicants. If the company faces a necessity of automation of business processes, one way of solving this problem is using of ready-made solutions (cases). In this case, communication will take place between the Manager of IT Technologies Department, Sales Director and Sales Manager. At advising on IT equipment or programmes runtime, as communicants will be experts in administration of systems and the user. Support of information systems at

enterprises suggests that the communicants will be database administrator, IT specialist and the user. Operation with digital equipment involves in communication experts on digital technology, specialists on digital equipment assembly, repair technician and owner of digital equipment.

Inclusion of such expertise in various tasks is justified by the theory and practice of modern software. This division of labour is due to the differentiation of professional duties. The type of specialist to be involved depends on the stage of creating an IT product. The first stage represents the definition of the product, its purpose and usefulness. At the second stage the information is collected and analyzed. This is area of professional competence of system analyst and advance sale manager. At the third stage, a designer develops visual layout of the product, which should correspond to the necessary requirements. At the fourth stage, where architecture design took place, a system architect constructs a model of an IT product. At the fifth stage the designed product is to be developed. Respectively, the programmers do it. At the sixth stage page layout to be displayed in the web browser is created. This is business of web-page designer. The seventh step contains testing of the designed product, as well as error checking and correction. In this work are involved tester and expert in whose work some inaccuracy has been revealed. The eighth step is the release of the product executing by an implementer. Technical support specialist carries out work with users of this product if it is necessary. Project manager is responsible for fulfillment of all the stages in time with respect of the quality and the efficiency at the product creating. Such a large number of professionals involved in the product creation demanded to establish a unified name for the profession, which moved beyond the scope of programmer competence. That is, the IT specialist is a term that combines all professionals included in a holistic process of creation and operation of an IT product (Borytko & Kulikov, 2014).

The specialist of applied information technology acts in close contact with specialists in various fields (Huijgens, Deursen & Solingen, 2017). In this case, for effective communication it is necessary to consider the language specificity of the customer, namely, to use the customer's professional thesaurus. However, the presence of identical thesaurus does not guarantee an effective communication. The project team must have commensurate vision of the professional situation. In the case of the intention of a specialist to take a close look at a definite problem situation, the success of realization of this intention cannot be guaranteed, as the volume and specificity of the information received, can far exceed the scope of the technical thesaurus available for the specialist. At that, if a specialist's thesaurus in a particular area of professional interest is narrower than a thesaurus of his colleagues, there is a possibility not to obtain the necessary information from the given data. That will bring efficiency to minimum. Despite the fact that the professional thesaurus is forming throughout the professional activity, special attention should be given to establishing a common language between communicants. To be able to communicate freely with various groups of communicants the IT professional must have quite large thesaurus, definite level of professional vocabulary and high level of the development of communicative competence.

Another feature of the communicative competence development of IT specialists is the ability to conduct professional communication in a foreign language. In the studies of such scientists as N.Y. Kabanova and M.V. Burnaska development of communicative competence is considered from the proper use of foreign language in the process of IT specialists training (Kabanova, 2006). M.V. Bernovskaya have identified features of professional communication of the IT specialists that are to be considered in the

process of formation of communicative competence and has allocated a special channel of computer communication. Thus, she narrowed the scope of activities of IT professionals to processing, retrieving, transmission and protection of information (Bernaskaya, 2007). As far as the role of foreign language in the process of the IT professionals training grows, the proper use of foreign language becomes compulsive. Operation of a specialist with foreign-language software reference, use of foreign resources to obtain technical data, operation with system messages can serve as a model. The IT specialist defines the requirements for a product to be developed jointly with the customer and interacts in a team in the process of the product creating, therefore, it is important to consider different ways of communication (human-computer, human-human).

The experts involved in the problem of communicative competence proposed various definitions of this phenomenon (Dumitriu, Timofti & Dumitriu, 2014; Kataoka, Ikeda & Besnier, 2013). We will adhere to the following definitions: communicative competence is the ability of a person to establish and maintain communication with people around. This ability includes knowledge about the notion of communication and communicative competence, the ways of communication, conditions of creating the opportunity for communication and skills to apply this knowledge in practice.

3. Research Questions

The key subject of a study became the following: is it possible to form communicative competence of IT specialists with the use of the teamwork method?

4. Purpose of the Study

The purpose of this study was the development of communicative competence of the IT specialists using teamwork method.

5. Research Methods

The study was conducted in three stages.

In the first stage, it is necessary to determine the initial level of development of communicative competence of the IT specialists. And, based on the obtained data, it is essential to adjust the developed educational technology. At this stage, there were used discussion methods, questionnaires and various tests.

