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E-LEARNING AS A CONTEMPORARY TOOL FOR REALIZATION OF TEACHING PROCESS -STATISTICAL ANALYSIS OF STUDENT'S PERCEPTIONS-

Abstract
Education systems around the world have gone through many stages of development but perhaps the most important stage in the evolution of these systems is the integration of e-learning platforms into traditional education systems. Today, as never before, the importance of such distance learning tools comes to the fore when the world is facing with Covid 19 pandemic. The Faculty of Economics in Prilep had to adapt to those new conditions and teaching process last year was conducted on-line through a G suite for education tool. This e-learning platform is Google's solution based on cloud computing concept.
In this paper we will explore the perceptions of students at the Faculty of Economics in Prilep in terms of the benefits of e-learning faced by students in such a new situation where teaching took place completely on-line. For that purpose, a survey was conducted in which students from all study years were included. In this paper will be presented a statistical analysis for student's perceptions about e-learning and their accordance for using this contemporary tool for teaching. The questionnaire was created with Google Forms and was delivered to students through the e mail.
The main aim of this paper is to detect student's perceptions about on-line teaching through this kind of e-learning platforms independently of their status in the faculty (year of study, department etc.). In the future, when creating and accrediting study programs, the recommendations contained in this paper could be taken into account in order to introduce e-learning as a one of the possible ways for realization of educational process.

Keywords: education, e-learning, cloud computing, innovation

1. INTRODUCTION

Education is one of the basic pillars in the development of any country, and especially of the economic growth of a country. Every country's education system must be prepared to meet the growing challenges through its flexibility and openness to innovation, especially in today when world facing by pandemic.
The development of information technology has enabled education systems to react proactively to such growing challenges. The importance of information technology in the teaching and learning process is especially evident in higher education. New information technologies have enabled the development of new concepts of education, primarily distance learning as a kind of contemporary tool for the realization of the teaching process.
Higher education should be a promoter of the information society and this means creating professionals who will be able to respond to the challenges and needs in all segments of society. Following the development of information and

communication technologies, higher education means creating young and innovative peoples who would deal with the challenges. One of the answers to this need is the development of e-learning.
In the conditions of a pandemic that preserves the world today, the importance of distance learning tools came to the fore. If some time ago e-learning was just an alternative to the traditional way of teaching, today it is the primary model for the implementation of curricula. In that direction, the Universities in the Republic of Northern Macedonia had to adapt to the new conditions.
E-learning as a teaching medium differs significantly from direct (face-to-face) delivery of information and knowledge and requires new options for courses development, their evaluation and interaction. The transition to online learning in large scale is very difficult because it is very complex even in the best of circumstances (World Bank, 2020). Software packages designed to help professors to create quality online courses have the role of facilitators of communication between teachers in the role of mentors and coordinators and its students.

2. CONCEPTUAL FRAMEWROK OF E-LEARNING PROCESS

The development of information technology has enabled the emergence of numerous tools that overcome the physical and geographical barriers between people. In that direction, a number of distance learning tools have been developed that enable lecturers and students to communicate without any barriers. E-learning is a computer-based tool that enables distance learning without geographical and time barriers, usually over the Internet. The term e-Learning dates back to the 1990s, when various applications began to take on a recognizable form. The first type of definition includes the following: “E-learning refers to the use of computer and network technology to acquire knowledge and skills” (Kenneth J. and Brown A. (2005). By the early 90s several schools had been set up that delivered courses online only and bringing education to people who wouldn't previously have been able to attend a college due to geographical or time constraints. Technological advancements also helped educational establishments reduce the costs of distance learning, a saving that would also be passed on to the students - helping bring education to a wider audience.
The European Commission proposes a broad definition of e-learning: “using new multimedia technologies and the Internet to improve the quality of learning by providing access to resources and services, as well as distance exchange and collaboration” (quoted in Nerguizian V. and all., 2011).
E-learning is a technology-supported type of education (Technology supported education / learning) where the medium of teaching is through computer technology, especially with the inclusion of digital technologies. Very often e-learning is called “pedagogy empowered by digital technology” (Titrade C. and all., 2009).
Unlike the traditional way of learning, the use of e-learning offers a number of advantages to both teachers and students. This primarily refers to the unlimited on-line resources such as databases, journals, e-books, etc., which are generally not available in traditional libraries. This way of learning also makes it much easier for students to find the information they are looking for. Distance learning has enabled Universities to overcome many problems, especially today when the world is facing a pandemic of the Covid 19 virus. In conditions of global pandemic, e-learning has become a basic tool for the realization of the curricula of the Universities.
Today there are a different type of e-learning tolls as an open source, others have a protected source code and are made for commercial purposes, and also there are cloud computing platforms for e-learning. Some of them are free to use, some have minimal usage fee, and some are relatively expensive, and include maintenance, servicing and updates. Differentiation also can be made according to whether they are in one or more languages, especially because of the international dimension of the larger companies and institutions that apply them. To be used effectively, the selected e-learning platforms need an overall evaluation of the utility and usability specifications to be well exploited and used in the best conditions.

