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INTRODUCTION

This Proceedings comprises papers from the **International conference on Information technology and development of education** that is held in the National House of Mihajlo Pupin, Idvor on June 27th 2014.

The International conference on Information technology and development of education has had a goal to contribute to the development of education in Serbia and in the region, as well as, to gather experts in natural and technical sciences' teaching fields.

The expected scientific-skilled analysis of the accomplishment in the field of the contemporary information and communication technologies, as well as analysis of state, needs and tendencies in education all around the world and in our country have been realized.

The authors and the participants of the Conference have dealt with the following thematic areas:

- Theoretical and methodological questions of contemporary pedagogy
- Personalization and learning styles
- Social networks and their influence on education
- Children security and safety on the Internet
- Curriculum of contemporary teaching
- Methodical questions of natural and technical sciences subject teaching
- Lifelong learning and teachers' professional training
- E-learning
- Education management
- Development and influence of IT on teaching
- Information communication infrastructure in teaching process

All submitted papers have been reviewed by at least two independent members of the Science Committee.

The papers presented on the Conference and published in this Proceedings can be useful for teacher while learning and teaching in the fields of informatics, techniques and other teaching subjects and activities. Contribution to science and teaching development in this region and wider has been achieved in this way.

The Organizing Committee of the Conference

CONTENTS

RESEARCH ON UTAUT APPLICATION IN HIGHER EDUCATION INSTITUTIONS

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Abstract - Information and communication technologies (ICT) have the potential to improve all aspects of our social, economic and cultural life. The ICT imposes inevitable positive changes upon the modern world. These changes are largely related to education as well. The introduction of ICT in institutions of higher education is clearly changing the way in which education is conducted. However, as much as important introduction is, the more important is acceptance of new technologies. For that purpose we shall use a unified theory of acceptance and use of technology (UTAUT) created by Venkatesh, which will explain the user intention to use information systems and subsequently to monitor the behavior of their use.

This paper describes the UTAUT model and the factors that affect it. Further, examples are given for the application of UTAUT in different educational environments. Then are given initial research for the application of UTAUT in our university "Goce Delcev"-Stip, Macedonia about acceptance and use of e-learning information system and ugd repository. Lastly, in the conclusion we note why the uptake of ICT is mandatory and should be undertaken in order to accept a new technology

I. INTRODUCTION

The presence of communication and information technologies in organizations today has dramatically increased. Some studies suggest that, by 1980, about 50 percent of all new capital investments in organizations are in information technology (Westland and Clark 2000). However, the technologies for improved productivity must be accepted and used by employees in organizations. The explanation of customer acceptance of new technology is often described as one of the most researched areas in modern literature information systems (IS) (Hu et al. 1999). Studies in this area have resulted in several theoretical models, with roots in information systems, psychology and sociology (Davis et al. 1989; Taylor and Todd 1995b; Venkatesh and Davis 2000).

One of those models was a unified theory of acceptance and use of technology (UTAUT) which is often used. UTAUT was tested using the original data and overcoming of the eight individual models was found. UTAUT has become a useful tool that managers need to apply in order to evaluate the probability of success while introducing a new technology and helps to understand the factors for its acceptance, in order to undertake more active interventions (such as training or marketing) targeted at users who may be less prone to adopt and use new systems (Venkatesh et al. 2003).

II. WHAT IS THE UTAUT

UTAUT aims to explain user intention to use information systems and subsequently to monitor the behavior of their use. Figure 1, illustrates the UTAUT model that collects all variables from the eight existing models and their additional constructions (intermediaries).

