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INVESTIGATION OF USER REQUIREMENT AND UTAUT - THEORY IN WEB BASED LEARNING FOR GIFTED STUDENTS IN DEVELOPING COUNTRY

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ABSTRACT

Educational software needs and establishment requirements as a part of e-learning have become very crucial for modern societies. One of the most important used techniques is the web-based learning. Modern societies are divided into two types of students: i) Regular students, and ii) Gifted students. The later has various distinguished abilities compared with regular ones. In this work, a model to improve, establish and identify the needs and requirements for E-learning system for gifted students in developing countries is proposed. The proposed model is self-efficacy with UTAUT theory that is consists of five factors which are: i) Performance expectancy, ii) Effort expectancy iii) Social influence, and iv) Facilitating conditions, v) Behavioral intention and vi) Use behavior. The proposed model also aims to explore the key factors that affect gifted students' acceptance of web-based learning. The proposed model is applied in Jordan where web-based learning concept was introduced in the 90s. The results gained from applying the proposed model in Jordan shows that the proposed model is accepted.

Keywords: *Web-Based Learning, Learning Management Information System, User Requirement, UTAUT theory, Self-efficacy, Gifted and Regular Students*

1. INTRODUCTION

Technology has an enormous impact on different fields like business, education and industry. Education has challenged experiences in the methods of providing or presenting the information like web-based learning (WBL). Thus, the use of technology in education is a crucial means to enhance the achievements for talented students[1]. Spending attention for gifted students to provide them with compatible technology helps to development of society or the country[2].

Gifted students have the human traits of above-average abilities, a high level of task commitment, and a high level of creativity and therefore these learners should be offered a wide variety of educational opportunities and services that are not ordinarily provided through regular programs of instruction [38]. Thus, WBL should be specifically designed for gifted students by considering the characteristics of these gifted learners.

Management information systems (MIS) as part of technology have been widely become a basic facility in which they enhance the academic and governance activities of an institution, indicated for the important role of learning management system, it provides both teachers and students with new technologies, as well as teacher's needs, motivations, professional development in using new technologies to describe the curriculum become more efficient [3, 4].

Indeed, MIS play an increasing role in the education and learning sector. Not only they are used in learning to create Learning Management Systems (LMS). Al-Shaikh [39] created an Online Registration System to be used to enroll students for the General Associate-Degree Examination

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(GADE) in Jordan. The system consists of an end-user section that enables users to log into the system, register students, and get the required statistics. It also includes an administrative section that is used by the system's administrator to control the registration process and monitor the progress of work and how college registrars are working with the system. The system was designed as a three-tier web-based application that is used by users all over the country.

The Challenge of creating a good technology for gifted students needs an opportunity to explore their interest in depth while polishing a variety of technology skills to be creative and productive, technology can be used in different ways[5-7].

In this work, the researcher evaluates web-based learning for gifted student's developing countries. In literature there are limited studies about web-based learning in developing countries. The available studies do not provide any concrete model or discussion about using web-based learning for gifted students, and the factors that enhances the learning process for this type of students.

The aim of this paper is to investigate the factors and relations of web-based evaluation among intelligent students; which leads to improve the quality of education for students, as well as satisfying diverse learning skills, supporting instructors unfamiliar with web technologies, and ensuring consistency across departments and universities.

Web based learning can be defined as a comprehensive e-learning & educational management platform that include learning management system (LMS), Content management system (CMS), Instructional management system (IMS), and students information system (SIS) all seamlessly integrated in one solution[4, 8, 9]. Also, it illustrates the important of user requirement in improving teaching and learning process for gifted students in developing countries.

There are studies explaining the performance expectancy, effort expectancy, on users acceptance of technology [10]. And based on literature, there is no studies about these suggest factors on gifted students.

However, limited number of studies have been found in the literature that consider the evaluation of WBL for students [17,37]. Moreover, it appears that gifted students have not been considered in relation to the WBL system due to the designing WBL is oriented to the user in general [17].

