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Introduction

Education is an important component of life because it provides the basic conditions for realization of our desires and lifelong ambitions. Information and communication technologies (ICT) offer the opportunities for expansion of education, especially for groups, which due to material costs or time constraints, are unable to enroll in educational institutions. The participants in these groups are people from rural populations, persons who are excluded from education because of cultural or social reasons, employees and many others (Abu, El-Ala and Others, 2012, p.135).

One of the most promising paradigms of education is e-learning. It mainly refers to the use of networked ICT in teaching and learning, in order to improve education overall. There has been significant growth indevelopment of e-learning systems and increasing interest in e-learning in the recent years (Behrenda and Others, 2011), (Bora andAhmed, 2013). This is certainly due to the huge progress in ICT, as well as rising demands of making learning compatible with the professional and personal development of each person.

E-learning plays a significant role in today's way of living and working, because many learning materials can be accessed from anywhere, at any time and from any number of people. E-learning has a huge impact on the job performance of educators and university students, as well as in lifelong and work-based learning outside the universities (Donnelly and McSweeney, 2009), (Lamba and Singh, 2011), (Viswanath and Others, 2012). E-learning is widely used method in trainings conducted in companies and other organizations, not only for building IT skills, but also for building business skills, as well as solving many fundamental issues in various fields.

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However, despite the benefits offered by e-learning, there are many obstaclesthat occur during implementation. For example, the traditional web based e-learning, constructed and maintained inside the educational institutions or companies, has many financial problems and demands, such as the need of large financial investment, without the possibility of its return (Viswanath and Others, 2012) (Odunaike SA and Others, 2012). Also, e-learning systems often require many hardware and software resources. There are a number of educational institutions and enterprises that cannot afford such investments, so cloud computing is the best solution for them. The implementation of an e-learningsystembased on cloud computing, has its own characteristics and requires a specific approach. Cloud computingis paradigm in which the resources of the IT system are offered as services available to users through network connection, usually the Internet. It is a model for providing IT services that meet consumer needs, charging only for the actual use that is made (Buyya, Broberg and Goscinski, 2011). The purpose of the cloud is to provide same or improved computer services and computer performance for the client, as technology and applications are located in customer's premises. Also, the cloud provides scalability in processing power, low maintenance costs, fewer computer downtimes, more storage space, all that while maintaining sophisticated IT infrastructure that can be used by the client, thereby improving business demand and increasing the competitiveness of enterprises (Dong and Others, 2009). The cost of implementation ofcloud computing is very low because the client does not have to buy or install equipment (Odunaike SA and Others, 2012). Cloud service provider is paid to provide these services and resources.Cloud computing attracted considerable attention as a ready-to-be-used solution that has been helpful in many situations. Thus, cloud computing opens a new idea for further development of e-learning (Madan and Others, 2012).

In this paper a description of the current state of e-learning in the Republic of Macedonia was performed, with a special analysis of e-learning in universities, schools and institutions where trainingsare conducted for the employees. Analysis

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of e-learning in universities and schools is made based on the results obtained from a survey on people who have completed their education or are active students and people who participate in the creation of the learning process (teachers and professors), while the analysis of the use of e-learning in the institutions where trainingsare conducted for the employees is made based on the results obtained from a survey of employees.

1. Examples of Websites Designed for E-learning

In order to deal with everyday challenges, we are in constant search for answers or solutions. Today's access to information is considerably easier and faster with the use of ICT. The rapid development of society, and everyday changes in technology, science and information, demands people to continuously upgrade their knowledge acquired during their formal education (Elumalai and Veilumuthu, 2012). Following this trend of continuous learning, many companies and educational institutions adopt e-learning as a way of sharing knowledge. Many educational institutions worldwide have developed their own platforms for e-learning, which are used in the education of their students (Eom and Arbaugh, 2011). These platforms havecourses developed for various subjects with educational materials and information easy sharable. Beside that, universities develop their own platforms for e-learning, there are many websites that provide free courses which can be followed on the Internet. All it takes is having a computer with internet connection. Below are listed few of the largest sites designed for e-learning.

Coursera[1]is one of the largest educational platforms which cooperates with highly ranked universities and organizations in the world and offers online courses for everyone. This platform's design is based on proven instructional methods verified

[1]https://www.coursera.org/ (accessed 28 June 2016)

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by highly ranked researchers. There are four key ideas for platform development: effectiveness of online learning, deep and thoroughly learning, mutual evaluation andmixed learning.

edX[2] is the only non-profit educational platform founded by Harvard University and the Institute of Technology of Massachusetts (MIT) in 2012.edX[3] provides online learning and numerous online courses of open character. It gives users high quality courses from the best universities and institutions worldwide. Users can obtain an official document or a certificate from the institution signed by the instructor. This certification verifies the achievements of the user and can be used to emphasize his skills.

Udacity[4] is the result of an experiment at Stanford University, where Sebastian Thrun and Peter Norvig have offered their course "Introduction to Artificial Intelligence" online for free. Today, the team of trainers and engineers has increased and seek to change the future of education, filling the gap between the real job skills, adequate education and employment. This team has created online university that offers students skills which arerequiredby employers nowadays, delivers accreditations approved by employers and educates at a price much lower than traditional schools. Students gain real skills through a series of online courses and participation in projects.

Livemocha[5] is the largest worldwide online community for language learning, which combines traditional learning methods with online practice and interaction with linguists from around the world. Since its beginnings in 2007 up to today, it

[2]https://www.edx.org/(accessed 28 June 2016)
[3]https://www.edx.org/(accessed 28 June 2016)
[4]https://www.udacity.com(accessed 28 June 2016)
[5]http://livemocha.com/(accessed 28 June 2016)

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increased the number of its members, which are from different countries in the world. This community was formed to create a world in which humans know more languages in order to be able to exchange practices and experiences and tobe able to work with people from different countries.

