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Collaborative Learning and Technology Usage for Social Intelligence Development in Education

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Abstract
The current study aimed to find out the relationship between the use of different e-learning tools and cooperative learning in developing social intelligence among students. The study sample consisted of 84 female students from Qassim University - College of Education are volunteered to answer the study tools, a questionnaire and pre and post tests. The results of this study showed a positive effect of using the collaborative e-learning tool on the levels of social intelligence among the female students at the College of Education. The study suggests many recommendations, the most important one is, e-learning tools such as the Blackboard application and others like both Microsoft Office and Google apps must be activated to enhance knowledge sharing and to build the students' personalities in all mental, skill and emotional aspects.
Keywords: E- Learning, collaborative learning, social intelligence, apps
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Introduction

Educational institutions are no longer the only educational environment to provide education. Hence, educators are constantly searching for the best means to provide an interactive educational environment to attract the interest of learners and encourage them to exchange views and experiences. E-learning is one of the learning methods that make learners the focus of the learning process. On e-learning platform, learners collaborate to obtain information, exchange it, and offer ideas to solveproblems without committing to a specific place or time to experience the learning process. [1]. In addition, e-learning has goals that must be achieved to benefit the educational process, including the provision of an educational environment rich in resources that serves the educational process for all its axes. Technological innovations in all educational institutions help prepare a generation of learners capable of dealing with modern technological innovations [2].

Since students nowadays are digital natives accustomed to learning in an active learning environment, interactive and collaborative e-learning environment beyond the traditional LMS is required by both learners and educators. Therefore, learning becomes a combination of cognitive and constructive process with social process. Social software involves shared participation in the creation of information, encouraging more active learning and supporting better group interaction [3]. Indeed, group-based activities and interactions are increasingly important for 21st-century learners [4]. Development of work-related competencies in students depend on the 'learning environment and learning methods'. Many researchers have highlighted the importance of helping learners develop skills related to teamwork and collaborative knowledge building, which are all linked to collaborative learning.

The collaborative learning environment is one in which the various tools and capabilities of the Internet can be used appropriately in developing various skills and to serve the collaborative learning environment. The concept of collaboration refers to working in a group of two or more individuals to accomplish a common goal, considering the assessment of the contributions of each individual in the group. This works to consolidate relations among the group members. Collaborative learning is one of the most important strategies that have proven their distinction and importance, providing participants with an opportunity to learn and share various sources of information as well as experiences among them. Knowledge building methods [5]. Many applications and tools can be employed in e-learning and distance learning to overcome many of the problems of the current educational reality as well as to continue education and emergency evaluation [6] (see Figure 1).