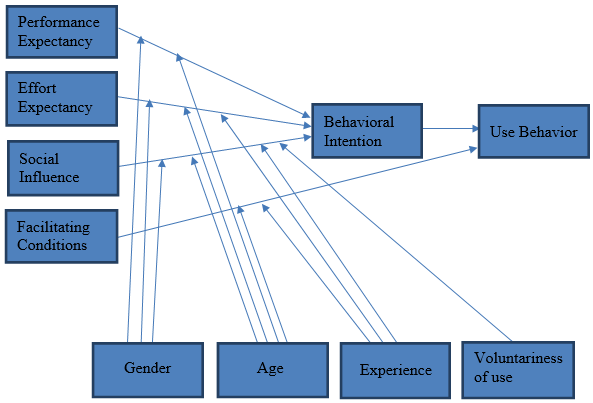

Figure 1 Diagram of UTAUT theory (Venkatesh et al. 2003)

The UTAUT theory considers that three key factors (performance expectancy, effort expectancy and social influence) are direct determinants of behavioral intention for use technology, whereas the facilitating conditions are direct determinant for usage behavior. The model integrates four intermediate factors like gender, age, experience and voluntary use, which have different impacts on basic constructions. By one sentence, we can say that, the UTAUT model condenses 32 variables from eight existing models into four main effects and four intermediate factors.

TABLE 1 UTAUT COMPONENTS

Construct	Description
Performance expectancy (PE)	the degree to which an individual believes that using a particular system would improve his or her job performance
Effort expectancy (EE)	the degree of simplicity associated with the use of a particular system
Social influence (SI)	the degree to which an individual perceives that others believe he or she should use a particular system
Facilitating conditions (FC)	the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of a particular system

TABLE 2 UTAUT MODERATORS

Construct	Description
Gender	Gender roles have a strong psychological basis and are enduring.
Age	Age has an effect on attitudes.
Experience	Effort is expected to be more important in the early stages of new behavior.
Voluntariness of Use	Is usage voluntary or mandated

III. APPLICATION OF THE UTAUT

At the University of Jos Plateau, Nigeria, a pilot – study was conducted which contained 23 UTAUT survey questions and 9 demographic statements in the total amount of 32 questions (Oye et al. 2011). Respondents were university academics. The survey showed that, 57% of respondents were male and 43% were female. By using the pilot study questionnaire part of the demographic statements, they were able to give answer to the following questions (a) Was ICT mandatory or voluntary in their institution. (b) What were the greatest barriers for using ICT for academics? The following results were obtained: the majority of the full-time lecturers (89%) responded that ICT was mandatory. Question, which talked about barriers of using ICT, had the majority of the respondents (42%) which said that their problem was the time; on the other hand, (31%) said that the problem was the training. Others respondents (4%) said that the cost was their problem; another group (20%) said that they needed the compensation and the final group (3%) said that, it did not fit their programs. This implies that the university ICT made task more easily accomplished, thereby making them more productive. Hence, result from the survey showed that 86.5% agreed with that. Therefore, this determined the level of expected adoption of ICT by the respondents. Among the four UTAUT constructs, performance expectancy exerted the strongest effect. Therefore, Performance expectancy was the most influential factor for the acceptance and use of ICT by the respondents.

Recommendations that were made were that, all employed teachers in Federal, State and Private universities should undertake mandatory training and retraining on ICT programs. This study used the models TAM and UTAUT to understand the teacher's behavioral intention on the acceptance and use of the technology.

TABLE 3 RESULTS FROM THE STUDY IN NIGERIA (WITH UTAUT CONSTRUCTS OF RELIABILITY OF ABOVE 0.70.)

Results from the study in Nigeria (Number of respondents N = 100)		
Gender	Male	57%
	Female	43%
Use	Mandatory	89%
	Voluntary	11%
Barriers for using ICT	Time	42%
	Training	31%
	Cost	4%
	Compensation	20%
	Do not fit with the job	3%

Another survey was conducted in a large public university in the Midwest area. The revised questionnaires were distributed to 394 undergraduate students in a business administration course. There were 294 returned responses, for an overall response rate of 74.62 percent. The demographic data of respondents were also collected. Table 2 demonstrates sample characteristics.

The subject of the questionnaire was the assessment of the students' intention to use Blackboard (named MyGateway at the survey institution) which is a Web-based software system used to support flexible teaching and learning in face-to-face and distance courses. Blackboard is an educational innovation that provides tools and facilities for the online course management, content management and sharing, assessment management, and online collaboration and communication between faculty and students or among students themselves.