E-learning for kids[6] is a global nonprofit organization created in 2004, which is dedicated to provide fun and free online learning for children from 5 to 12 years. Offering free courses in Math, Science, reading and writing, Its vision is to be a source of online learning available from any place for free.

2. E-learning in Republic of Macedonia

2.1. Comparison between Traditional Way of Learning and E-learning

Traditional learning is well-known, widely accepted and validated method of sharing knowledge, which is the basis of the educational system in Macedonia. However, with the rapid development of Internet technology, method which actively began to be used worldwideappears. This methodis e-learning and very fast it occupies an important place alongside traditional learning. E-learning is relatively new method of learning, where students use modern computer technology as a medium for learning. In Macedonia, as a country which actively follows information development and advancement in terms of internet technology, theconditions are met for integration of e-learning in the educational process. In order to compare the traditional way of learning and e-learning, we list the advantages and disadvantages of these two forms of learning. **Table 1** displaysthe advantages and disadvantages of traditional learning and e-learning.

[6]http://www.e-learningforkids.org/(accessed 28 June 2016)

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From the **Table 1** comparison conclusion can be made that e-learning as a new method of learning can complement the traditional method of learning in Macedonia, introducing flexibility in the educational process and rectifying the shortcomings of traditional learning related on physical presence. E-learning is a technology worth investingand to be integrated in the education process in Macedonia.

The use of cloud computing in higher education offers a number of benefits, but there are some risks and limitations associated with its use (Katz, 2010):

Main benefits: access to applications from anywhere, teaching support, user account management, free software or pay per use, openness to the business environment and advanced research, openness to students and new technologies;

Risks: risks related to security and data protection, risk that the cloud provider would stop operating;

Limitations: institutions limitation regarding conditions, not all applications run in the cloud, Internet connection interruptions.

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Table 1: Comparison between traditional learning and e-learning

Traditional learning		**E-learning**	
Advantage	***Disadvantage***	***Advantage***	***Disadvantage***
	Required presence in the classroom, according to classroom timetable	Following Online lectures gives more time for other activities (Donnelly and McSweeney, 2009),(Katz, 2010)	
Doing live discussion with the instructor and classmates. Buildingpresentational and communication skills. Social interaction, making new friends			Online communication and discussion via email, communication dialog, forum (Lack of social interaction, there is no opportunity to meet new friends in person) (Katz, 2010)
	The teacher determines the structure of the teaching plan and the learning time. Teaching is conducted according to existing curricula. Lectures are	The student himself organizesthe plan and time of learning. Learning materials are available online in different formats. Most of the learning process is carried out by the student	

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	usually in large groups and it leads to the inability of the instructor to devote time to each individual	through searching and collecting information from the Internet(Katz, 2010)	
	Motivation and attention of students are on low level because of their weak involvement in the learning process	The motivation of students is high because of their involvement in the learning time managementand learning process (McSweeney, 2009),	
	Travel expenses	No travel expenses (McSweeney, 2009), (Katz, 2010)	

Source: Literature review

2.2. Empirical research on the use of e-learning in the Republic of Macedonia

The survey was conducted in order to determine the current state of e-learning in education, training and professional development in the country. For this purpose, the survey was conducted on three different groups of interests. In the first and second group are people directly involved in the educational process. In the first group are people who have completed educationor are still enrolled in the educational system, i.e. students, while in the second group are people who create

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the learning process, i.e. the employees in educational institutions (professors and teachers). The third group includes employees who use e-learning for training and professional development in order to improve their professional skill set. The selection of the groups was made in order to obtain representative samples and real data, whose analysis will give a realistic picture of e-learning in Macedonia.

For the purposes of this research three questionnaires were made and sent to respondents from three different groups. 100 questionnaires were sent to the first group of participants (students), where 67 respondents replied. 80 questionnaires were sent to the second group of participants (teachers/professors), where 45 respondents replied. 80 questionnaires were sent to the third group of participants (employees), where 28 respondents replied.

2.2.1. E-learning in Educational Institutions

Analysis of data obtained from the survey on persons who have completed education or are still enrolled in the educational system (students)

The questionnaire for the first group of respondents consists of 16 questions, including questions regarding the degree of their current or completed education, according to which respondents were divided into 3 groups, namely: high school students, undergraduate and graduate students. In the text below follows a detailed description of the analysis and graphic representation of the survey.Regarding the question whether they are familiar with e-learning, 47% of the respondents replied positively, 37% of respondents said that theywere partially familiar with e-learning and 16% of respondents replied that they were not familiar with the e-learning. From the total number of respondents who replied that are familiar with e-learning, 78% belong to the group of respondents who have completed or are still in graduate studies, followed by respondents from undergraduate studies (54%) and