The educational process represents a group interaction of students with the aim to carry out the task with allowances made for the risen demands. Development of the ability to work in team, the correct understanding of the task by all members of the team, constructive intra-group cooperation, preventing and solving possible conflicts.

In the second phase, small groups of trainees received common task. Their goal was to join efforts, after identification of the priorities to delineate areas of responsibility and to achieve general result. Students were acquainted with the principles and rules of work in team, and with the examples of solving practical tasks. At that we used group interaction. Also, there was used such a method as group discussion.

Then the listeners were given an explanation of the forms and methods of professional communication (verbal, written, writing). The trainees discussed and analyzed communication types, clarified the effectiveness of communication depending on a task. There was created a problem situation,

the trainees had to solve it using the most effective method of communication. Thus, there was provided the use of a game method when the students could be locked in the situation.

After that, the analysis of conflict situations during professional communications was conducted. And also: discussion of techniques of conflicts neutralization and prevention; creating of problem situation with the presence of conflict, its solution by using the most effective methods of conflict neutralizing; creation of a situation close to a conflict, resolution of professional problems bypassing a possible conflict. At this stage, the students were able to view the conflict and analyze the viewpoints of all parties of the conflict applying the method of sensitivity training.

At the third phase, there was conducted diagnostics of the level of development of communicative competence of the IT specialists. At this stage, there were used discussion methods, questionnaires and various tests.

For estimation of the results that had been shown by the students in the course of experiment, we used a method of non-parametric statistics, as it does not depend on the pattern of distribution, i.e. Wilcoxon T-criterion, allowing establishing the direction and intensity of changes in the identical selection of test persons before and after the experiment. The total number of respondents agreed to participate in the experiment was 23 persons from 19 to 35 years old working in the company specializing in software development and promotion of these products through various advertising networks.

6. Findings

Ascertaining cut off of the initial status of the development of communicative competence of the IT specialists has shown the following values respective to the number of people (Table 1).

Table 01. Results of the ascertaining experiment for the design team

	Low	**Average**	**Predominant**	**Maximum**
Factor A	5	5	2	1
Factor M	0	4	7	2

The table shows that more than half of the respondents have low sociability level (factor A). Estimation of the team interaction level (factor M), showed that people who prefer to rely on themselves and do not intent to team work prevail among the respondents (70%) (inverse proportionality, the higher is the score in gradation from low to maximum; the less is inclination of a respondent to team interaction). Results of the ascertaining cutoff for specialists in advertising and promotion are presented in Table 2.

Table 02. Results of the ascertaining experiment for specialists in advertising and promotion

	Low	**Average**	**Predominant**	**Maximum**
Factor A	2	2	4	2
Factor M	0	5	4	1

This table shows that the respondents from among the promoters almost equally have the average and below the average level of sociability (factor A). Estimation of the team interaction level (factor M) also showed that some respondents are inclined to team work, and about the same part prefer to be on own (inverse proportionality, the higher is the score in the gradation from low level to maximum, the less propensity has a respondent for group interaction).

Educational experiment was conducted in the process of realization of the developed educational technology at the implementation of organizational and methodological conditions.

Results of educational experiment (control diagnosis of the executed cases) of the IT specialists are stated in the Table 3.

Table 03. Results of the educational experiment

	Low	**Average**	**Predominant**	**Maximum**
Factor A	1	4	6	2
Factor M	4	6	3	0

Table 3 shows increase of the development level of communicative competence. Most of the respondents (60%) showed the level above the average. Also we can see increase of a factor indicating ability of most part of the participants to work in team. According to the test the specialists show the indices indicating priority of team result relative to the individual one (inverse proportionality, the higher is the score in a gradation from low to maximum, the less is inclination of a respondent to group interaction).

Educational experiment was conducted in the process of realization of the developed educational technology at the implementation of organizational and methodological conditions.

The results of the educational experiment (control diagnosis of the executed cases) for the specialists of advertising and promotion are given in the Table 4.

Table 04. Results of the educational experiment for the experts on advertising promotion

	Low	**Average**	**Predominant**	**Maximum**
Factor A	0	2	5	3
Factor M	2	4	4	0

The table shows rise of the level of communicative competence development of most of the respondents (76%). Most of the respondents showed level above the average more expressive than in the course of ascertaining experiment. And also some of the respondents showed a shift towards growth of a factor that tells for team work. According to the test the specialists show the indices indicating priority of team result, relative to the individual one (inverse proportionality, the higher is the score in a gradation from low to maximum, the less is inclination of a respondent to group interaction).