3. EMPIRICAL RESEARCH OF THE PERCEPTIONS OF STUDENTS FOR E-LEARNING AS CONTEMPRARY TOLLS FOR DISTANCE LEARNING

To explore student's perceptions of the benefits and challenges of using e-learning was used the method of representative sample and were used combined questions of different types. The data was obtained through an on-line questionnaire that contained closed-ended questions and also was used Likert scale for certain specific questions. The questionnaire was created with Google Forms and was sent via e-mail to the students of the Faculty of Economics in Prilep from all study years.130 students answered the questionnaire, which is an appropriate and representative sample on the basis of which relevant conclusions can be drawn. In this paper will explore the student’s perceptions for implementation of e-learning in realization the curricula i.e., the dependence of their accordance on gender, department and year of study.
The first group of questions referred to the status of students who were covered by the questionnaire. Table 1 shows that are covered students from all study years equally, while regarding the department of study, most of them are in the department of Banking and finance and Accounting and audit, which corresponds to the structure of students enrolled in Faculty of economics in Prilep. The structure of students by departments is shown in Table 2.

Table 1. Year of study

Year of study	Percent
First year	25.38%
Second year	23.85%
Third year	31.54%
Fourth year	19.23%

Table 2. Department of study

Department	Percent
Banking and finance	31.54%
E-business	7.69%
Marketing management	12.31%
International business	1.54%
Management	3.85%
Accounting and audit	43.08%

Also, most of the students were female or 70% while male was 30% of the students.

Hypothesis: Accordance of the students for realization of the on-line education process does not depend on their cluster affiliation in the realization of the study process.
Based on the general hypothesis defined as follows, the following individual hypotheses can be differentiated:
Hypothesis 1: Students' accordance for realization of the on-line education process does not depend on their gender.
By applying the appropriate CBS-Chi-Square Analysis, the input information for the observations is obtained, as well as the corresponding empirical and calculated (theoretical) values for the number of students - gender structure according to the attitude for the accordance for on-line education process (Table 1, Table 2 and Figure 1) as well as the expectations or test results:

Information Entered - Observations

Number of Columns:	5
Number of Rows:	2
Alpha Error:	.05
Degrees of Freedom:	4
Critical chi-square:	9.48773

Table 3. Empirical number of students - the gender structure according to the attitude towards the accordance for realization of the on-line education process

	Strongly agree	Agree	Neither agree not disagree	Disagree	Strongly disagree
Men	8	15	9	4	4
Female	25	35	20	12	2

Table 4. Theoretical number of students - the gender structure according to the attitude towards the accordance for realization of the on-line education process

	Strongly agree	Agree	Neither agree not disagree	Disagree	Strongly disagree
Men	9,9	14,9	8,7	4,8	1,8
Female	23,1	35,1	20,3	11,2	4,2