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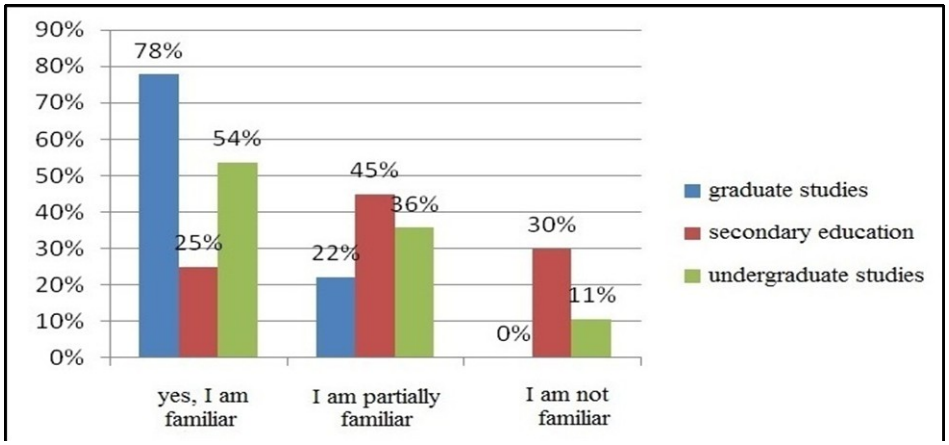
with the lowest percentage are respondents from secondary education (25%). From the respondents who replied that are partly familiar with e-learning, with the highest percentage are those who have completed or are still in secondary education (45%), followed by respondents from undergraduate studies (36%) and finally respondents from graduate studies (22%). From the total number of respondents who answered negatively to the question, the most common are those of secondary education (30%), followed by respondents from undergraduate studies (11%), but none of the respondents from graduate studies responded negatively to this question (**Graph 3.1**).



Graph 3.1: Question results: "Are you familiar with e-learning?"

Source: Data analysis

Regarding the organization of the learning process, the majority (60%) of the respondents said that the learning process was organized in a mixed way -

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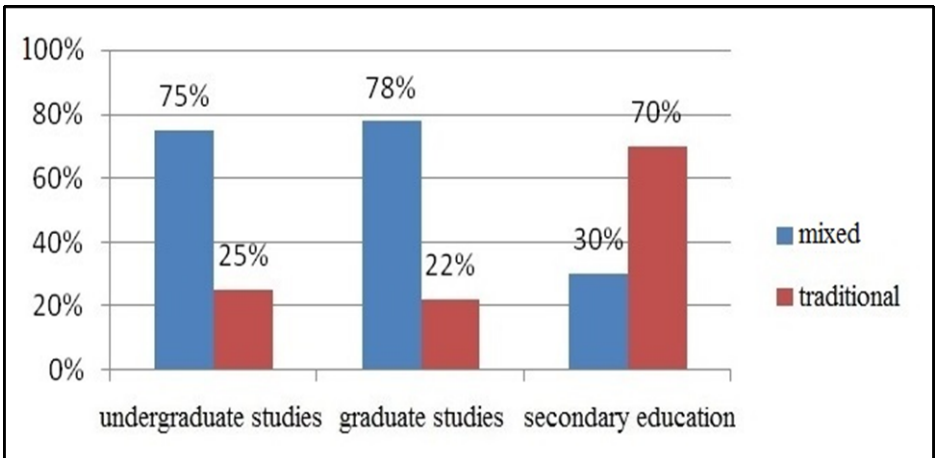
traditional learning, complemented by online communication and sharing of educational content, while the rest (40%) said that it wasorganized in a traditional way in a class room.

The group which chose the mixed way, the highest proportion occupy respondents who belong to the group of graduate studies (78%), followed by respondents from the group of undergraduate studies (75%) and finally the respondents from secondary education (30%). The group whichchose the traditional way, the highest proportion occupy respondents with secondary education (70%), followed by respondents from the group of undergraduate studies (25%) and finally the respondents from the group ofgraduate studies (22%)(**Graph3.2**).



Graph 3. 2: Question results: "How is the learning process organized in your educational institution?"

Source: Data analysis

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From the analysis of the results above, a conclusion can be made that both types of learning processes are present in the educational system. As it can be seen, the traditional classroom approach is more prevalent in primary education, while the mixed approach is more prevalent in undergraduate and graduate studies.

In order to determine whether the educational institutions have a system for e-learning or not, the respondents were asked whether their educational institution has asystem of e-learning,besides the traditional learning system. Respondents were able to choose between two possible answers (yes/no). 65% said that their educational institution has a system of e-learning, and 35% said that it does not. According to the results, an e-learning system is most often to be met in higher education, rather than in the secondary education.

Most of the respondents (90%) who replied negatively on the abovequestion, have also stated that an e-learning system should be introduced in their educational institution and they believe that e-learningcould improve the overall teaching process.The other 10% believe that there are no suitable conditions for implementation of such a system.

The respondents that have stated that there is an e-learning system in their educational institution were asked to replay for what the system is most often used by them and whether the e-learning system is error prone or not.70% replied that the e-learning system is mostly used for file sharing and communication, 16% replied that the e-learning system is actively used during teaching and 14% replied that the e-learning system is rarely used in general.The majority of the respondents (28%) replied that they use the e-learning system mostly for downloading teaching materials in a particular subject/course, uploading home works and projects (21%) and monitoring their success in a particular subject/course(19%). 3% replied that they use the e-learning system for following online lectures also.(**Graph3.3**).