In countries that are not fully developed such like Jordan, WBL has not been oriented for or developed to match the needs of gifted students who have distinguished capabilities compared to regular students. Thus, the acceptance of the existing WBL systems needs to be evaluated to accommodate the requirements of gifted students. For example, it has been suggested that WBL applications for gifted students should have more features to enhance the WBL system for gifted students to enhance motivation, self-efficacy, and group discussion among others. The lack of studies on the efficacy of the WBL system for gifted students is obvious in developing countries such as Jordan. Therefore, they should have more appropriate framework to enhance their learning process.

The main objective of this study is to identify the factors that affect gifted student's acceptance of web-based learning moreover to establish and identify the needs and requirements for E-learning system for gifted students in developing countries

The elements that are discussed and examined in this work are consisting from: i) Performance expectancy, ii) Effort expectancy iii) Social influence, iv) Facilitating conditions, v) self-efficacy, and vi) user requirement.

This paper examines the following five hypotheses:

- H1: Performance Expectancy (PE) has significant effect on behavioral intention
- H2: Effort Expectancy (EE) has significant effect on behavior intention.
- H3: Social Influence (SI) has significant effect on behavior intention.
- H4: Facilitate Condition (FC) has significant effect on use behavior.

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- H5 Self-efficacy (SE) has significant effect on use behavior

In a similar context, Al-Shaikh et al. [40] created an information system to measure the influence and penetration of the social-media accounts of mainstream Arab news agencies. The authors created a framework to study the impact those pages have on followers all over the Arab world. To do so, authors defined a number of measures (or factors) that were used to evaluate how much mainstream news media are followed on Facebook.

The research questions in this paper are:

1) What are the major factors affecting gifted students' acceptance of Web based learning in developing countries?

2) How to propose appropriateness Web-based learning system for gifted students in developing countries?

3) to establish and identify the needs and requirements for E-learning system for gifted students in developing countries.

The rest of this paper is organized as follow: Second section contains several review sub-sections about the topics that are related to the proposed model. Section three contains the proposed model along with testing results. Finally, Section four concludes the paper.

2. GIFTED AND REGULAR STUDENTS

Despite the limitations and restrictions to improve education sector in developing countries, the education has been paid special attention to gifted students and established Centers for Caring Gifted and Talented Students and resource rooms supervised by special education teachers because this student should have suitable classes to meet their needs and abilities[11, 12].

Thus, teachers of gifted students should be prepared and trained to meet the special needs of disabled learners in general. Furthermore, their special education teacher programs offered the universities have lack of courses and training in education of giftedness; however, these programs are not designed for counseling students who are gifted and talented or included special courses in counseling this group of students. Moreover, those teachers are not able to teach or meet educational needs of this population. On the other hand, the regular teachers lack the skills needed to teach this group of students and challenge their advanced cognitive abilities. Indeed, these teachers prepared and trained to teach regular students not students who are gifted and talented [11-13].

Moreover, there are differences between gifted and regular students, which are of interest in the learning and teaching of gifted students as illustrates on Table 1. The suitable detection of these features is required for the development of appropriate curriculum for these types of students.

Table1: Characteristic of gifted and regular students

	Gifted students	Regular students	Ref.
Intelligence qualified	More	Less	[14]
Systematic	More	Less	[15]
Social	Less	More	[16]
Activity	Meeting, playing with each other.	Normal standard students	[17]
Long attention	Long attention in problem solving and creative thinking	Normal	[18]
Hypothesis	Build hypothesis to solve	Very less	Experience as teacher for gifted students
Challenge	More	Less	Experience as teacher for gifted students

3. IDENTIFYING USER NEEDS AND ESTABLISHING REQUIREMENTS FOR GIFTED STUDENTS

Identifying user needs that means understand as much as possible about the users, as

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well as their work and the context of their work, therefore Web Based learning system under development would support users to achieve their goals[19]. Then Establish requirements: Building upon the needs identified, produce a set of requirements. Moreover, requirement is a statement that specifies what an intended product should do, or how it should perform[20].