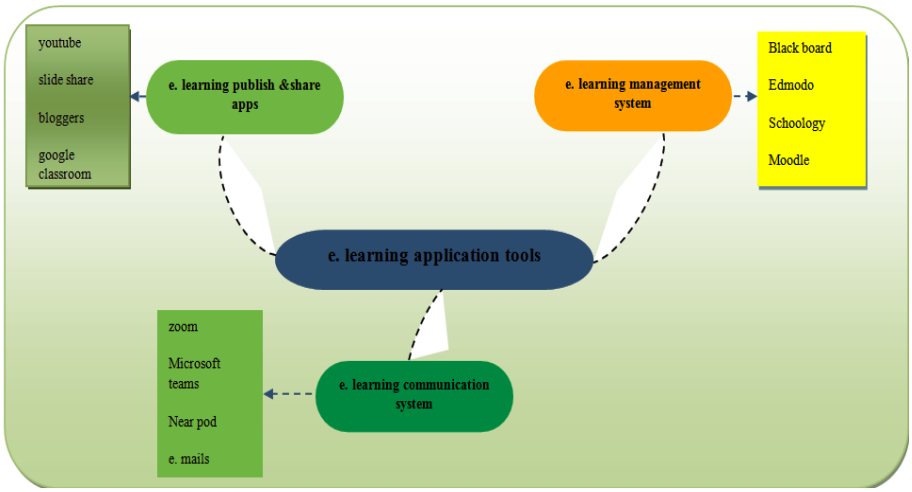

Fig. 1.the web2.0 tools in collaborative learning

Web 2.0 tools on the participatory education level provide learners greater freedom to express their opinions, innovate ideas, discover, analyse, and evaluate information. They facilitate synchronous and asynchronous communication and provide tools for participatory learning such as online forums, chat rooms, comment feature on peer contributions, and editors. Web Participatory. In addition to Wikis, blogs, social bookmarks, and social networks characterized by interaction and communication, a virtual medium of the latest technologies are used in virtual collaborative education and cooperative training, which constitutes the second generation of e-learning. Furthermore, social intelligence, according to the original definition by Edward Thorndike, is 'the ability to understand and interact with men, women, boys and girls, and to act wisely in human relationships' [7]. Social intelligence or interactive intelligence is also equivalent to acting intelligently in interpersonal relationships, and it is one of the types of intelligence specified in Howard Gardner's theory of multiple intelligence, which is closely related to the theory of the mind. Some authors restrict the definition to dealing only with knowledge of social situations, perhaps more properly known as social cognition or social marketing intelligence. This pertains to orientation in psychosocial advertising, marketing strategy and tactics. According to Sean Folino, social intelligence is the ability of a person to fully understand their environment and act appropriately in a socially successful behaviour. The Social intelligence quotient (SQ) is an abstract statistic similar to the 'standard points' approach used in IQ tests with a mean of 100. Unlike the standard IQ test, it is not a fixed model. It inclines more towards Piaget's theory which states that intelligence is not a fixed trait but rather a complex pyramid of information-processing skills that underlies the adaptive balance between the individual and the environment. Thus, an individual can change their attitude and behaviour towards their complex social environment.

Osullivan (1967) [8] studied social intelligence and presented his research on social behaviour, which represents social intelligence in the behavioural context of mental abilities, and later the Guilford Six-Factor Scale of Social Intelligence was developed [9]. In his model of multiple intelligences, Gardner presented social intelligence as a personal intelligence that includes many social aspects and indicated that it is a relatively broad concept of capabilities, including humanity, motives, mood and psychological state of others, the ability to build successful relationships with others and to work as an active member of the team and the ability to show compassion towards others. Therefore, the concept of social intelligence comprises two aspects: the cognitive aspect which refers to the ability of an individual to understand or interpret the verbal and non-verbal behavioural symbols of others; its representation through perception, insight, social knowledge and the behavioural aspect, which refers to the extent of an individual's effectiveness and personal effects in the event of interaction with others.

1.2 Research Problem

Although many studies have been conducted on social intelligence and collaborative e-learning apps in different disciplines and by many researchers, there are still gaps and unanswered questions. It is important to analyse the context with a proven methodology and explore its potential consequences for individuals and groups. Contemporary education should equip the student with the skills to acquire information, encourage curiosity, and foster critical thinking, creating conditions for a new approach to education. In our search, the following research questions were formulated to be answered:

1- How does social intelligence relate to students' academic and professional achievement through collaborative e-learning apps?
2- Do external and internal factors in collaborative e-learning apps enhance or reduce the efficiency of

social intelligence?

3- How technology and the spread of collaborative e-learning apps can enhance the motivation and development of students' social intelligence?

2. Theoretical Framework for Research

Technology Acceptance Model-TAM

Technology Acceptance of the Davis Business Model on developing a framework for evaluating technology acceptance model TAM-Model Acceptance Technology as a method for measuring technology acceptance. There was a positive trend towards it and consequently the desire or motivation to use it. The latest and amended version of the Technology Acceptance Model (TAM) [10] consists of the following factors:

Behavioural factors

Behavioural Variables (BV)

Perceived Ease of Use (PEOU): it indicates the degree to which an individual believes that using technology is easy and does not require any effort or suffering.

Perceived Usefulness (PU): it is the degree to which an individual believes that the use of technology can enhance and improve their performance at work. Behavioural Intention (BI): The behaviour that is planned by the individual and is anticipated through perceived ease of use and perceived benefit.

Actual Use (AU): The actual practice of using technology that is predicted through the behavioural intent.

External Variables (EV) such as demographic variables. These external variables affect the PEOU and PU [11].

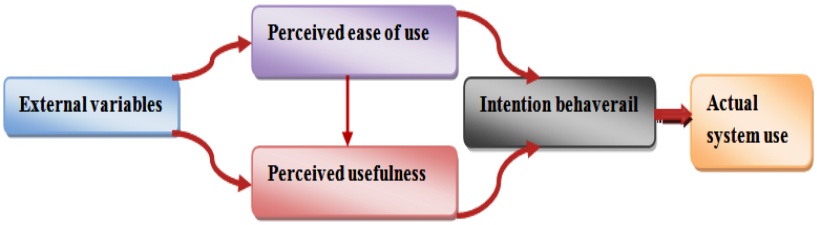

figure 2. The latest version of the technology acceptance model [12]

