MODELS OF USE OF ICT TOOLS AND TEACHERS’ ATTITUDES TO THEM

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Abstract

The constant evolution of information and communications technology, including its implementation in education, places new demands on teachers who have to be prepared to work with modern ICT (hardware and software) and at the same time create appropriate educational materials for such tuition. This need stems not only from practice but also from the necessity to accept modern paradigm of teaching, the flagship of which being constructivism. The latter perceives the importance of student’s inner conditions of learning as well as their contact and/or interaction with the environment.

Based on the aforementioned assumptions, we proceeded to analyze the methods and approaches to the use of ICT by the teachers in primary and secondary schools, who implement teaching supported by up-to-date didactic means and digital technologies. As the basic method for gathering the necessary research data, the questionnaire was chosen. The created research questionnaire was distributed to primary and secondary schools’ teachers, and included both closed and open questions. The acquired research data were subjected to statistical analysis using multidimensional statistical methods. Within the framework of the conducted research it was proved that teachers use ICT tools in teaching profusely. Furthermore, it was possible to deduce in which teaching situations they use ICT tools more than others, and also which particular type of tool is frequent. The paper summarizes selected partial results of a project called “Attitudes of Pupils and Teachers toward Educational Content in the Subject of Informatics at Primary and Secondary Schools”. This project was solved in 2017 at the Department of Technical Education and Information Technology at Faculty of Education, Palacký University Olomouc.

Keywords: ICT tools, models of ICT tools, teaching supported by an ICT tools.

1 INTRODUCTION

It is not necessary to persuade anybody about the fact that the ICT tools develop progressively. It is also not necessary to ask the generation of sixty- and seventy-year-olds about the information technologies at their school desks. If we ask the generation of today’s fifty-year-olds, they will probably remember calculators; however, the majority will say that they had not come across this type of technology at basic school directly, that they had only heard that there is a thing called computer (or other technologies). If we ask the generation of today’s forty-year-olds and if they remember their years at desks, they will immediately cross their minds a revolutionary novelty – a computer. They will probably also remember a number 386 with a floppy disc drive. Analyzing the content for information science’s lessons 20 years ago, we will recall mainly the following topics: “how to turn on a PC”, “why and when is the restart used”, and “how to insert a floppy disc into a drive and how to display the files or how to start a game”. Then, we also remember a topic “the Internet” which was (in the first grade of secondary school) the main ICT topic. If we look at school’s ICT topics today, we discover that topics which we have learnt 15 years ago are not learnt any more (since every pupil already knows that), and the topics to be learnt by today’s pupils seem to our parents too professional.

ICT tools (or information and communication technologies – often called digital technology) also influenced the recipients of education – pupils – as a result of its penetration into all spheres of life. The idea of natural use of ICT – i.e. modern social networks and open information sources – by the contemporary generation of pupils and students starts to be gradually seen as a fact which is based on the two main arguments. The first is based on the fact that today’s children and students handles and controls the computer technology with a matter of astounding course. The second argument is based on the stats of ICT use according to the age – they show that, unlike the older generations, almost all children use the Internet and a computer (Lupač, 2011). These two arguments provided a base for ideas of the American author Don Tapscott (1998, pp. 22–27) while he called the power model of a family distorted since it is children who teach their parents to orientate themselves in a digital environment now. Its terms N-GEN and digital generation were soon followed by others:
digital natives (Prensky, 2004, p. 5), homo-zappiens (Veen & Vrakking, 2006, p. 38), digitally-born (Palfrey, Glasser, 2008) and others. The digital natives are used to acquire information really quick. They perform more actions at one time (multitasking). They prefer to process the image material before the text material. They prefer a random access to information (hypertext) and they like to work in network environment (online). They expect an immediate praise and often appreciation of their creativity (Prensky, 2009, p. 6). The ideas of Prensky and Tapscott became very influential and a number of researches strove to support or disprove them with mixed success (Bennett, Maton & Kervin, 2008, pp. 12–31).

2 TEACHING SUPPORTED BY AN ICT TOOL

As mentioned above, ICT tools introduced into the education many crucial stimuli and applications (Klement, Dostál & Bártek, 2017). That of course did not happen suddenly, but has undergone specific development stages. Gradually, several concepts of possible uses of ICT tools (computers) in education were established (Zounek, 2009). There is no need to analyze them in detail – it is important to view them as a whole, divided into two thought streams, which are shown in the following Image 1.