In this study, the researcher imposed four questions in order to gather specific requirements that mainly related to parents involvement in web based learning and adopting of social media in web based learning such as chatting systems and YouTube channels. Many studies indicated to the paramount importance of sending an SMS to parents stating the exam time as a reminder; it can improve the performance of the students and their exams grade. The major advantage of SMS is that it is available and cost effective, as most parents have their own phones to and are reminded about the student's exam time. The characteristic of gifted students shows the acceptance for their family orientation in studies, it can also guide them to critical thinking and problem solving [21-24].

4. PROPOSED MODEL OF WEB-BASED LEARNING FOR GIFTED STUDENTS

This section illustrates the most used factors that affects web-based learning acceptance for gifted students. These factors are i) performance expectancy, ii) effort expectancy iii) Social Influence, and iv) Facilitating Conditions on behavioral intention and use behavior. Moreover this paper illustrate user requirement to improve the learning process for the gifted students in developing countries. This model postulates that two direct variables to determine the behavioral intent of technology.

4.1 Performance expectancy

Is the degree to which an individual believes that using the system will help him/her to attain gains in job performance?

The Performance Expectancy (PE) has sign This construct, within each individual model, was the strongest predictor of intention and remained significant at all points of measurement in both voluntary and mandatory settings[25, 26]

Based on the literature, the influence of performance expectancy on behavioral intention is hypothesized to be moderated by gender and age; such an effect would be stronger for men, particularly younger worker.

4.2 Effort expectance:

Is the degree of ease associated with the use of system. The constructs in the other models that capture the same concept are: perceived ease of use technology acceptance model,(TAM), and complexity in Diffusion of innovation model theory. The construct in each individual model was significant in both voluntary and mandatory settings, and as expected from the literature it was significant only during the post training measurement. Based on the literature, the influence of effort expectancy on behavioral intentions is hypothesized to be moderated by gender, age, and experience; such an effect would be stronger for young women and older workers at early stages of experience[25, 26]. In this study the researcher focus on explaining the relationship between effort expectancy on behavioral intention on using technology for gifted students in developing countries.

4.3 Social Influence (SI)

Is the degree to which an individual perceives that important others believe he/she should use the new system? Similar constructs are represented in existing models: subjective norms in Theory of reasoned action, Theory of reasoned action two, Theory of planned behavior, and combined TAM-TPB, social factors Model of Personal Computer Utilization (MPCU), and image (DOI)[27].

The comparison between models found that this construct behaved similarly; it is insignificant in voluntary contexts and becomes significant when use is mandatory. The literature explained that in mandatory contexts the effect is attributed to compliance and appears to be important only in the early stages of individual experience and when rewards/ punishment are applicable; in contrast, social influence in voluntary contexts operates by influencing perceptions about the technology (what is known as internalization and identification)Equally, based on the literature, the influence of social influences on behavioral

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intentions is hypothesized to be moderated by gender, age, voluntariness and experience; such an effect would be stronger for women, particularly in mandatory settings in the early stages of experience [25, 26][28]

4.4 Facilitating Conditions (FC)

Facilitating Conditions (FC) indicate the degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system. This definition captures three different constructs in existing models: perceived behavioral control (TPB/DTPB and combined TAM-TPB), facilitating conditions (MPCU), and compatibility (DOI). The comparison between models revealed that the relationship between intention and this construct in each model is similar in both voluntary and mandatory settings in the first training period but such influence disappears in the second period (one month after implementation)[28-30]