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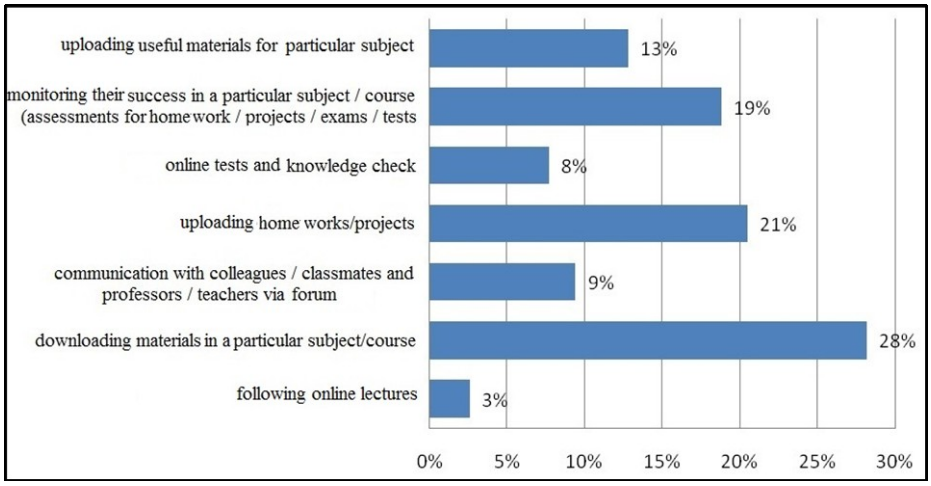

Graph 3.3: Question results: "What is the e-learning system mostly used for?"

Source: Data analysis

Regarding the reliability, even 82% of respondents said that there are often problems when using the e-learning system. The biggest problem pointed was the lack of regular update of teaching materials (47%) and occasional unavailability of the e-learning system (35%). (**Graph 3.4**).

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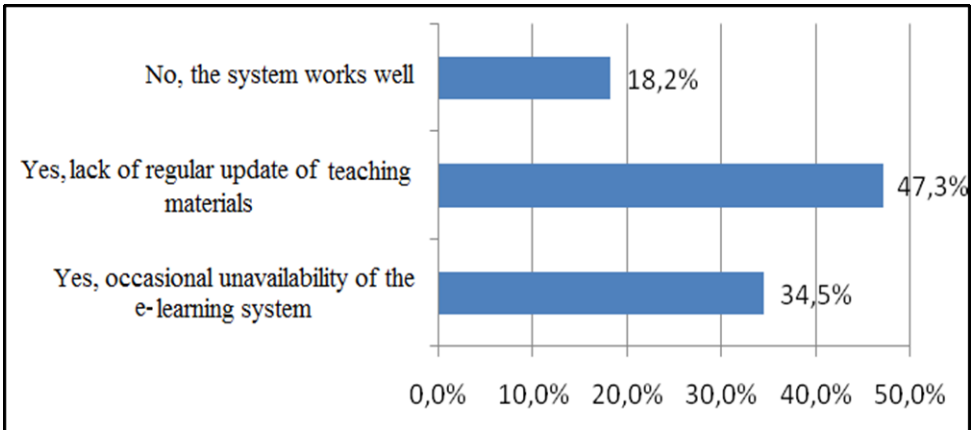

Graph 3.4: Question results: "Are there any problems while using the e-learning system?"

Source: Data analysis

On a scale from 0 (the worst) to 5(the best)40% of the respondents gave a 4 points rating as an assessment, while other results are almost equally distributed around the 4 point assessment (3 points- 31%, 5 points- 21%). *Graph 3.5* shows the assessment results.

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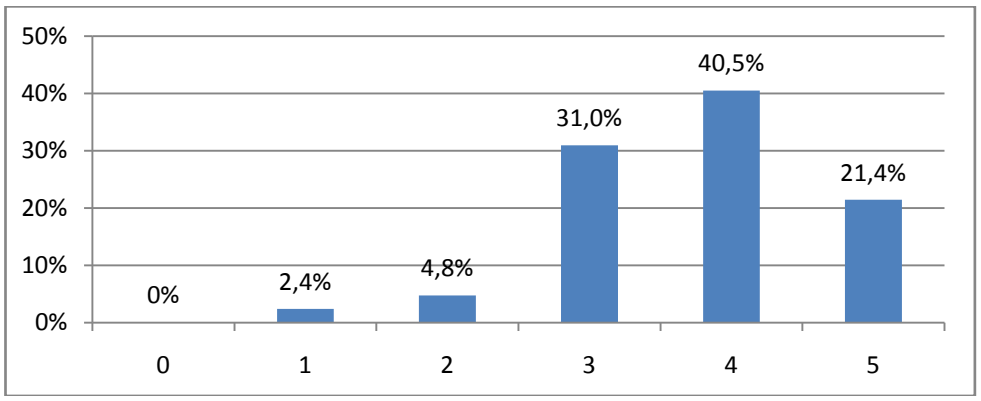

Graph 3.5: Question results: "How useful is / was e-learning during your education?"

Source: Dataanalysis

According to previously presented results it can be concluded that some educational institutions already have an e-learning system, which is mostly used for downloading materials on a particular subject/course. The most common problem when using the e-learning system is of human nature and it is related with thelack of regular update of teaching materials. The second most common problem is of technical nature, thus the system is often unavailablewithout any prior announcements.

Besides the above questions, the respondents were asked a second group of questions regarding individual self-learning beyond the formal education. Asked if they ever individuallyenrolledin a course or lecture over the Internet, 58% replied that they did not, while 42% replied that they did. 83% of the respondents who gave a positive replay have also stated that they liked the overall experience and

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would enroll in a course again, while 17% said that although it was fine, they consider that the traditional way of acquiring knowledge is more efficient. 28% of the respondents replied that the biggest benefit from the individual self-learning is the possibility to self-organize and maintain own learning schedule, 26% replied that the biggest benefit would be cost reduction, 25% replied that it facilitates the learning processand 21% replied that they consider the possibility of self-learning to be the biggest benefit.Regarding the negative sides of e-learning, 42% replied that they consider the lack of social aspect the most negative side of e-learning. Among other disadvantageswere technical deficiencies (22%),lack of some elements of the traditional educational process (22%) and technical incompetence of the educational staff (14%).