![Figure 1. Concepts reflecting ICT tools in the education](image)

According to the aforementioned concepts, which to some extent overlap each other and of which the newer are always enrichment of the older by new tools and application possibilities, ICT tools play four basic roles within the educational process (Zounek & Šedová, 2009):

- they carry the teaching content which comprises not only texts or hypertexts, but also images, animations, photos, videos and audio recordings,
- they represent communication tools which can (apart from communication itself) support also cooperative forms of teaching,
- they function as information sources which can be used by pupils while learning – not only in the classroom,
- they can be used as creative tools or environments.

3 MODELS OF TEACHING SUPPORTED BY AN ICT TOOL

The teaching supported by ICT tools represents a complete system employing the possibilities of information and communication technologies in order to achieve educational aims (Klement & Kubrický, 2009). Employment of an ICT tool as a didactic means (for the realization of the teaching supported by ICT tools) is based in three basic models which delimit the position of a tool in relation to a pupil in the educational process. The employment of an ICT tool as a didactic tool (for the realization of teaching support by ICT tools) is based in three basic models which delimit the position of a tool in relation to a pupil in the educational process. Individual models emphasize individual functions that are
performed by ICT tools in the educational process. Therefore, we distinguish between these following models adjusted according to L. Kouba (2002):

**ICT tool functioning as a teaching machine (automatic machine) during the teaching supported by ICT tools.** ICT tool is playing a role of a teacher – it transfers the knowledge, checks its acquisition, strives to motivate a pupil via the program element. However, there are also some disadvantages of this model, e.g. a limited human–machine communication (this objection lapses with a constant development of ICT tools’ intelligence); furthermore, this model lacks the factor of interpersonal communication, educational effect of a teacher, etc.

**Figure 2. Model of ICT tool employment as a teaching machine**

**ICT tool functioning as a demonstration means to help a teacher.** It serves a teacher to demonstrate phenomena difficult to demonstrate otherwise, however, possible to be modeled in a clear illustration. It is possible to demonstrate various variants of solutions on a plane and in a space, it enables an interactive development of an image, construction and animation of the process. Nevertheless, there is a space for communication between the teacher and a pupil. The teacher can transfer the presentation of a subject matter at connected ICT tools with a possibility of audiovisual projection (most common are projectors, interactive boards, touch devices, mobile phones etc.).

**Figure 3. Model of ICT tool employment as a demonstration means**

**ICT tool as an external memory of a teacher.** This model strengthens (contrary to the previous models) the teacher’s work with information, it enables to didactically-appropriate use the information concerning the subject matter’s acquisition and pupil’s understanding in order to manage the presented subject matter. It helps the teacher to analyse their own work in more detail and to improve their activity.
Contemporary, ICT tools therefore represent a massive stimulus to the development of modern forms of education. They have a potential to introduce a “new” quality into the education which will be based on a reasonable employment of these tools, however, it should still respect traditional methods and forms of education based on the interaction between the teacher and their pupils or among the pupils themselves. In this case, the role of the teacher is irreplaceable since they have to be ready not only to work with ICT tools (or to control them), but also to employ them in their teaching.

4 AIM AND METHODOLOGY OF THE RESEARCH CARRIED OUT

The aim of the realized research, which was realized via quantitative research methods, was to find out the responses for the research problems which were stated beforehand. These research problems are described in detail further down in the text and they were based on discovering the current state of employment of ICT tools in real conditions of pre-primary, basic and secondary schools. In a framework of individual research problems, the facts concerning the frequency and ways of employment of particular ICT tools by teachers were therefore discovered. Furthermore, the ways of possible employment of ICT tools for individual forms of teaching were also discovered, and last but not least the availability of ICT tools for teachers was addressed as well as their demands of particular ICT tools in their teaching. This set of research sub-problems was wholly summarized into the essence of the research problem as follows: How are ICT tools employed, for which teachers’ activities are they employed in the teaching?