Based on the literature, when both performance expectancy and effort expectancy constructs are present, facilitating conditions become insignificant; and consistent with TPB/DTPB facilitating conditions are also direct antecedents of usage (an attribute found also in MPUC). This effect is expected to increase with experience with technology as users find multiple avenues for help and support. Hence, the influence of facilitating conditions on usage is hypothesized to be moderated by age and experience; such an effect would be stronger for older workers, particularly with increased experience. The empirical test of the original data (collected from four organizations) and the cross validation using new data (collected from two additional organizations) provided strong support for UTAUT. The new model was able to account for 70 percent of the variance in usage intention, which is considered a measure improvement over any of the original models where the maximum was around 40 per cent. The authors acknowledged a limitation of content validity due to measurement procedures and recommended that future research should be targeted at more fully developing and validating appropriate scales for each of the constructs with emphasis on content validity and revalidating or extending UTAUT with the new measures [28, 31, 32]**.** The following section provides a discussion of studies adopting the UTAUT framework in their research design.

4.5 Self-efficacy

Computer self-efficacy (SE) is defined as the beliefs one's have about the ability to use computers ineffectively[33]. Furthermore, self-efficacy is being used as "the confidence in one's ability to perform certain learning tasks using in web-based environment". It recommended that self-efficacy have significant indirect influences on behavioral intentions. It recommended that self-efficacy have significant indirect influences on behavioral intentions. This study indicated that self-efficacy has significant positive influence on use behavior.

Furthermore, there are a lot of studies that have indicated that computer self-efficacy influences performance or behavior, including behavioral intention or attitude. Moreover, according to the researcher a significant influences has been made by the Internet self-efficacy on behavioral intentions to usage Web-based learning [29, 34-36].

Figure 1 shows the proposed model of web-based learning for gifted students.

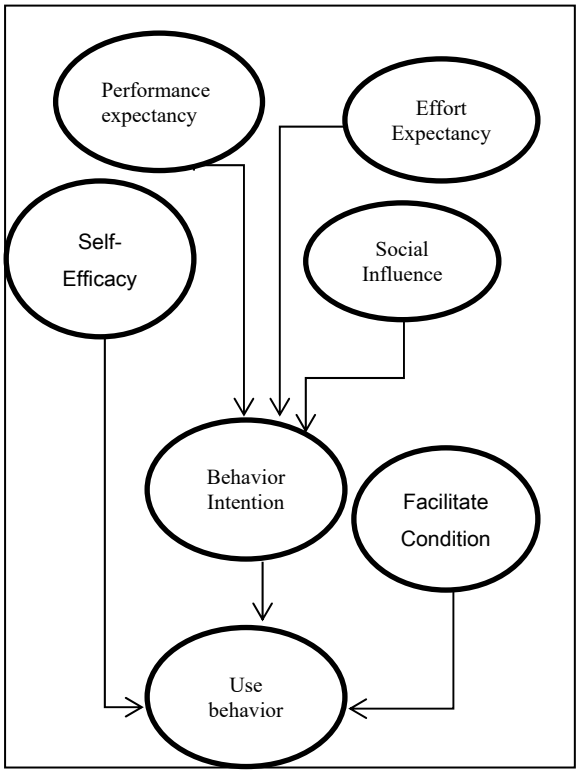

Figure 1: Proposed Model Of Web-Based Learning For Gifted Students

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5. RESULT DISCUSSION

In this section, we present the implementation of the model, as well as the results of model application.

5.1 Descriptive Statistics of the user requirement in Web based learning

The researcher imposed four questions in order to gather specific requirements that mainly related to parents involvement in web based learning and adopting of social media in web based learning such as chatting systems and YouTube channels

As shown in Table 2 the first two questions are related to parent's involvement in web based learning. the majority of respondents prefer to send SMS to parents once the results are published (445 respondents, 85.1%), whereas the lowest percentage as 65.4% of respondents are prefer to send SMS to parents reminding them of the exam time. The last two questions that are related to the adoption of social media in web based learning such as chatting systems and YouTube channels. Both questions almost have the same percentages. The respondents prefer to chat with colleagues and teachers in web based learning and use YouTube via web based learning as 71.3% and 71.7% respectively.