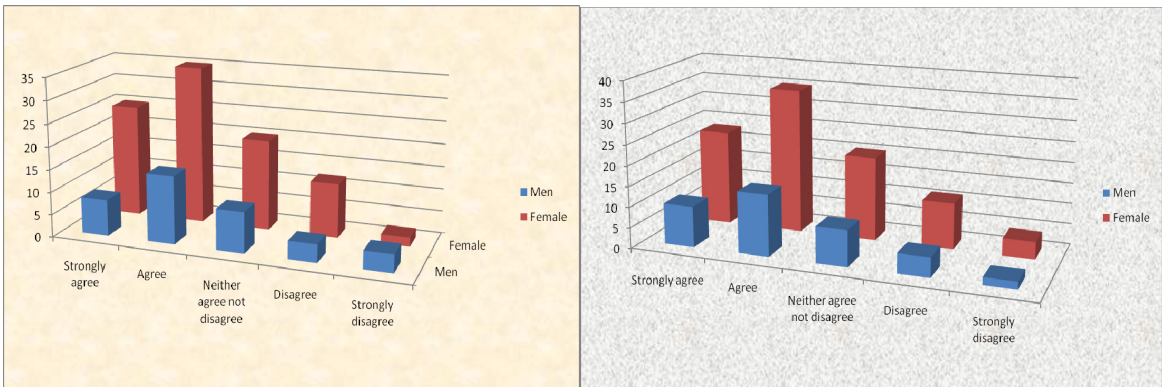

Figure1. Empirical and theoretical number of students - the gender structure according to the attitude towards the accordance for realization of the on-line education process

Results - Expectations
Critical chi-square: 9.4877
Computed chi-square: 4.5791
p value: 0.3299
Conclusion: Do not Reject Hypothesis

The calculated value of the test is: $\chi^2_{pr} = 4.5791$. For the risk of error from 0,05% and number of degrees of freedom $r = (m-1)(n-1) = (3-1)(3-1) = 4$ the theoretical (critical) value of the test is: $\chi^2_{(0,05;4)} = 9.4877$

Because ($\chi^2_{pr} = 4.5791$)<($\chi^2_{(0,05;4)} = 9.4877$)the hypothesis is not rejected and it can be concluded that the students' accordance for realization of on-line education process does not depend on their gender. This is confirmed by the fact that the defined risk of error is $1-\alpha$, that is 0,05 is less than the value of the realized level of error risk, which is p=0,3299.

Hypothesis 2: Students' accordance for realization of the on-line education process does not depend on the study year to which they belong.

By applying the appropriate CBS-Chi-Square Analysis, the input information for the observations is obtained, as well as the corresponding empirical and calculated (theoretical) values for the number of students - academic year to which they belong according to the position on the accordance for on-line teaching (Table 3). , Table 4 and Figure 2) as well as the expectations or test results:

Information Entered - Observations
Number of Columns: 5
Number of Rows: 4
Alpha Error: .05
Degrees of Freedom: 12
Critical chi-square: 21.0261

Table 5. Empirical number of students - academic year to which they belong according to the position on the accordance for realization of the on-line education process

	Strongly agree	Agree	Neither agree not disagree	Disagree	Strongly disagree
First year	8	14	7	5	2
Second year	8	11	7	3	2
Third year	9	18	10	4	1
Fourth year	7	7	6	4	1

Table 6. Theoretical number of students - academic year to which they belong according to the position on the accordance for realization of the on-line education process

	Strongly agree	Agree	Neither agree not disagree	Disagree	Strongly disagree
First year	8,6	13,4	8,1	4,3	1,6
Second year	7,4	11,6	6,9	3,7	1,4
Third year	10	15,7	9,4	5	1,9
Fourth year	5,9	9,3	5,6	2,9	1,1