As a main means for the data collection (necessary for the realization of the research), the questionnaire was used. The questionnaire belongs among indirect – investigational methods – in the structure of research methods classification. The questionnaire can be characterized as a measuring means which we can research the people’s opinions on individual phenomena (Chráska & Kočvarová, 2015). The research phenomena might be (from the point of an individual – respondent) related to either external processes or internal processes. For the needs of the research, the structured questionnaire (Gavora, 2010) was constructed based on the research questions and hypotheses delimited above. The questionnaire contained closed-end questions while possible responses were offered, semi-closed-end questions with a scale of possible responses (a four-step scale was used), and open-ended questions which enabled the respondents to describe the variant state of observed phenomena. In order to ensure the understandability of individual questions of the questionnaire, the questionnaire itself was provided with an explaining text which delimited individual terms used.

The constructed research questionnaire was distributed among 850 pedagogical workers of basic and secondary schools. In total, 260 pedagogical workers filled in the constructed questionnaire, therefore, the response rate was 30.6 per cent which might be a proof that the solved issue is topical and contributing. The research sample consisted of members of teaching staff of 35 schools in total while these schools are based in three regions of the Czech Republic (Olomouc region, Moravian-Silesian region and Zlín region) while 8 of them were respondents from pre-primary schools, 165 respondents were from basic schools, and 81 were based in secondary schools, the rest of 6 respondents expressed their affiliation to “other” type of school. The research sample is described in Table 1.
Table 1. Research sample structure

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Group</th>
<th>Frequency</th>
<th>Relative frequency in %</th>
<th>Overall frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male</td>
<td>66</td>
<td>25.4%</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>194</td>
<td>74.6%</td>
<td></td>
</tr>
<tr>
<td>Length of professional experience</td>
<td>less than 5 years</td>
<td>35</td>
<td>13.5%</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>5-10 years</td>
<td>33</td>
<td>12.7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10-15 years</td>
<td>36</td>
<td>13.8%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15-20 years</td>
<td>47</td>
<td>18.1%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>more than 20 years</td>
<td>109</td>
<td>41.9%</td>
<td></td>
</tr>
<tr>
<td>Type of school</td>
<td>pre-primary school</td>
<td>8</td>
<td>3.1%</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>basic school</td>
<td>165</td>
<td>63.5%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>secondary school</td>
<td>87</td>
<td>33.5%</td>
<td></td>
</tr>
<tr>
<td>Size of school</td>
<td>less than 100 pupils</td>
<td>14</td>
<td>5.4%</td>
<td>260</td>
</tr>
<tr>
<td></td>
<td>100-200 pupils</td>
<td>57</td>
<td>21.9%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>200-500 pupils</td>
<td>120</td>
<td>46.2%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>500-1000 pupils</td>
<td>69</td>
<td>26.5%</td>
<td></td>
</tr>
</tbody>
</table>

In order to discover the size of individual groups of respondents (who responded in the same way), basic descriptive statistics were used as well as their visualization via graphs. Additionally, these results were subjected to an analysis while the level of significance of the responses of the individual groups of respondents was studied. These groups of respondents were divided according to their significant characteristics (sex, age, length of professional experience, etc.). In order to perform this verification, we used parametric Student’s t-test which compares the means of one variable in two groups ( Chráska & Kočvarová, 2015). We used statistical system Statistica 11 for all calculations and visualizations (Klimek, Stříž & Kasal, 2009).

In the following text, there are some constituent outcomes of realized research, which were based on the finding the current level of employment of ICT tools in real conditions of pre-primary, basic and secondary schools. In the framework of investigated research problems, the facts focused on the frequency and ways of employment of concrete ICT tools for individual teaching forms by the teachers are analyzed, assessed and interpreted within the following text.

