INFORMATION COMPETENCES OF MATHEMATICS TEACHERS FROM STUDENTS’ POINT OF VIEW

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Abstract

The teacher’s ability to inspire students to study some educational subject is a great pedagogical masterfulness. A particular category between teachers is presented by mathematics teachers. The strict logical scheme of mathematics does not allow a great popularity to this subject. It belongs to less favourite and generally marked as “difficult subjects”. Therefore, it is a big challenge to attract students’ interest in this subject. The mathematics teacher of 21st century cannot do an educational job without the knowledge of IT. Utilization of IT in education belongs to the necessary equipment of a modern man and as well it belongs to the key competences.

Competences directly related to information are called as information competences and should be managed by teachers on all levels of schools. Information competences should be learned by all students – future teachers during the school education. Simultaneously it should be improved and complemented by new knowledge within the lifelong education because teachers are getting a higher chance for better applying in practice.

The aim of the article is focused on the information competences of mathematics teachers in general and simultaneously on the assessment of information competences of teachers from the students’ point of view. The questionnaire survey was conducted on the sample of students at the Faculty of Economics and Management of the Slovak University of Agriculture in Nitra in Slovakia during the years 2012 - 2016. The results of questionnaire survey contain the students’ opinions on the information competences of their mathematics teachers.

Keywords: information technologies, mathematics, mathematics teacher, information competences, questionnaire survey.

1 INTRODUCTION

In general a teacher is one of the pillars of educational process; he is its initiator and organizer. The teacher's profession is inseparably connected with the lifelong education which presents the constant acquiring of new knowledge in a particular subject field and the creation of new knowledge. As regards the teachers in universities so their self-education is quite specific. It is included in the scientific-research activities which are becoming the main criteria for their work assessment [1].

The basic conditions which should be met by a good teacher are as follows:

- vocational education,
- pedagogical-psychological education,
- scientific-research activity,
- active lifelong education,
- utilization of multimedia and information technologies (IT) in the education process and research [2].

2 INFORMATION COMPETENCES OF A MATHEMATICS TEACHER

Information technologies and new trends in education are priorities in Slovakia as a part of V4 countries (Slovak Republic, Czech Republic, Hungary, Poland) [3]. Innovations, news and new trends are the engine of the human population, which thanks to them expands its options. The emerging trends are those that indicate the direction of the contemporary world, which leads to the facilitation and improvement of daily life [4].
In the present time multimedia, information and mobile technologies or virtual reality spread across all aspects of our lives, including education. These technologies bring new forms of learning materials (multimedia), which, besides the fact that are available anytime and anywhere (mobile learning), fundamentally changing the way of education (virtual reality). These technologies allow creating learning environments that provide an opportunity to involve the students in learning, regardless of geographic location, level and form of education [5].

The dynamics of change in the field of information technology open the doors to use of new methods of education. Communication bandwidth (networks), computers, laptops, tablets and mobiles (hardware) and new generation of operating systems, program languages and game engines (software) offer new possibilities [6]. In this case, a teacher should possess new skills and competences that will ensure teaching quality and effective learning outcomes [7].

New methods in the education are combined with the utilization of IT. Utilization of work with IT belongs to the indispensable equipment of a modern man and as well it belongs to the key competences. Competences directly related to information are called as information competences. Mainly these terms are used in connection with the information competences:

- information literacy,
- computer literacy,
- digital literacy [8].

Computer literacy is the ability to work with the commonly used programme equipment, the ability to use the internet for communication, searching and processing of information, the ability to use services and possibilities provided by a modern technology effectively.

Information competence consists of subassemblies of information and computer literacy and therefore it is suitable for the solution of a vast range of tasks and unforeseen problems in the area of IT. The current society is characterized by rapid changes, a large amount of information and a rapid pace of innovation, mainly information. Therefore the utilization of information and communication technologies belongs to the essential equipment of a modern man and as well belongs to the key competences [9].

Information competence is an indispensable part of key competences of teachers on all levels of schools. Information competence should be learned by all teachers during the school education. Simultaneously it should be improved and complemented by new knowledge within the lifelong education because teachers are getting a higher chance for better applying in practice.

The mathematics teacher of 21st century cannot do his job without the knowledge of IT. He should be capable to find suitable sources of information in the internet and decide whether they are utilizable in the educational process and whether they are interesting for students. The IT application to the educational process requires the change of subject theses and the content of individual subjects' education. New technologies do not change only the manner of education but as well their educational content. Electronic educational materials present a possibility of IT application to the educational process.

Despite the fact that the role of information and communication technologies is important for online learning, it is impossible to ignore the pedagogic point of view. It will never be possible to carry out the training process only through ICT, with no teacher participation. Even though the new technologies will significantly change teacher's role in the learning process, they will never substitute for the teacher's personality. Teacher's role will always be motivating students, advising them in their study progress, giving them vision and meet his/her social role [10].