At the end the respondents were asked whether the traditional way of learning can be fully replaced by an e-learning. 46% said no, butstated that e-learning can complement the traditional method of learning. 40% believe that traditional learning methods can be replaced by the e-learning methods, but not in all areas of education. Only 14% of the respondents believe that the traditional learning methods can be replaced bye-learning in total (**Graph3.6**).

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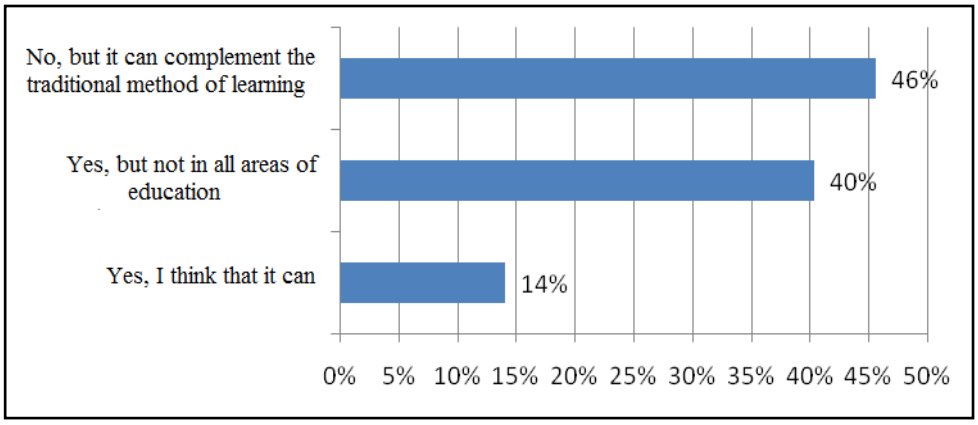

Graph 3. 6: Question results: "Can the traditional way of learning be fully replaced by e-learning?"

Source: Data analysis

Finally the participants were asked a question whether an e-learning is a learning process worth investing in the future, to which the most of the respondents (91%) answered yes, while only 9% answered no.

Analysis of data obtained from the survey on persons involved in the creation of the learning process (teachers and professors)

The survey for the second group of respondents consisted of 19 questions, divided into three groups: questions of general nature, questions related to e-learning in educational institutions and questions related to following individual courses

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online. It the text below is a detailed description of the analysis and graphical representation of the survey results.

The survey has been answered by three different target groups: university professors (44%), secondary school teachers (18%) and primary school teachers (38%).

In order to obtain information regarding the basic conditions needed for smooth implementation of an e-learningsystem, the participants were asked whether their educational institution is located in urban or rural areas, and if there is a stable internet connection in their institutions. The purpose of such question was to determine whether there is a problem with the internet coverage and if the problem is directly related with the location of the educational institution. Surprisingly, very small percentage of the respondents in the primary (35%) and secondary (38%) schools said that there is a stable Internet connection in the institution where they work, regardless of the location of the institution. Even 80% of respondents from universities said that they have a stable internet connection. From the results obtained a conclusion can be made that a stable Internet connection still poses a problem in primary and secondary schools.

All of the respondents replied that they have solid computer skills and that computers are actively used in their workplace. Most of them rated their skills high and stated that they posses excellent computer skills (67%). In the **Graph 3.7**, it can be seen the most common use of computers during their workday.

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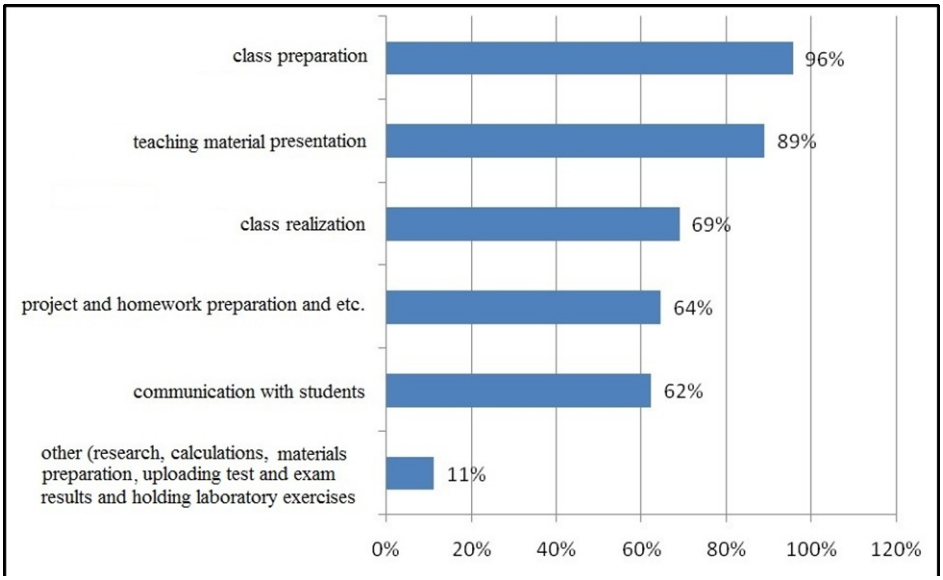

Graph 3.7: Question results: "Regarding your work, for what do you use your computer most of the time?"

Source: Data analysis

Class preparation (96%) and teaching materials presentation (89%) are the most common ways of using computers in educational institutions, while class realization (69%), projects and homework preparation(64%), communication with students (62%) are almost evenly distributed. Besides the above answers,a small percent of the respondents (11%) stated other examples of using computers at work, such as: research, calculations regarding work, preparation of work materials, uploading tests' and exams' results and teaching laboratory exercises.