5 TEACHERS’ATTITUDES TO ICT TOOLS EMPLOYMENT AT SCHOOLS

The first item of the questionnaire dealt with the discovery of frequency of the employment of ICT tools by the members of teaching staff of the observed schools. The employment of ICT tools is one condition of their purposeful implementation into the teaching at schools since their ownership itself does not imply their real employment. The questionnaire item was, therefore, semi-closed-ended while the respondents could select one or more activities in which they employ ICT tools the most. Based on this idea, the following research assumption was created: the ways of employment of ICT tools at schools vary; they include a wide range of activities, however, there are at least four activities which are realized by members of teaching staff while employing ICT tools.
As it can be concluded from the stated Graph 1 above, the preparation of teaching materials (15 per cent of respondents), then the realization of frontal teaching (6.9 per cent of respondents), the solving of administrative tasks (3.1 per cent of respondents), and the realization of individualized teaching (1.5 per cent of respondents) are the most frequent activity of the members of teaching staff employing ICT tools. The stated frequencies are relatively small which is caused by the fact that the respondents could select more than one offered option. In terms of these cumulated activities, the combination preparation of teaching materials, realization of frontal teaching, realization of individualized teaching, solving of administrative tasks became the most frequent one (21.2 per cent of respondents; the following combinations took the next places: preparation of teaching materials, realization of frontal teaching, solving of administrative tasks (16.5 per cent of respondents); preparation of teaching materials and realization of frontal teaching (14.6 per cent of respondents); and preparation of teaching materials and solving of administrative tasks (10 per cent of respondents).

Therefore, it is obvious that the members of teaching staff employ ICT tools for at least four main activities based in: preparation of teaching materials, realization of frontal teaching, realization of individualized teaching and solving of administrative tasks – totally in 88.8 per cent of respondents. The most frequent activity (84.9 per cent) stated as realized by the members of teaching staff was the preparation of teaching materials. Based on this fact, it is therefore possible to accept the stated research assumption and to specify it while stating that the ways of employment of ICT tools at schools vary; they include a wide range of activities, however, there are four activities (preparation of teaching materials, realization of frontal teaching, realization of individualized teaching, and solving of administrative tasks) which are realized by members of teaching staff while employing ICT tools these include totally 88.8 per cent of all realized activities.

6 TEACHERS’ ATTITUDES AND PREFERENCES WITH RESPECT TO ICT TOOLS EMPLOYMENT IN THE PREPARATION OF TEACHING MATERIALS

The second item of the questionnaire aimed at the concrete ICT tools employed by the members of teaching staff in activities related to the preparation or modification of teaching materials. The preparation of teaching materials was – in the previous analysis at the side of the members of teaching staff – named as the most frequent activity (84.9 per cent of respondents). Therefore, it was our goal to complete this with findings related the type of ICT tools employed in this activity. Based on this idea, the following research assumption was created: in schools, personal computers and notebooks are the most frequently employed ICT tools while at least 50 per cent of members of teaching staff do employ these ICT tools in order to prepare or modify teaching materials.
Graph 2. Teachers’ attitudes and preferences with respect to ICT tools employment in the preparation of teaching materials

As it can be concluded from the stated Graph 2 above, a notebook (52.3 per cent of respondents), and a personal computer (38.5 per cent of respondents) are the most frequently employed ICT tool in order to prepare teaching materials. It is necessary to mention that 0.4 per cent of the members of teaching staff did state that they do not employ any ICT tool in order to prepare teaching materials. Based on this fact, it is therefore possible to accept the stated research assumption and to specify it while stating that in schools, personal computers and notebooks are the most frequently employed ICT tools in order to prepare or modify teaching materials while 90.8 per cent of the members of teaching staff do employ these ICT tools for this purpose.

The discovered results were subjected to further analyses which were focused on the fact whether there are independent on individual significant characteristics of the groups of respondents. Based on this, there were the following research hypotheses stated (a hypothesis was formulated for each significant characteristic, afterwards a related null and alternative hypotheses were formulated as well). The stated hypotheses were verified on a sample of 260 respondents via Student’s t-test for independent groups while significant characteristics of the group of respondents were a grouping variable, as presented in Table 2 below.

Table 2. Preferences of ICT tools in order to prepare teaching materials vs. sex, length of professional experience, type and size of school

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Student’s t-test; grouped by sex, length of professional experience, type of school and size of school, number of respondents: 260</th>
<th>Which ICT tool do you use the most in order to prepare or modify teaching materials?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group 1</td>
<td>Group 2</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1 = male</td>
<td>2.166667</td>
<td>2.216495</td>
</tr>
<tr>
<td>Group 2 = female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of professional experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1 = less than 10 years</td>
<td>2.140625</td>
<td>2.382353</td>
</tr>
<tr>
<td>Group 2 = more than 10 years</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1 = Pre-primary and Basic schools</td>
<td>2.219512</td>
<td>2.196629</td>
</tr>
<tr>
<td>Group 2 = Secondary schools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of school</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1 = less than 200 pupils</td>
<td>2.201058</td>
<td>2.211268</td>
</tr>
<tr>
<td>Group 2 = more than 200 pupils</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
In the case of testing the dependence on sex, a value of \( p = 0.7344687 \) was reached. Based on these results, we cannot refuse the null hypothesis, therefore, it is possible assume (with a lot of probability) that in order to prepare or modify teaching materials, there are no differences between the frequencies of employment of ICT tools among the members of teaching staff – males and females.