Table 2: Descriptive Statistics Of The User Requirement In Web Based Learning

Items		Frequency	Percent	Mean
Is it important in Web based learning to send SMS to parents once the results are published?	yes	445	85.1	1.15
	No	78	14.9	
Is it important in Web based learning to send SMS to parents reminding them of the exam time?	yes	342	65.4	1.35
	No	181	34.6	
Is it important to chat with colleagues and teachers in web based learning?	yes	373	71.3	1.29
	No	150	28.7	
Is it important to use YouTube via web based learning?	yes	375	71.7	1.28
	No	148	28.3	

5.2 Path coefficients assessment and Hypotheses Testing

In this section, the researcher attempts to realize identifying the factors that affecting the gifted student acceptance of Web based learning). In this regard, this study has proposed a set of hypotheses, the structural model is used to test hypotheses. As shown in Table 3 the results of the structural model, path coefficient values are shown for every path, or relationship, between each independent construct and its dependent construct. In order to test the significance of the path coefficients in the structural model, t-statistics for all path coefficients were extracted using abootstrapping analysis in SmartPL.

Table 3: Structural Model: Path Coefficients And Hypothesis Testing

	Hypothesis	Beta	Std Error	T-Value	Decision
PE -> Bi	H1	0.287	0.048	***5.997	Supported
EE -> Bi	H2	0.093	0.035	***2.636	Supported
SI -> Bi	H3	0.114	0.046	***2.489	Supported
FC -> USE	H4	0.061	0.052	1.162	Not supported
SE -> USE	H5	-0.116	0.051	***2.287	Supported

Notes: t values are calculated through bootstrapping routine with 523 cases and 5000

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samples. *P< 0.1, ** P < 0.05, ***P < 0.01 (One-Tailed test)

The main the gifted student acceptance of Web based learning model proposed in this research comprised of 4 constructs that work in different causal levels. As shown in Table 2, all hypothesis are supported the theoretical foundation except H5. Thus, after structural equation modeling by PLS and based on the research hypotheses, each main theoretical association is figured as a model to be analyzed during the model development and validation.

H1: The Performance Expectancy (PE) has significant effect on behavioral intention.

This section investigates the relationship between the Performance Expectancy (PE) and the behavioral intention constructs. To support the investigation, the above hypotheses were tested as depicted in Figure 2. Results from the PLS Analysis showed that the Performance Expectancy had a significant positive effect (B= 0.287, p<0.01) on the behavioral intention

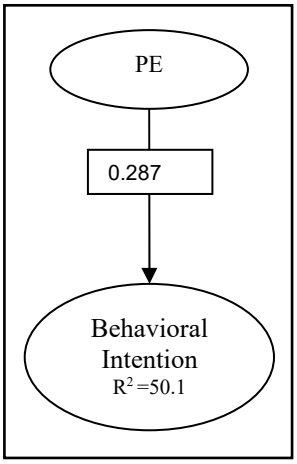

Figure 2: Performance Expectancy

H2: The Effort Expectancy (EE) has significant effect on behavioral intention.

This section investigates the relationship between the Effort Expectancy (EE) and the behavioral intention constructs. To support the investigation, the above hypotheses were tested as depicted in Figure 3. Results from the PLS Analysis showed that the Effort Expectancy (EE) had a significant positive effect (B= 0.093, p< 0.01) on the behavioral intention.

H3: the Social Influence (SI) has significant effect on behavioral intention.

This section investigates the relationship between the Social Influence (SI) and the behavioral intention constructs. To support the investigation, the above hypotheses were tested as depicted in Figure 4. Results from the PLS Analysis showed that the Social Influence had a significant positive effect (B= 0.114, p< 0.01) on the behavioral intention.