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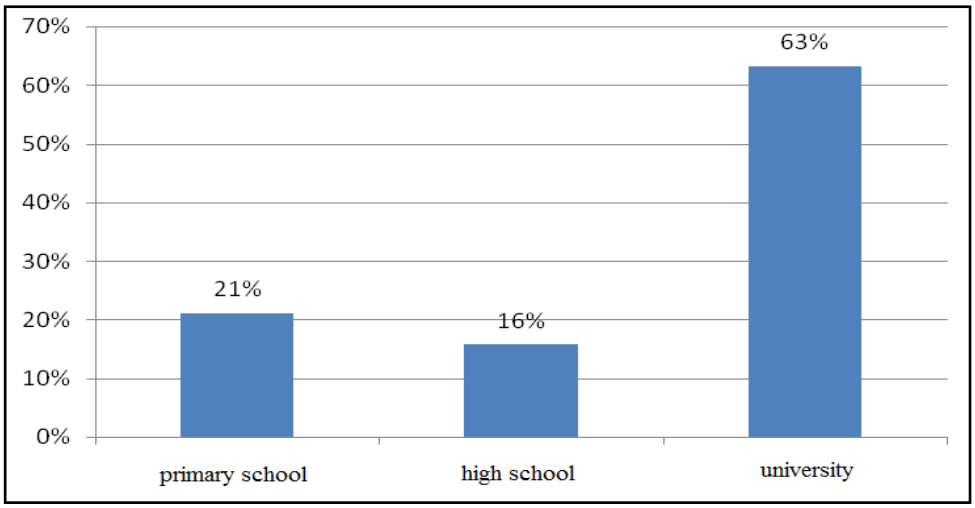
Regarding following a course, seminar or training online, 42% of respondents replied positively and the remaining 58% answered negatively. Those who gave a positive reply are mostly university professors (63%), followed by primary school teachers (21%) and high school teachers (16%) (**Graph3.8**).



Graph 3.8: Question results: "Have you ever followed a course, seminar or training via the Internet?"

Source: Data analysis

Asked about their experience regarding following such training online, respondents from primary and secondary schools had mixed opinions, while most of the respondents from the universities would follow such training again.

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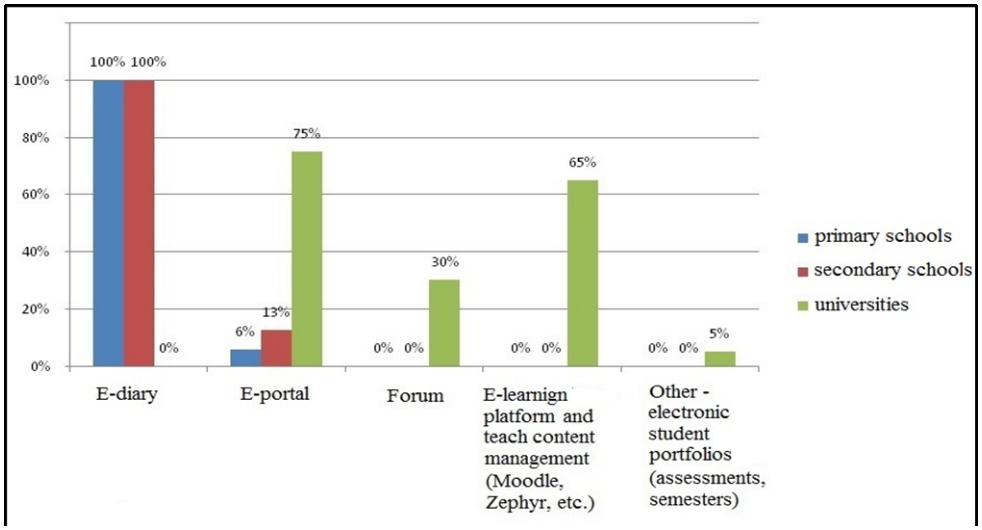
Furthermore, the respondents were asked if they were familiar with e-learning and whether the educational institution they work in has some form of e-learning. All of them replied positively, where 78% replied that they are familiar with e-learning, and 22% replied that they are partially familiar with it. The **Graph 3.9** summarizes the responses of the second question, divided by type of educational institutions.



Graph 3.9: Question results: "Does your educational institution have any form of e-learning?"

Source: Data analysis

According to the graph, in primary and secondary schools the most widespread form of e-learning is the e-diary, while only a small number of schools have e-

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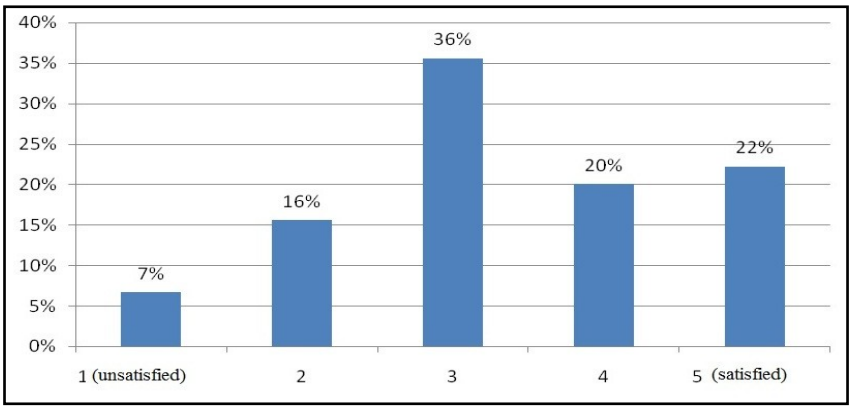
portals. On the other side, almost all forms of e-learning are present in universities (e-portal, forum, e-learning platform and teach content management, electronic student portfolios).