The model assumes that the acceptance of technology from individuals is determined by perceived benefit and perceived ease of use, and these two factors determine the behavioural intentions towards the use of technology and its actual use. Technological acceptance is further affected by a set of external factors. The technology acceptance model comprising electronic learning applications for the learner is based on the Theory of Reasoned Action (TRA), which considers that an individual's direction towards performing the intended behaviour is determined by the set of beliefs they harbour about the consequences of performing the said behaviour and their self-assessments of these consequences [13]. According to this theory, the use of technology is determined through the behavioural intent to use that also determines the individual's actual use of the technology through the benefit that they perceive from it. The greater the perceived benefit from using the system, the greater the degree of intent to use it. Due to the dependence of the technology acceptance model of behavioural factors and external factors, the model was based on the explanatory theory of the planned behaviour [14].

Decomposed Theory of Planned Behaviour (DTPB)

This theory assumes that an individual's rational behaviour collects and evaluates all information and considers the effect of their potential actions. Furthermore, the user's motivation for technology can be explained by three factors: the perceived benefit, the ease of use, and the direction towards this technology [15]. Al-Farih (2015) [16] and [17] claimed that the theory of planned behaviour is a successful theoretical framework for investigating the behavioural intentions of users. It predicts actual user behaviour, given that the more technology is viewed as uncomplicated, the more likely it is to be accepted and used by a high number of users.

Self-Determination Theory (SDT)

It provides a mature and empirically validated approach to examining the factors that promote sustained motivation and well-being. Although a nuanced theory, in its broadest sense, SDT identifies a small set of basic psychological needs deemed *essential* to people's self-motivation and psychological well-being (and whose neglect or lack is associated with ill-being and distress) [18]. These basic needs are as follows:

- **Autonomy**: having agency, acting in accordance with one's goals and values
- **Competence**: feeling able and effective
- **Relatedness**: feeling connected to others, a sense of belonging

3. Research Methdology

Methodological Procedures for Research

First, a technology acceptance model was defined to investigate the effectiveness of e-collaborative learning technology based on mobile learning applications with respect to the social intelligence of female students. The current research depended on the following:

1. A semi-experimental approach to measure the impact of the interaction between the independent variable (environment of collaborative e-learning apps) and the dependent variable (social intelligence theory levels)
2. An experimental design of search used by the researchers on two pre-application and post-application experimental groups with each evaluation card and test completion

Second, the experimental processing of the research

3.1.Research Sample

The research sample included 84 female students specialized in educational technology from the Department of Education Technology and Development of Educational Thinking from the Department of Educational Assets, Faculty of Education, Science and Arts, Qassim University, Saudi Arabia. The levels of social intelligence during and after using collaborative e-learning apps were measured through experimental processing.

3.2. Tools of the Research

Measuring the SI levels: the first version of this tool was represented through six fields (Perceived ease of use, Perceived usefulness, Intention to adopt, Mobility, Personalisation, and Collaboration). It contained 30 testing passages in order. A four-step scale was used to measure the degree of SDT and collaborative e-learning skills from the students' perspective, with degrees of Very large (5), Large (4), Moderate (3), Little (2). The scale's internal consistency was computed by finding both the correlation of each paragraph of the scale and the total grade of the domain to which it belongs. The stability of the scale was calculated using Cronbach's alpha coefficient. Cronbach's alpha coefficient was calculated for each subscale and the scale as a whole. The results are presented in the Table 1.

Table 1 indicates that the total value of the stability of the whole scale is SIGNIFICANT AT 5% AND 1% LEVEL, which assures that the scale has a high degree of stability. After making scale's validity and stability certainty, it becomes applicable.

Table 1. Results of the Cronbach's Alpha calculation of questionnaire axes and questionnaires as a whole

Vairables	M	SD	PU	PUN	IN	M	P	C	WS
PU	.33	.28	1						
PUN	.52	.40	89**	1					
IN	.32	.33	.82**	.83 **	1				
M	.38	.29	.84**	88**	72**	1			
P	.35	.31	.85**	86**	83**	81**	1		
C	.22	.35	.48*	46*	46*	48	61**	1	
WS	.35	.29	.92**	93**	87**	67**	82**	92**	1

****.Correlation is significant at the 0.01 level (2-tailed); *. Correlation is significant at the 0.05 level (2-tailed) PU= Perceived Ease of Use; PUN=Perceived usefulness ; M=Mobility; IN=Intention to adopt; P = Personalization; C = Collaboration; WS = The Whole of Scale**

Levels of social intelligence:

The scale aims to measure the levels of social intelligence of the female students. According to this aim, it comprised 52 paragraphs distributed through five specific areas related to social intelligence and divided into six sub-components of the scale which are as follows: Social Processing Information, Social Skills, Social Self-efficacy, Social Awareness, Empathy and Social Problem-solving. The scale was presented in its initial form a group of 10n arbitrators from the College of Education.