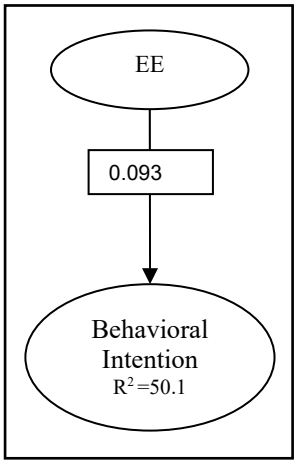

Figure 3: Effort Expectancy

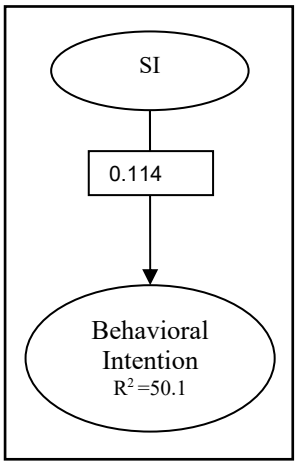

Figure 4: Social influence

H4: The Facilitating Conditions (FC) have significant effect on use behavior.

This section investigates the relationship between the Facilitating Conditions (FC) and the

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use behavior constructs. To support the investigation, the above hypotheses were tested as depicted in Figure 5. Results from the PLS Analysis showed the FC had no significant effect (B= 0.0.061, p>.10) on the use behavior.

H5: Self-Efficacy (SE) has significant effect on behavioral intention

This section investigates the relationship between the Self-Efficacy (SE) and the behavioral intention constructs. To support the investigation, the above hypotheses were tested as depicted in Figure 6. Results from the PLS Analysis showed that the Self-Efficacy had a significant positive effect (B= -0.116, p< 0.01) on the use behavior.

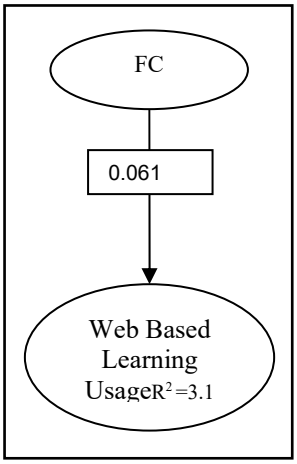

Figure 5: Facilitate condition

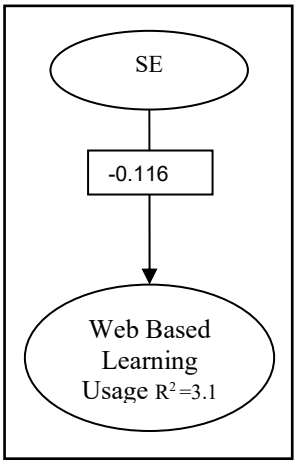

Figure 6: Self Efficacy

6. CONCLUSION AND FUTURE WORK

This paper has described the nature of this research as a descriptive study using a quantitative survey method. It also outlined the methodology employed to investigate the factors performance expectancy, effort expectancy, social influence, facilitate condition and self-efficacy that effect on user (gifted students) acceptance of WBL.

Therefore, this paper has explained the usefulness of user requirement for gifted students in developing countries especially Jordan. The population and means for obtaining a representative sample explain along with the data collection method. In addition, to investigate the difficulties that faced by user acceptance of Web based learning for gifted students.

As a future work, more and more factors can be tested and investigated, as well as measuring their influence using non-traditional methods. For instance, optimization techniques incorporated with metaheuristic algorithms, such as the Grey-Wolf Optimizer [41], can be implemented to predict the effect or influence of these very factors or different factors.

Furthermore, more computing techniques can be also applied and used in the investigation and analysis, such as modeling and simulation [42]. Defeasible description logic [43] can also be used to represent the knowledge acquired by analyzing how such systems work, as well as making decisions based on the acquired knowledge.

Finally, it is worth to mention that LMS can benefit a lot from the widespread of computers and the ubiquity of computing in all aspects of our lives, as well as the adaptation of cloud computing and the widespread of databases in almost all institutions, schools, and educational centers [44, 45]. This can also be further studied as an additional factor which influences the education of students, and specifically gifted students.

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