TABLE 4 SAMPLE CHARACTERISTICS FROM THE STUDY IN MIDWEST AREA (P-VALUE <= .01)

Sample Characteristics	Results
Academic Year	Freshman 30.38 % Sophomore 15.00 % Junior 40.77 % Senior 13.08 % Other 0.77 %
Gender	Male 50.38 % Female 49.62 %
Age	Mean 22.12 S.D. 5.19
Application Experience	None 50.77 % 1-2 Semester 30.77 % More than 2 Semester 18.46 %
Application Training	None 82.31 % 1-5 Hours 16.92 % More than 5 Hours 0.77 %
Voluntariness	Yes 50.00 % No 50.00 %

The last study attempted to understand factors that affected university students' usage intention of library apps in university libraries. The survey was administered in Taiwan in the context of adopting library apps in university libraries; the subjects selected were distributed across various departments, and undergraduate and graduate students in eastern Taiwan from each department and school were evenly distributed to ensure valid comparison.

All subjects participated in the study voluntarily. There were a total of 363 Participants, 168 males and 195 females. Within the sample population: 277 (76.3 percent) were undergraduate students and 86 (23.7 percent) were graduate students. The age of the participants ranged from 18 to 28 years. Most of the participants (69 percent) stated they were familiar with the term library APP before the survey.

TABLE 5: RESULTS FROM THE STUDY IN TAIWAN (P-VALUE <= 0.05; 0.01; 0.001)

Results from the study in Taiwan (Number of respondents N = 363)		
Gender	Male	168
	Female	195
Population	undergraduate students	277
	graduate students	86

IV. APPLICATION OF THE UTAUT WITHIN THE UNIVERSITY "GOCE DELCHEV" – STIP

Within the University "Goce Delchev" - Stip survey was conducted in February 2014. The survey was consisted of 74 modified UTAUT questions. We used a model that besides the four basic determinants contained three more determinants such as self - efficacy, anxiety and attitude towards using technology taken from other theories (Figure 2). The survey consisted of three sets of questions, the first group or 31 questions were intended for acceptance and use of the e – learning information system, the second set of questions were intended for UGD- repository (also 31 issues) and the third group or 12 questions were designed to test the demographic structure of the respondent.

From the 31 questions intended for the e-learning system and UGD repository, respectively, 4 were intended to determine the appropriate determinants and 3 were designed to determine the intention behavior.

The survey was conducted using Lime software for online survey and it was based on the determinants defined in this study. The time required to complete the survey was approximately 10 to 15 minutes. The survey included approximately 360 respondents, of which 138 responded, but 46 were partially and only 92 of the responses were completed. The following analysis is done only on those 92 responses.

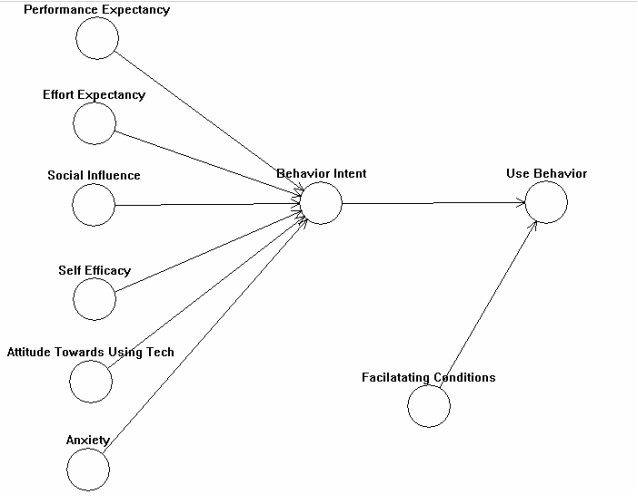

Figure 2 Our Research Model (Moran, 2006)

General demographics of the participants in the survey is shown in Table 6 and we see that most of the respondents are female, mostly between 30 and 44 years old and most of them have full-time work with more than 10 years' experience. Also, according to the analysis we conclude that most of the respondents are professors who teach more than 5 courses and use the e - learning system once or several times a day, but they use a repository usually once a week.