The validity of the social intelligence scale: the researcher verified the global validity of the scale using the exploratory factor analysis and the results are shown in Table 2. Cronbach's alpha coefficient was utilized to calculate the stability factors of each subscale and the scale as a whole. Table 2 shows that the total value of the stability of the whole scale as 0.81. This assures that the scale has a high degree of stability. After making of the scale's validity, stability certainty, it becomes applicable.

Table 2. The contributions and the saturations of the components of the social intelligence scale

SSample size		Social Processing Information	Social Skills	Social Self-efficacy	Social Awareness	Social Empathy	Social Problems Solving
==84	CONTRIBUTION	69	52	38	72	71	71
	SATURATION	84	73	52	85	84	84
	The variation. ratio (63.6%), and the latent root (3.64)						

Table 2 shows the saturation of all components on a single general factor with a latent root 3.64 and explains 63.60% of the variance with saturations on this factor confined to 0.52 for self-efficacy and 0.85 for social awareness.

Table 3. Results of Cronbach's Alpha Calculation Process

Domain	Coefficients
1- Processing Information	0.65
2- Social Skill	0.85
3- Social Self-Efficacy	0.73
4- Social Awareness	0.74
5- Social Empathy	0.78
6- Social Problem-solving	0.85
The Whole Scale	0.81

It is evident from Table 3 that the measure of social intelligence has high stability coefficients, as the alpha coefficient values are limited between 0.65 and 85.0 for the scale. Therefore, all the previous procedures indicate that the social intelligence measure has good reliability and validity indicators, which confirms its suitability for use in the current study.

Result and Discution

The researcher examined the study hypotheses to answer the research questions; the results were as follows:

The results for the first hypothesis: The first hypothesis states that "there is a statistically significant positive correlation between the components of social intelligence and collaborative e-learning apps among the students at the College of Education, Kindergarten at Qassim University. To test the validity of this hypothesis, the Pearson correlation coefficient was used between social intelligence (components and overall score) and collaborative e-learning (components and overall score). The results are as shown in Table 4.

Table 4. Correlation coefficients between the components of social intelligence and the components of the collaborative e-learning environment

Sample size	e-learning collaborative apps	Social Intelligence Vairables						
==84		**Social Processing Information**	**Social Skills**	**Social Self-efficacy**	**Social Awareness**	**Social Empathy**	**Social Problems Solving**	**The whole of scale**
	Perceived ease of use	49*	41*	47*	51*	61*	.38*	.70**
	Perceived usefulness	47*	43*	41*	3*	49*	48*	51*
	Intention to adopt	.57*	.55**	.52**	.65**	.58**	.59**	.53**
	Mobility	.67**	.64**	.68**	.67**	.62**	.61**	.65**
	Personalization	.57**	.59**	.51**	.59**	.59**	.59**	.58**
	Collaboration	.62**	.62**	.63**	.62**	.67**	.65**	.73**
	the whole of scale	.61**	.66**	.63**	.76**	.69**	.64**	.72**

*** Statistically significant at (0.05) level & **statistically significant at (0.01) level**

It is evident from Table 4 that there is a statistically significant positive correlation between social intelligence with its various components and those of the e-learning environment among students at the College of Education, Kindergarten, Qassim University. Path analysis was used to identify the relationship paths between the components of social intelligence and those of the collaborative e-learning environment as a total degree.

This resulted in the development of the following model for students of the College of Education, Kindergarten, Qassim University.