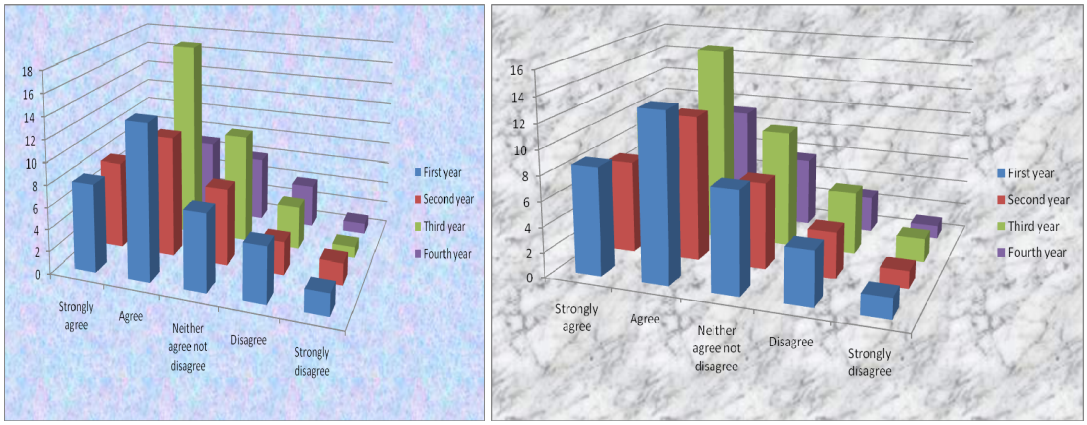

Figure 2. Empirical and theoretical number of students - academic year to which they belong according to the position on the consent for realization of the on-line education process

Results - Expectations
Critical chi-square: 21.0261
Computed chi-square: 3.1448
p value: 0.9944
Conclusion: Do not Reject Hypothesis

The calculated value of the test is: $\chi^2_{pr} = 3.1448$. For the risk of error from 0,05% and number of degrees of freedom $r = (m-1)(n-1) = (4-1)(5-1) = 12$ the theoretical (critical) value of the test is: $\chi^2_{(0,05;4)} = 21.0261$

Because ($\chi^2_{pr} = 3.1448$)<($\chi^2_{(0,05;4)} = 21.0261$)the hypothesis is not rejected and it can be concluded that the students' accordance for realization of the on-line education process does not depend on the study year. This is confirmed by the fact that the defined risk of error is $1-\alpha$, that is 0,05 is less than the value of the realized level of error risk, which is p=0,9944.

Hypothesis 3: Students' accordance for realization of the on-line education process does not depend on the department.

By applying the appropriate CBS-Chi-Square Analysis, the input information for the observations is obtained, as well as the corresponding empirical and calculated (theoretical) values for the number of students - academic year to which they belong according to the position for the accordance for realization of the on-line education process (Table 5, Table 6 and Figure 3) as well as the expectations or test results:

Information Entered - Observations
Number of Columns: 5
Number of Rows: 6
Alpha Error: .05
Degrees of Freedom: 20
Critical chi-square: 31.4104

Table 7. Empirical number of students - the study program in which they study according to the attitude towards the accordance for realization of the on-line education process

	Strongly agree	Agree	Neither agree not disagree	Disagree	Strongly disagree
Banking and finance	11	18	9	4	1
Accounting and audit	10	21	16	7	4
Marketing management	4	6	4	2	0
Management	3	1	1	2	0
International business	1	0	0	1	0
E-business	4	2	1	0	1

Table 8. Theoretical number of students - the study program in which they study according to the position on the accordance for realization of the on-line education process

	Strongly agree	Agree	Neither agree not disagree	Disagree	Strongly disagree
Banking and finance	10,6	15,4	9,9	5,1	1,9
Accounting and audit	14,3	20,8	13,4	6,9	2,6
Marketing management	3,9	5,7	3,7	1,9	0,7
Management	1,7	2,5	1,6	0,8	0,3
International business	0,5	0,7	0,5	0,2	0,1
E-business	1,9	2,9	1,9	0,9	0,4