TABLE 6 DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Demographic characteristics	Responses	Occurrence	Percent
Gender	Male	37	40,22
	Female	55	59,78
Age	to 30	13	14,13
	from 30 to 44	45	48,91
	above 45	34	36,96
Working status	Part-time	5	5,43
	Full-time	87	94,57
Working experience	1-5 years	18	19,57
	6-10 years	28	30,43
	More than 10 years	46	50
Education level	Professor	54	58,70
	Assistant	33	35,87
	Lecturer	1	1,09
	Laboratory	4	4,35
Scope of work	0-1 course	1	1,09
	2-3 courses	13	14,13
	4-5 courses	35	38,04
	More than 5 courses	43	46,74
I use e-learning system	once or several a day	39	42,39
	once a week	37	40,22
	once a month	12	13,04
	once a year	3	3,26
	never	1	1,09
I use the repository	once or several a day	14	15,22
	once a week	25	27,17
	once a month	47	51,09
	once a year	5	5,43
	never	1	1,09

For the question, which is the largest barriers for using the e-learning system, most of the respondents, even 54.35% said that it is the time, which means that the respondents claim that they have no time to study and work on the system, because they have another work. Approximately 15.22% said that they needed technical support, 11.96% stated that the barrier is the low training etc. (Table 7).

TABLE 7 WHICH ARE THE LARGEST BARRIERS FOR USING THE E-LEARNING SYSTEM ACCORDING TO YOU?

	Frequency	Percent	Valid percent	Cumulative percent
TIME	50	54.35	54.35	54.35
TECHNICAL SUPPORT	14	15.22	15.22	69.57
COST	0	0	0	69.57
TRAINING	11	11.96	11.96	81.53
DOES NOT FIT MY PROGRAM	6	6.52	6.52	88.05
OTHER	11	11.96	11.96	100
Total	92	100	100	

That was for e- learning system, now in the following table (Table 8) are represented the largest barriers for using the UGD university repository. 52.17% said that it is the time, 18.48% said that they needed technical support, 8.70% stated that the barrier is the low training, 7.61% said that the system doesn't fit with the other systems they use, and the last 13.04% listed other reasons why they doesn't use the repository often.

TABLE 8 WHICH ARE THE LARGEST BARRIERS FOR USING THE UGD REPOSITORY ACCORDING TO YOU?

	Frequency	Percent	Valid percent	Cumulative percent
TIME	48	52.17	52.17	52.17
TECHNICAL SUPPORT	17	18.48	18.48	70.65
COST	0	0	0	70.65
TRAINING	8	8.70	8.70	79.35
DOES NOT FIT MY PROGRAM	7	7.61	7.61	86.96
OTHER	12	13.04	13.04	100
Total	92	100	100	

As one of the main reasons for not using e-learning, system is noted having many other commitments, and for the repository are listed technical inconsistencies of the system and the fact that the older professors have difficulty and ambiguities to work with the system, and they need many help.

These are initial results and detailed results will come in the following researches.

V. CONCLUSSION

We are living in a constantly evolving digital world. ICT has an impact on nearly every aspect of our lives - from working to socializing, learning to playing. The digital age has transformed the way people communicate, network, seek help, access information and learn. ICT in education is very important. ICT in education is the key to unlocking the skills and knowledge of our future generations of young people. It is the tool for learning for the 21st century (Kate McKenzie).

The quality of our work can be improved by using new ICT technologies we, if they are accepted and used by us. This and the factor time are the biggest reason why the uptake of ICT is mandatory in our University. That means that all the staff must have time to work with these systems.

Although the use of ICT is mandatory most of the staff says that they have no time, but that means that they don't want to do that and they have no reason about not using the corresponding systems.

About the issue what should be undertaken in order to accept a new technology, we can simple say that for one technology to be accepted by the employees, mandatory training, time, and above

all perseverance and desire to learn something new are required.

From the results, we will also see whether and to what extent UTAUT will be accepted for this type of information systems, in environment and conditions similar to higher education in our country, in conditions in which there is a lower IT culture. As the second result we expect to identify influential factors for the theory that most stands out in our environment. Based on this and other studies may be suggested expanding the factors that affect the theory with other factors that affect the environment similar to ours.

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