In the case of testing the dependence on the length of professional experience, a value of \( p = 0.096022 \) was reached; therefore, it was also not possible to refuse the null hypothesis – it is possible assume (with a lot of probability) that in the process of preparation or modification of teaching materials, there are no differences between the frequencies of employment of ICT tools among the members of teaching staff with a various length of professional experience.

In the case of analysis according to the type of school, a value of \( p = 0.868035 \) was reached; therefore, it was also not possible to refuse the null hypothesis – it is possible assume (with a lot of probability) that in order to prepare or modify teaching materials, there are no differences between the frequencies of employment of ICT tools among the members of teaching staff of pre-primary, basic and secondary schools.

In the last analysis (which was focused on the influence of the size of the school), a value of \( p = 0.943336 \) was reached; therefore, it was also not possible to refuse the null hypothesis – it is possible assume (with a lot of probability) that in order to prepare or modify teaching materials, there are no differences between the frequencies of employment of ICT tools among the members of teaching staff of schools with a lower and a higher number of pupils.

7 TEACHERS´ ATTITUDES AND PREFERENCES WITH RESPECT TO ICT TOOLS EMPLOYMENT IN FRONTAL TEACHING

The third item of the questionnaire aimed at the concrete ICT tools employed by the members of teaching staff in order to realize frontal teaching. The employment of ICT tools to realize frontal teaching was – by the members of teaching staff – named as the second most frequent activity (66.1 per cent of respondents). Therefore, it was our goal to complete this with findings related the type of ICT tools employed in this activity the most. Based on this idea, the following research assumption was created: in order to realize the frontal teaching, personal computers and notebooks with a projector are the most frequently employed ICT tools while at least 50 per cent of members of teaching staff do employ these ICT tools in this type of teaching.

As it can be concluded from the stated Graph 3 above, a personal computer or a notebook with a projector are the most frequently employed ICT tool in order to realize frontal teaching (51.2 per cent of respondents). These tools are followed by the interactive board (32.7 per cent of respondents), and a tablet with the content distribution (2.7 per cent of respondents). It is necessary to mention that 12.3 per cent of the members of teaching staff did state that they do not employ any ICT tool in order to realize frontal teaching. Based on this fact, it is therefore possible to accept the stated research
assumption and to specify it while stating that in schools, personal computers or notebooks with projectors, and interactive boards are the most frequently employed ICT tools in order to realize frontal teaching while 83.9 per cent of the members of teaching staff do employ these ICT tools for this purpose.

The discovered results were subjected to further analyses which were focused on the fact whether there are independent on individual significant characteristics of the groups of respondents. Based on this, there were the following research hypotheses stated (a hypothesis was formulated for each significant characteristic, afterwards a related null and alternative hypotheses were formulated as well). The stated hypotheses were verified on a sample of 260 respondents via Student's t-test for independent groups while significant characteristics of the group of respondents were a grouping variable.

In the case of testing the dependence on sex, a value of p = 0.587077 was reached. Based on these results, we cannot refuse the null hypothesis, therefore, it is possible assume (with a lot of probability) that in order to realize the frontal teaching, there are no differences between the frequencies of employment of ICT tools among the members of teaching staff – males and females.

In the case of testing the dependence on the length of professional experience, a value of p = 0.007896 was reached; therefore, it was possible (at the set level of significance) to refuse the null hypothesis and to accept the alternative hypothesis. Based on these results, it is therefore possible to state that in order to realize the frontal teaching, the members of teaching staff with a longer professional experience employ ICT tools more frequently than the members of teaching staff with a shorter professional experience.

In the case of analysis according to the type of school, a value of p = 0.954015 was reached; therefore, it was also not possible to refuse the null hypothesis – it is possible assume (with a lot of probability) that in order to realize the frontal teaching, there are no differences between the frequencies of employment of ICT tools among the members of teaching staff of pre-primary, basic and secondary schools.