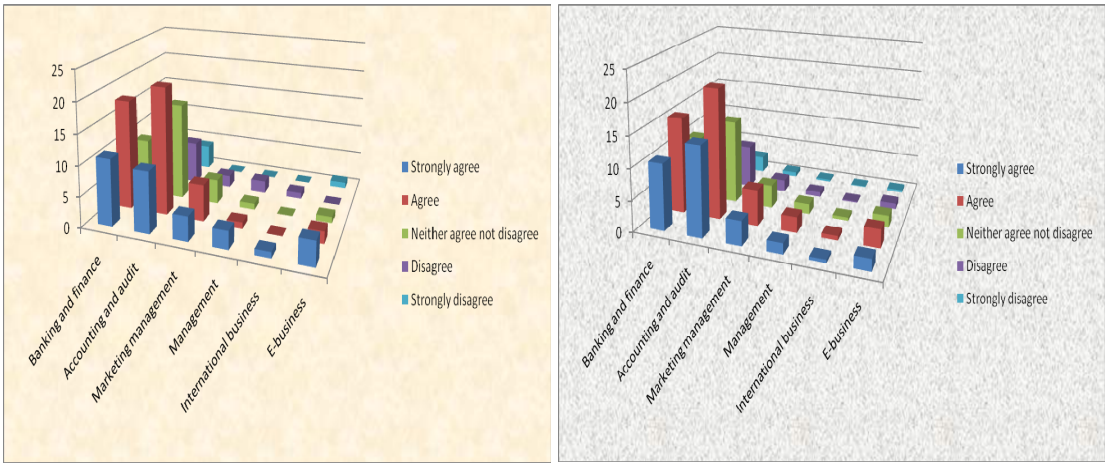

Figure 3. Empirical and theoretical number of students - the study program in which they study according to the position on the accordance for realization of the on-line education process

Results - Expectations

Critical chi-square: 31.4104
Computed chi-square: 17.6299
p value: 0.6115
Conclusion: Do not Reject Hypothesis

The calculated value of the test is: $\chi^2_{pr} = 17.6299$. For error risk of 0.05% and number of degrees of freedom $r = (m-1)(n-1) = (6-1)(5-1) = 20$ the theoretical (critical) value of the test is: $\chi^2_{(0,05;4)} = 31.4104$

Because ($\chi^2_{pr} = 17.6299$)<($\chi^2_{(0,05;4)} = 31.4104$) the hypothesis is not rejected and it can be concluded that the students' accordance for realization of the on-line education process does not depend on the department. This is confirmed by the fact that the defined risk of error is $1-\alpha$, that is 0,05 is less than the value of the realized level of error risk, which is p=0,6115.
Based on the conclusions from the three individual hypotheses, we can summarize the general conclusion (Table 7) that the students' accordance for realization of the on-line education process does not depend on their cluster affiliation in the realization of the education process.

Table 9. Statistical conclusion on the students' accordance for realization of the on-line education process depending on their cluster affiliation in the realization of the education process.

Hypothesis	Degrees of Freedom	Computed chi-square	Critical chi-square	p value	Conclusion
Hypothesis 1	4	4.5791	9.48773	0.3299 (0.05)	Do not Reject Hypothesis
Hypothesis 2	12	3.1448	21.0261	0.9944 (0.05)	Do not Reject Hypothesis
Hypothesis 3	20	17.6299	31.4104	0.6115 (0.05)	Do not Reject Hypothesis

4. CONCLUSION

Distance learning is one way for realization of the teaching process that offers numerous opportunities for both teachers and students. Especially today, when the world is facing a pandemic of the Covid 19 virus, the importance of these new learning methods has come to the fore. In that context, the universities in the Republic of North Macedonia had to adapt to the new conditions. The Faculty of Economics in Prilep realized the teaching process through Google cloud-based tools, which are part of the G Suite education platform.
The main hypothesis and the main purpose of this paper is to determine whether students agree with this way of teaching regardless of their gender, department and year of study. It should also be noted that 58.6% of students agree that the teaching process should take place through e-learning. According to the obtained results, the students' accordance for e-learning does not depend on the previously mentioned three parameters. This means that, regardless of gender, department and year of study, most of the students are agree with this way of realization of the teaching process. Also, according to the survey results, 56.9% of students in the future would prefer a combined model of learning through physical presence and on-line teaching.
All these facts indicate that students, despite the limitations and problems they face in distance learning, are beginning to accept these contemporary tools (e.g. e-learning) for the realization of the teaching process and curricula, regardless of their gender, year of study and department.
This paper will be the basis for further analysis of students' perceptions for acceptance of this type of contemporary tools as e-learning for the realization of the teaching process. Due to the limited size of the paper, we will not be able to present all the data from research. We decide to present this statistical analysis because it is very important for further research that will be done based on the answers from the questionnaire.

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