Most of the respondents (51%) replied that e-learning is mostly used forsharing teaching materials, teacher - student communication and internal communication, 27% replied that the e-learning system is actively used in the teaching process (lectures, work at class, etc..) and 22% said that the e-learning is rarely used in the teaching process overall. It can be concluded that in most of the educational institutions, thee-learning system is not fully utilized.

The majority of the respondents rated their e-learning system with average grade 3 (36%). Other ratings are distributed between average grades 5 (22%), 4 (20%), 2 (16%) and 1 (7%). The results can be seen in **Graph 3.10.**



Graph 3.10: Question results: "Are you satisfied with the e-learning system?"

Source: Data analysis

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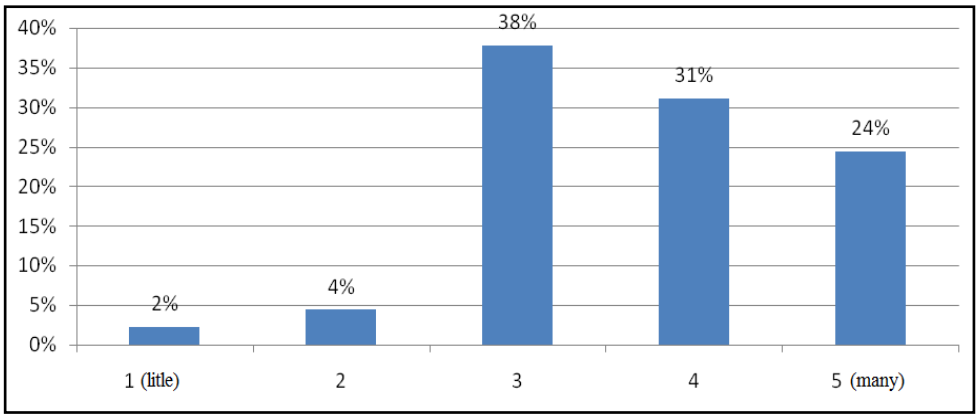
When asked about the most important feature that e-learning currently brings into the educational process, the respondents replied that they consider sharing of teaching materials as one of the most important feature, followed by improved teacher/student communication.

At the end, the respondents were asked to rate the usefulness of current e-learning systemin the educational process. (**Graph 3.11**). Most of the respondents rated it with a grade 3 (38%), followed by agrade4 (31%) and a grade 5 (25%).



Graph 3.11: Question results: "How useful is the e-learning system in the educational process overall?"

Source: Data analysis

At the end of the survey the respondents were asked if e-learning is a process worth investing in the future. All of the respondents gave an affirmative answer.

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2.2.2. E-learning in Training and Professional Upgrade

Analysis of data obtained from the survey on employees that use e-learning for professional and personal development

The questionnaire for the third group of respondents consisted of 14 questions, divided into three groups: general questions, questions related to courses followed at work and question related to following individual courses online. Three age groups were included in this survey: between 23-35 years, between 36-45 years and over 45 years. Most of the respondents belong to the age group of 36 to 45 (43%), second most are in theage group over 45 years (36%) and all others are in the age group 23 to 35 years (21%).

All of the respondents replied that they can use computers, where 50% stated that they possess excellent computer skills, 36% said that they have solid computer skills and 14% said that they have a good computer knowledge. Most of the respondents in the age group of 23-35 (83%) and 36-45 (67%) said that they possess excellent computer skills, while most of the respondents falling in the age group over 45 said that they have good (40%) or solid (50%) computer skills.

All of the respondents also reported that they use a computer to perform their daily job duties. 64% of the respondents stated that they follow or have followed an e-learning course in the past, while 36% replied that they never did. Most of the negative replies are from respondents within the age group over 45 (80%). All of the respondents who have never followed an e-learning course, said that they were not informed that such a course exists.

The respondents who have followed e-learning courses were also asked to evaluate them. The **Graph 3.12** shows the global evaluation of e-learning courses. Most respondents (56%) rated the courses with a grade 4.

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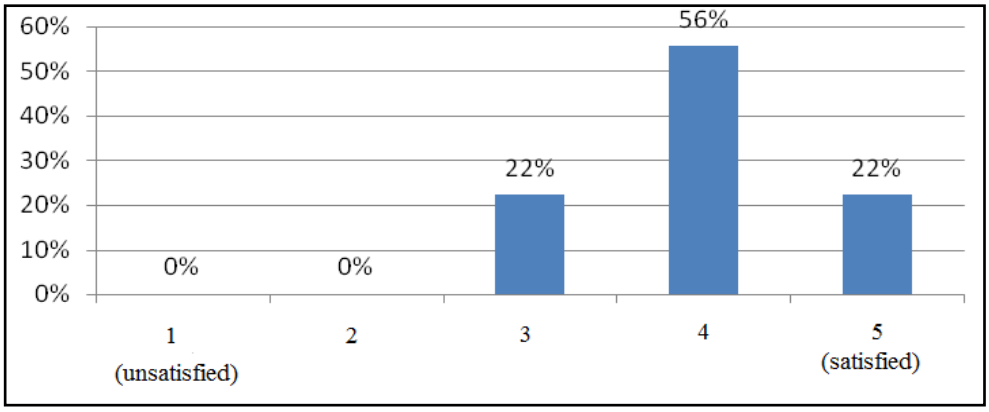

Graph 3.12: Question results "Are you satisfied with the e-learning courses?"