In the last analysis (which was focused on the influence of the size of the school), a value of p = 0.182334 was reached; therefore, it was also not possible to refuse the null hypothesis – it is possible assume (with a lot of probability) that in order to realize the frontal teaching, the members of teaching staff of schools with a higher number of pupils employ ICT tools more frequently than the members of teaching staff of schools with a lower number of pupils.

8 SUMMARY AND DISCUSSION OF THE OBTAINED RESULTS

As it was already stated in the introduction, the main aim of the realized research was, based on relevant research methods, to find out how are ICT tools employed, for which teachers' activities are they employed in the teaching. In order to achieve this aim, it was necessary to perform a complex explanation of the current state of ways of employment of ICT tools at schools, hence it was necessary to perform several steps which were based in achieving of sub-aims of individual parts of realized research. Based on the stated results, it is possible to state that our set research assumptions and hypotheses were, to a large extent, proved – therefore, it is possible to state that the employment of ICT tools in conditions of pre-primary, basic and secondary schools became a norm as they are employed in various different activities linked to the preparation and the realization of teaching rather frequently. Additionally, it is possible to state that the discovered results are not totally dependent on the sex or length of professional experience of the members of teaching staff, neither on the type or size of the school.

Nevertheless, it is possible to state that the group of the members of teaching staff with the length of professional experience of less than 10 years showed surprisingly lower frequencies in some analyses than the group of the members of teaching staff with the length of professional experience of more than 10 years. Despite the fact that these results were not (usually) statistically significant, it is necessary to think about this fact. One possible explanation may be the fact that this group of the members of teaching staff perceive the employment of ICT tools in their teaching as natural part of the teaching – therefore they do not perceive even their employment as something “new”. The fact that these members of teaching staff went through their pre-gradual training in times when the ICT tools and their employment in the educational process were already a part of their training might be strengthened in favor of this conclusion. Therefore, the ICT tools and their employment seem natural for them. However, it is also possible to consider the whole issue from a different perspective related
to the teaching experience. In this perspective, it is possible to state that the members of teaching staff with a shorter length of professional experience need more time and energy to manage pupils and organization of their teaching – therefore they do not have neither time nor energy for a more frequent employment of ICT tools. It is, of course, merely a contemplation which should be supported by a relevant statistical analysis which is, however, a direction in which we want to take in the future in order to create an additional research work of this field.

9 CONCLUSIONS

In the framework of the realized research, whose main outcomes are presented above, we managed to identify albeit a small group of the members of teaching staff, it was however a group whose members declared (in their responses) a lower frequency of ICT tools employment and also a lower level of their assessed applicability. At this point, it was not possible to speak about a group of “refusers” of the employment of ICT tools in the teaching, however, this tendency is not entirely new. In the following text, we summarize the main outcomes of the realized research in individual areas which emerged from the statistical processing while employing the methods of educational research:

- the frequency of employment of ICT tools at schools is high; 84.6 per cent of the members of teaching staff do employ ICT tools in their teaching. This result is independent on the sex of respondents, however, it depends on the length of their professional experience and the type and size of school they are teaching at,
- ways of employment of ICT tools at schools vary; they include a wide range of activities, however, there are four activities (preparation of teaching materials, realization of frontal teaching, realization of individualized teaching, and solving of administrative tasks) which are realized by members of teaching staff while employing ICT tools – these include totally 88.8 per cent of all realized activities,
- in schools, personal computers and notebooks are the most frequently employed ICT tools in order to prepare or modify teaching materials while 90.8 per cent of the members of teaching staff do employ these ICT tools for this purpose. This result is completely independent on the sex and length of professional experience of respondents as well as the type and size of school they are teaching at,
- in schools, personal computers or notebooks with projectors, and interactive boards are the most frequently employed ICT tools in order to realize frontal teaching while 83.9 per cent of the members of teaching staff do employ these ICT tools for this purpose. This result is independent on the sex of respondents as well as the type and size of school they are teaching at. However, it depends on the length of their professional experience.
- in schools, personal computers or notebooks are the most frequently employed ICT tools in order to realize individualized teaching while 48.8 per cent of the members of teaching staff do employ these ICT tools for this purpose; 19.2 per cent of the members of teaching staff express their employment of e-learning portal or websites. This result is independent on the sex of respondents, their length of professional experience and the size of school they are teaching at. It is dependent only on the type of school.

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