It is possible to determine the efficiency of the developed educational technology based on the comparative analysis of the results of ascertaining and educational stages, and statistical processing with the use of Wilcoxon T-criterion.

Comparative analysis of the results of ascertaining and forming experiments revealed the following.

The percentage for the four levels of ascertaining and educational experiments for the developers group are presented in the Table 5.

Table 05. Comparative analysis of ascertaining and educational experiments for the group of developers

Level of sociability (Factor A)				
	Low	**Average**	**Predominant**	**Maximum**
Before the experiment	5	5	2	1
After the experiment	1	4	6	2

Table 5 indicates outcome data improvement after the experiment.

The percentage for the four levels of ascertaining and educational experiments for the group of promoters is presented in the Table 6.

Table 06. Comparative analysis of ascertaining and educational experiments for the group of promoters

Level of sociability (Factor A)				
	Low	**Average**	**Predominant**	**Maximum**
Before the experiment	2	2	4	2
After the experiment	0	2	5	3

From the Table 6 it follows the experiment the results changed towards improving of indices.

The percentage for the four levels of ascertaining and educational experiments for a group of developers are stated in the Table 7.

Table 07. Comparative analysis of ascertaining and educational experiments for the group of developers

The level of group interaction (Factor M)				
	Low	**Average**	**Predominant**	**Maximum**
Before the experiment	0	4	7	2
After the experiment	4	6	3	0

The table shows that after the experiment the results have changed and became better.

The percentage for the four levels of ascertaining and educational experiments for a group of promoters is stated in the Table 8.

Table 08. Comparative analysis of ascertaining and educational experiments for promoters group

The level of group interaction (Factor M)				
	Low	**Average**	**Predominant**	**Maximum**
Before the experiment	0	5	4	1
After the experiment	2	4	4	0

Table 8 indicates that after the experiment data of results changed towards improving of indices.

Data of statistical processing with the use of Wilcoxon T-criterion. Temp is empirical value, p is significance level.

Table 09. Results of the mathematical processing of the experiments data for the promoters group by Wilcoxon T-criterion.

	T_{emp}	**Level of significance**
Factor A	1	$p \leq 0.01$
Factor M	4	$p \leq 0.01$

The table shows that the results are statistically significant, as the received Temp is in the area of significance. This means that educational technology is effective for this test group.

Table 10. Result of the mathematical processing of promoters' data in accordance with Wilcoxon T-criterion

	T_{emp}	**Level of significance**
Factor A	1	$p \leq 0.01$
Factor M	1	$p \leq 0.01$

The table shows that the results are statistically significant, as the received Temp is in the area of significance. It means that educational technology is effective for this test group.

Pilot testing on examination of educational technology was conducted based on the developed technique in accordance with the structural functional model and aims to identify opportunities for the development of communicative competence of specialists in the IT sphere of activities.

In the course of experiment, there were obtained the results of measurement of the sociability development level and team interaction of students. Results of primary measurement of the level of sociability and group interaction showed that more than half of students had low sociability development

level and are prone mostly to individualized activities relative to team work (70%). The level of development of sociability and group interaction of the experts on advertising promotion showed almost equal level of indices above and below the average level. The received results showed that there is a need to implement the module "communicative competence" in the system of continuing education.

The results of the pilot and experimental work showed that sociability development and group interaction became higher. Among the experts in software development more than half of the respondents (60%) showed levels of sociability above the average, a greater number of specialists began to focus on teamwork and not just on individual results (80%). Most part of respondents among experts in advertising and promotion (76%) showed levels of sociability as high and above the average, and besides there was a small shift towards team interaction. Such a small shift is due to the fact, that these experts initially were more loyal to team work.

7. Conclusion

Training with the use of information technology, according to some researchers, increases the productivity of students (Bai et al., 2016; Comi et al., 2017; Semradova & Hubackova, 2013). The worked out in the course of research model of the communicative competence development of IT specialists, is considered as a holistic system, a set of functionally related and logical components. This position is provided in the context of the system and the subjective approaches. Due to the systems concept there are provided conditions for the establishment of the interrelated process of the communicative competence development. This approach allows us to build a holistic model of the communicative competence development of specialists in the IT sphere of activities. Approach on the part of subjectivity involves the development and personal growth during the training process. Subject position requires attitude to a student as to the unique individual with rich inner world, outlook, and the features of personality.

The comparative analysis has shown the significant growth of the indices, which level was on a mark below the average. These statistically significant results of the mathematical data analysis allow asserting that the educational technology is effective and suggests that the development of communicative competence of the IT specialists is possible to realize in conditions of post-graduate education.

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