Source: Data analysis

For qualitative evaluation of the user experience while following e-learning courses, participants were able to choose more than one answer. The *Graph 3.13* shows the representation of each of the answers in percentages. It can be see that most of the respondents believe that e-learning courseshelp improving the work quality in general (72%), have sufficient information about a specific topic (56%) and are easy to understand (44%). A small number of respondents (6%) believe that the courses are not informative enough.

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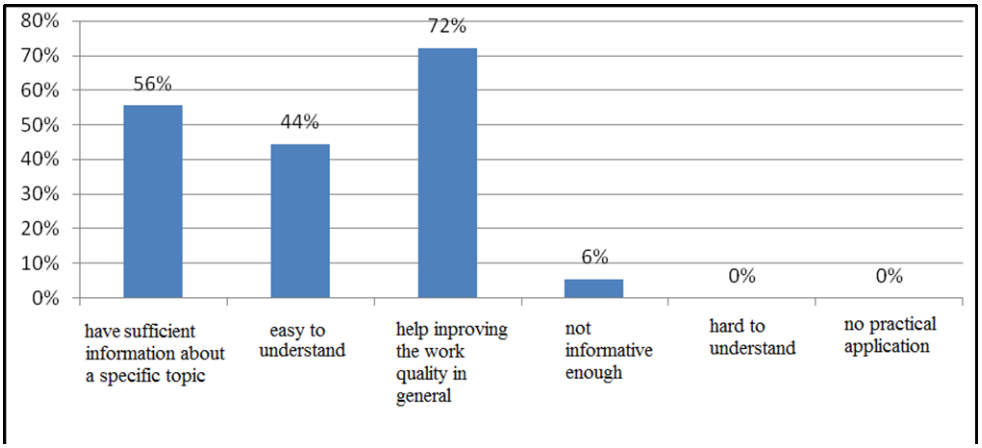

Graph 3.13: Question results "What is your opinion regarding the usefulness of the e-learning courses?"

Source: Data analysis

Asked whether e-learning courses have some advantages over the traditional way of training and gaining knowledge, the respondents stated that e-learning eases the following of the course, allows self-organization and time management and reduces the costs of the following of the course in general (**Graph 3.15**).

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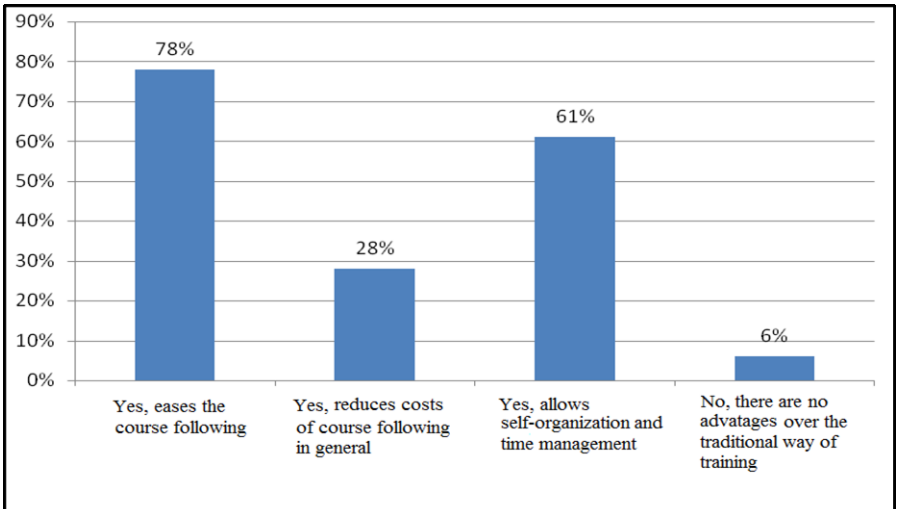

Graph 3.15: Question results "Do e-learning courses offer advantages over the traditional way of learning?"

Source: Data analysis

Most of the respondents (72%) who have followed a course online prefer e-learning over the traditional way of training and would welcome the opportunity of increasing the number of courses related to their line of work.

At the end, all of the respondents were asked whether they have followed a course or lecture online, apart from their work related field. 18% responded positively, where 60% of them said that they liked the overall experience and would follow such a course again, while 40% believe that traditional way of learning is more effective.

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Conclusion

According to the detailed analysis of the available data, a conclusion can be made that there is a positive attitude towards e-learning in general, but its active usage and integration into the educational system is on a low level. Many of the benefits offered by e-learning are partially used in the educational institutions and companies. That is why a joint effort should be made to improve its current usage. The reason for not utilizing the full potential of e-learning is not the lack of computer skills among the respondents, but the unawareness of existence of such a system on a global level and a weak IT structure. Unstable internet connection in primary and secondary schools is a common example of a bad IT structure.

The processed data shows that the respondents are familiar with e-learningin general, but that does not mean that they all have the opportunity to use it actively in professional and formal development. The majority of respondents haveonly had contact with e-learningon a professional level, while a very small percentage have actively followed a courses or lectures as part of informal and individual education and lifelong learning.

However, there is a huge potential regarding e-learning in Macedonia. That is seen in the fact that most of the respondents who have had contact with e-learning, either on professional or private level replied positively about this method of gaining and sharing knowledge. Most of the respondents who have followed an online course consider that e-learning is worth investing in. The institutions should not neglect this fact. They should give their best to respond to the growing demands of the educational community, make changes in the existing educational structure and increase the percentage of e-learning in all parts of the educational system.

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