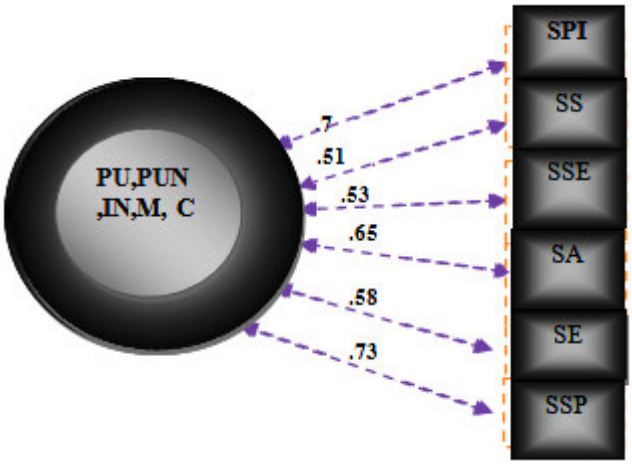

Fig. 3: Path analysis model for relationships of the components of e-learning to the components of social intelligence

The multiple correlation coefficient (R) for the previous equations was 0.59, which is high and confirms the presence of a large degree of overlap between the components of social intelligence and emotional intelligence. It is evident from the analysis results that collaborative e-learning tools include numerous social skills, and these skills require the individual to have the verbal ability to interact socially with others, manage discussions and social dialogues and successfully perform in leadership roles. They also help an individual initiate conversation and maintain contact with group members. Therefore, collaborative electronic learning contributes to influencing students and helps them acquire various social intelligence skills that are essential in personal acceptance and employment later.

The results of the second hypothesis and their interpretation: there are differences of statistical significances, a 0.5 degrees difference in the students' grades, in the social intelligence scale between the pre- and post-application situations. The results seem to be in favour of post-application. The statistical value (T) was calculated to determine the significance of the differences between the average of pre- and post-application.

Table 5. Examination (T) of results to find the differences between the average of pre- and post-application of social intelligence

Variables	Pre-test average	SD PRETEST	Post-test average	SD POSTTEST	T. VALUE	IG.
Information Processing	9 .1	1.3	31.2	.34	23.1	0.01
Social Skill	111.3	129	29.4	.19	28.1	002
Social Self-efficacy	113.3.	1.45	50.1	.45	27.2	001
social awareness	113.2	1.72	35.1	.91	24.3	.00
Social empathy	111.2	1.25	29.1	1.55	25	.001
Social Problem-Solving	9.1	1.44	25.1	1.47	4.1	.003
The whole scale	67.2	1.78	200	1.21	53.4	.00

The results in Table 4 indicate that the calculated value (T) is greater than the tabulated value (T) at 0.05 at each level of the social intelligence before and after application; this is in favour of post-application. The researcher attributes this to the variety of services that can be provided by e-learning environments in the field of cooperative learning, allowing students the freedom to learn and collaborate through the management tools system and other shared applications. This can occur through any place, time, and accessibility of educational information and expertise in the quickest way together as teams. Students can explore the information themselves and follow the training exercises. They can also share their experience through discussion groups and wiki or through Microsoft applications or Google applications. Students can also post the exchange, save and retrieve files and resources without the need to ask for the help of programmers. This will lead to a more comprehensive realization of the vitality of education, according to the needs of the students. It would help the learner pursue their learning on the basis of previous experiences and skills, which will further enhance the

levels of social intelligence. Furthermore, this collaborative experience can enhance self-confidence, a sense of others and a sense of self-worth, which will provide the student job-acceptable skills for future orientation.
The third hypothesis: The employment e-learning collaborative applications in the developing social intelligence levels achieved an impact of at least 1.2.

Table 6. Black's earning rates for the six levels of social intelligence and the whole scale

Variables	Final grades	Pre-test average	Post-test average	Black e-value
Information Processing	45	9.1	31.2	1.23
Social Skill	40	11.3	29.4	1.22
Social Self-efficacy	60	13.3.	50.1	1.28
Social Awareness	50	13.2	35.1	1.2
Social Empathy	40	11.2	29.1	1.22
Social Problem-solving	35	9.1	25.1	1.23
The Whole Scale	270	67.2	200	1.28

Table 6 shows that Black's earning rates for the six levels of social intelligence and the total ranged from 1.20 to 1.28, which is not less than 1.20 for the black gain factor based on the hypothesis. This indicates that the use of collaborative e-learning applications is very effective in developing social intelligence levels.

It is noticeable in the results that the nature of cooperative e-learning within a team led to a significant increase in the level of social intelligence in the study sample. The researcher explains regarding the fact that the educational process is not limited to developing the scientific cognitive aspects of the student and goes beyond that develop aspects of personality. In general, psychological and social aspects have a significant impact on helping individuals achieve balanced growth on the one hand and psychological and social adaptation on the other. The university curricula of a religious nature which emphasizes the necessity of interconnectedness among members of society and works to develop social relations that reflect the students' social skills and develop their social intelligence. Moreover, student affairs, student clubs and various activities provide a real opportunity for students to develop their talents and abilities that work to increase their social intelligence, self-confidence, awareness of relationships, interest in social matters and love of sharing and cooperation with others. The reason for this is also that females need more harmony with others and obtain a distinctive social position better than a domestic job, and females in Arab societies have exceptional characteristics such as kindness, extra care and attention, and the provision of a suitable environment for them; all this increases their intelligence.

