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CONTENTS

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Levels of teachers' ict competence in the field of web services

Abstract: The study analyzes the survey findings of teachers to define the level of how they use ICT tools for their professional activities. The teachers from some higher educational institutions of Ukraine took part in the disclosure questionnaire involving 23 questions. The author using on-line services created such a questionnaire because of its helpfulness in better distribution of teachers among sufficient, optimum and creative levels. The survey was conducted in the period from November 2016 up to February 2017. The statistical sample consisted of teachers from some Ukrainian universities.

Keywords: ICT competence, web services, educational process, academic staff.

1. INTRODUCTION

Studying issues related to the development of information and communication technologies (ICTs) in all areas of human activities attracts more and more attention from the scientific community. Moreover, some influence of ICTs on the educational process is actively discussed without any limits as to the accreditation levels or forms of the educational institution [6; 8].

The ICT adoption requires numerous changes in the university teachers' competence [2] like some self-perfection, search for new educational theories, procedures, training techniques, as they are based on ICT [9]. Undoubtedly, any forward-minded teacher must acquire skills of electronic tools, in particular, when popular on-line applications (web services) expand possibilities, allow creating a certain training climate (environment) where students learn the educational content easier and teachers simpler work with students with feeling concern for studying the subject. Results of many pilot projects prove that the potential of on-line applications

as a building block forming modern advanced competent specialists (university teachers) is large, complex and valuable [4]. Such applications help to solve issues related to education, as they help to build competencies, which achievement-oriented specialists should possess [1], and it is just the case. Teachers have more opportunities to organize classes with their help as well as students have more opportunities to solve the tasks assigned to them [3].

On-line applications are good and indispensable tools that a modern teacher should have, as they allow them to develop a creative level of their ICT competence. One can confidently say that some teachers have already used some web services. Therefore, it will be expedient to find out their ICT competence level. However, there are factors that hinder the process of using Web services in the learning process. The solution to these issues is topical not only for teachers, but also for engineers interested in it and developing such applications (web services).

The purpose of this study is to define the level of the ICT competence formation and determine conditions for the teachers' self-realization.

2. METHODOLOGY

Rigorous research in the period from September 2016 up to February 2017 involved 215 teachers from various institutions of learning. There were 21.6% of men and 78.4% of women among them. Active participants of this research became 18 professors, 55 associate professors, 95 university teachers, 27 schoolteachers, and 20 graduate students. The author of the questionnaire delivered it to the respondents through the e-mail, social networks (Facebook, LinkedIn, and Google+) and gave it personally. The experimental study was held thanks to the questionnaire titled: "The ICT Proficiency Level – Teachers' Competences". It served to define the teachers' levels of competences: basic, sufficient, and creative. Respondents were asked to choose answers that were divided in accordance with the Likert response scale. Each question was evaluated according to the scale: "Yes" - 3, "Not Sure" - 2, "No" - 1. Questions related to gender, pedagogical experience, type of institution, and position make possible to talk about the diverse composition of respondents and their equal distribution, and hence the correctness of sampling. The statistical program SPSS 17 was used to process obtained results.

3. Research Findings

Any computer competence [7] is a significant part of the education system [5]. All the teachers and students should possess it. Student needs are distinctive and, in their turn, require highly qualified teachers (especially in ICTs). Consequently, it became an urgent issue for our research, in particular, to find out the teachers' levels of their ICT competence and quality of conditions for actual use.

The academic staff from various levels of educational institutions were involved in the study to define the level of their ICT competence. Processing questionnaires, we selectively distributed all the respondents into two groups. The educational institution type as the place of the respondents' work like schools – 16.7%; lyceums, gymnasiums, colleges – 22.1%; educational and industrial plants – 5.6%; boarding schools – 5.6%; institutes and universities – 50%, became the basis for the first group. The second one – under the pedagogical experience: up to 5 years – 5.4%; from 6 to 10 – 5.4%; from 11-20 – 10.8%; from 21-30 – 21.6%; from 31 and more – 56.8%. When selecting for groups, we relied on the expert evaluation. The number of experts was determined under the method suggested by V. Cherepanov [10]. With the help of calculations at the level of confidence probability $\gamma = 0.95$, the reliability of the expert evaluation is sufficient 15. The leading scientists from T. H. Shevchenko Chernihiv National Pedagogical University, Chernihiv National Technological University, and Rivne State Humanitarian University became the members of the expert group. Having analyzed both groups of respondents, the experts concluded that to assess the second group where the pedagogical experience taken into account would be mostly qualitative than the first one which had a general character.