The development of information technology, however, leads to the development of computer-aided learning and assessment systems aimed for the use in mathematics education [11].

The utilization possibilities of electronic educational forms and materials in the education of mathematics are as follows:

- e-educational materials in the form of web pages,
- electronic educational courses in the environment LMS MOODLE.

The crucial task of electronic forms of education is the innovation of presentation form of subject's content in the high school by means of internet, multimedia CD-ROMs and electronic studying.
materials available for students in time and place which suit them. All studying tools in the form of web pages should be accessible not only to the university students but as well to the general public.

3 METHODOLOGY

The questionnaire survey containing students' opinions on key pedagogic competences of teachers was conducted in the Faculty of economics and managements Slovak University of Agriculture (FEM SPU) in Nitra within the years 2012 - 2016. In the year 2012 the sample consisted of 111 respondents, in the year 2013 109 respondents participated in the questionnaire survey, in the year 2014 it was 112 respondents, in the year 2015 the sample consisted of 110 respondents and in the year 2016 it was 113 respondents of the first year study of this university (Table 1).

<table>
<thead>
<tr>
<th>Year</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
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<tbody>
<tr>
<td>Number of respondents</td>
<td>111</td>
<td>109</td>
<td>112</td>
<td>110</td>
<td>113</td>
</tr>
</tbody>
</table>

Source: authors

Our survey was focused on the assessment of key pedagogic competences of teachers from the students' point of view. We interested in the assessment of information pedagogic competence from the students' point of view [12]. Information competence of teachers was surveyed by the question: „Do you consider your teachers as capable in the area of information technologies and their utilization in the education?”

4 RESULTS

The results of questionnaire survey and their analysis were conducted using the methods of mathematical statistics. Information competence of teachers mainly consists of knowing and utilizing of information technologies by teachers in the education when presenting the lectures or seminars. The question: “Do you consider your teachers as capable in the area of information technologies and their utilization in the education?” was answered by students after passing the exam in mathematics in the submitted academic years as follows:

<table>
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<tbody>
<tr>
<td>very capable</td>
<td>27.03 %</td>
<td>29.36 %</td>
<td>33.93 %</td>
<td>40.00 %</td>
<td>46.02 %</td>
</tr>
<tr>
<td>averagely capable</td>
<td>52.25 %</td>
<td>50.46 %</td>
<td>47.32 %</td>
<td>41.82 %</td>
<td>38.05 %</td>
</tr>
<tr>
<td>less capable</td>
<td>20.72 %</td>
<td>20.18 %</td>
<td>18.75 %</td>
<td>18.18 %</td>
<td>15.93 %</td>
</tr>
</tbody>
</table>

Source: authors' calculations

In Tab. 2 we can see, that from year to year, the students considered their teachers more and more capable in the area of information technologies and their utilization in the education. In the year 2012 the respondents - students considered up to 79.28 % of their teachers as very and averagely capable in IT utilization in the education and 20.72 % of respondents consider their teachers as less capable in the area of information technologies and their utilization in the education. After years, the percentage of very and averagely capable teachers in IT utilization in education is gradually increasing, in the year 2016 the respondents - students considered up to 84.07 % of their teachers as very and averagely capable and 15.93 % of respondents consider their teachers as less capable in the area of information technologies and their utilization in the education.

The evaluation of students' answers about information competence of their teachers was conducted by means of programme Microsoft Excel and it is presented in Tab. 2 and Fig. 1.
In Fig. 1 we can see the evaluation of students’ answers about information competence of their teachers, whether they are capable in the area of information technologies and their utilization in the education within the years 2012 – 2016 and if the information competence of their teachers is affected by the implementation of IT to university education during the years 2012 – 2016.

5 CONCLUSIONS

Based on the results of obtained students’ answers from the questionnaire survey to the question: „Do you consider your teachers as capable in the area of information technologies and their utilization in the education?” it arose that year after year the majority of students consider their teachers as very capable in the area of IT. In comparison with the previous year and following year the number of very capable teachers in IT increased in the next years and the number of averagely capable teachers in IT decreased, what can be assessed positively. It might be stated that information competence is the part of knowledge of the increasing number of university teachers and its utilization in the education is still spreading whether in the form of lecture presentation or electronic educational materials used for sole and additional study. The progress in information competence of teachers is substantial in the percentage of students which consider their teachers as very capable in the utilization of IT in students' education. Information competence is an essential part of key competences of teachers on all school levels. Information competence should already be obtained by all teachers during the school education; simultaneously it should be improved and increased by new knowledge within the lifelong learning because teachers increase their chance for better applying in practice. Lifelong learning of teacher is part of their life. It is important to acquire also other key competences which they will use in future practice. The lifelong learning programs can be aimed at acquiring language skills, communication skills, diplomatic protocol and social literacy, computer literacy, legal issues, management and marketing, economics, finance and accounting, and so on [13].

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