Recommenditions

The researcher recommends the following:

1. Since current generations are interested in digital applications and internet is a large part of their lives, e-learning tools such as the Blackboard application and others must be activated in both Microsoft Office and Google to enhance knowledge sharing and to build the students' personalities in all mental, skill and emotional aspects. Such a student will graduate from university with the ability to create a difference in their working life.
2. Including the study of social intelligence in university courses will enhance the capabilities related to social skills, especially communication skills, problem-solving skills, and dealing with life pressures, especially those related to academics.
3. Work should be done to allocate specialised materials for the advancement and stimulation of intelligence and thinking skills, especially social intelligence.
4. The causes that lead to the decline of social intelligence among university students should be established and treated in the appropriate manner.
5. Studies should be conducted on social intelligence and its relationship to some emotional disorders or student problems.
6. A programme to promote social intelligence among university students should be developed.
7. Training courses should be developed for academics and university workers on the nature of social intelligence and in dealing with students and helping them understand their feelings and the feelings of others.

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References

1. Al-Hamdani, E., *E-learning benefits and requirements. Oman, Educational Massage Publisher*, 1,3- 47

(2006)
2. *Attia ,K, M, The concept of virtual learning environments, J, edu., tech, Egypt 24,**4**, 1-4(2014).*
3. Du, Z., Xiaolong, F., Zhao C., Liu, Q. and Liu, T., *Interactive and collaborative e-learning platform with integrated social software and learning management system.* Proc. 2012 Int. Conf. Inf. Technol. Software. Eng., Beijing, China, 11–18 (*2012*).
4. Martin, F., Blackboard as the learning management system of a computer literacy course. *MERLOT J. of Online Learn. And Teach.*, *4*, 2, 138-145 (2008).
5. C. Ullrich, K Borau, HLuo, X Tan, L Shen, et al.., *Why Web 2.0 is Good for Learning and for Research: Principles and Prototypes.* 17th International World Wide Web Conference, Beijing, China..10. (2008).
6. El Mhouti, A., Nasseh, A., *Erradi, M. et al. Enhancing collaborative learning in Web 2.0-based e-learning systems: A design framework for building collaborative e-learning contents*. *Educ Inf Technol* **22,** 2351–2364 (2017).
7. Thorndike,E.L. Intelligence and its uses. *Harper's Magazine, 140,* 227–235. (1920). 20 May 2021. https://psycnet.apa.org/record/1920-10067-001.
8. O'sullivan, M. and Guilford J. P., *Guilford, Six Factor Tests of Social Intelligence: Manual of Instruction and Interpretation.* Beverly Hills: Sheridan Psychological Service (1973).
9. Al-Munabri, and F.,M ,Fatima, *Social intelligence & social responsibility and achievement a sample of female students of the College of Education at Umm Elgorra University J. of Edu. and Sci. Syst.*,3, **4**, 180-187 (2010).
10. Bagozzi. R. P., The legacy of the technology acceptance model and a proposal for a paradigm shift. *J. of Assoc. for Inf. Syst.*, 8, **4**, 244-254 (2007).
11. Oh, J. C. and Yoon, S. J., Predicting the use of online information services based on a modified UTAUT model. *Behav. Inf. Technol.,* 33, **7**, 716-729 (2014).
12. Viswanath and Davis, *ATheoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies,* ,J of Man. Sci 4,6.186-204 (2000)
13. Sabri, K. S. and Rabi, J., The West Bank (Palestine) of computer technology and their tendency to use it in Sultan Qaboos University. *J. of Educ. and Psychol. Stud.*, 5,**7**, 314-377 (2014).
14. Lievens, Filip and C, David. , *Practical Intelligence, Emotional Intelligence, and Social Intelligence. In Handbook of Employee Selection,* New York: Routledge. (2017). 21 March 2021: https://ink.library.smu.edu.sg/soss_research/550
15. Taylor, Shirley, and Peter A. Todd. "Understanding Information Technology Usage: A Test of Competing Models." Information Systems Research6,.**2**,144-76 (1995):. August 27, 2021. http://www.jstor.org/stable/23011007.

Al-Taweel, L., Development of the technology acceptance model and testing it on th