The task of the pilot study of the early stage was to define the teachers' level of the ICT competence at three levels revealing each respondent's potential. Teachers being aware of web services, electronic tools, e-learning, properties of information and communication technologies, as well as very rarely using ICT resources (and only those that are developed by other authors), and wanting to gain experience in developing their own web resources had the *basic level*. Those, who belonged to the *sufficient level*, had a strong knowledge of ICTs, web services, e-media, and e-learning. Their didactic abilities are known as well as their little practice of using some electronic tools. They are interested in the experience of their colleagues. Teachers having some deep and clear insight into the ICT terminology

and applicable fields of Web services as well as being able to allocate modern electronic tools from the proposed list belonged to the *creative level*. Moreover, they are familiar with web services, know how to use them both in a real-case scenario and in future, as well as have their own web sites, and blogs. Additionally, they take part in marathons, competitions, master classes, workshops, and coaching sessions with the demonstration. Those, who have such a level, strengthen the competence related to the new web services and interested in the experience of colleagues.

It should be noted that the data obtained herein are only the respondents' judgements; therefore, they may not coincide with the real possibilities of solving problems based on specific examples. Undoubtedly, those incumbent teachers do not use ICT tools in their professional activities.

Unfortunately, within the limited volume of the article, we are forced out of giving an estimation only to those judgments, which are directly related to the level detection of teachers' ICT competences. For example, the respondents answered "Yes" – 80%; "No" – 10%; and "Not Sure" – 10% the question like "Do you know what web services (online applications), e-journals are?" As to the question: "Are you familiar with the editors of creating online tests (master test, onlinetestpad, Google Forms)?" the following results were obtained: "Yes" – 56.5%; "No" – 30.4%; and "Not Sure" – 13%. There were 87% respondents for innovative technologies and 13% – for traditional in case of the question like "What education technologies do you support?" Answering the question: "Do you have your own created websites, educational blogs?" the respondent said "Yes" – 53.6%; "No" – 42.9%; "Not Sure" – 3.6%. Another question: "Did you take part in marathons, demonstration sessions, and work-shops on ICT development?" showed that respondents answered it as "Yes" – 60.9%; "No" – 39.1%. The question "Would you take part in master classes on developing web services?" was answered as "Yes" – 87%; "No" – 8.7%; "Not Sure" – 4.3%. Putting the question: "Do you use your own video lessons in class?" we got the following answers: "Yes" – 39.3%; "No" – 57.1%; "Not Sure" – 3.6%. The respondents replied "Yes" – 40.9%; "No" – 50%; and "Not Sure" – 10% to the question: "Do you use your own e-Gradebook developed to register the student achievement in class?" and "Yes" – 42.9%; "No" – 50%; "Not Sure" –7.1% to the question: "Do you use your own simulators in class?" There were answers: "Yes" – 42.9%; "No" – 50%; and "Not Sure" – 7.1% to the question: "Do you use logical games with web services?"

It ought to be noted that teachers are not aware of the existence of many web services, and this is 51% of all the respondents. There are also those who do not know what web services or electronic journals or gradebooks are – 20%. More than 42.9% of respondents are familiar with the editors creating online test forms (they help to perform many routine tasks). A slim majority (55%) of teachers do not have their own electronic resources (websites, electronic journals, e-gradebooks, etc.). In the study, the question "What web services, in your opinion, are the most relevant for learning in the educational process?" was put and the respondents must rate online applications from 2 to 5 points. Interactive exercises, master-tests, creation of websites, and Google documents got 5 points. It points to the fact that respondents are greatly interested in web services. The most popular responses to the question “Which of the following technologies would you like to know better?” were the creation of simulators, web sites and blogs, web quests, knowledge maps, testing and management of training systems.

Thus, the obtained results allowed defining the ICT competence of pedagogical workers. At the next stage, we analyzed the data, according to which we can say that teachers with a work experience of 30 or more years have a basic level, and it is 15%; sufficient – from 11-20 years – 49.6%; and creative – from 0-10 years – 35.4%. Data obtained in the process of our research study testify that the teaching experience does not influence on the level of their ICT competence, as the majority of young teachers are engaged in their self-education, self-development and try to improve their ICT competence.

To create balanced material, financial, organizational, psychological, and motivational conditions is required for any effective activity in case of the pedagogical workers’ self-realization. We defined in our research study the level of school conditions mentioned above for each teacher. Research findings showed that 61.5% of respondents unsatisfactorily assessed financial conditions but positively material, organizational, psychological and motivational. This is strong proof that financial conditions are worse as to their organization than others are.

4. CONCLUSIONS

It is worth summarizing, the results presented herein show that young teachers are more proficient in ICT competence. We emphasize that half of the educators know little about the effectiveness of using web services (consequently,

they have such a low-level ICT competence). As a result, they have not had own electronic resources (websites, blogs, electronic journals, video lessons, simulators, and logic games) as one of the main tools assisting to organize the educational process yet. The obtained data made possible to appraise the educational institution conditions (material, financial, organizational, psychological, and motivational) helpful in any qualitative innovation as well as to confirm significant shortcomings on the part of the educational institution management.

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