The Impact of Teaching and Learning Styles on Behavioural Intention to use E-learning in Libyan Higher Education

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Abstract: This study aims to identify the dominant teaching and learning styles in Libyan higher education. This study also investigates which teaching and learning styles have higher possibility of intention to use e-learning as a tool for teaching and learning in Libya. The preferred learning styles used in this paper are based on Honey and Mumford's (1986) and the preferred teaching styles are based on Grasha's Model (1996). Survey participants comprised 318 students and 182 teachers from two private and two public universities in Libya. Descriptive statistics such as mean and standard deviation, minimum and maximum were used to analyse the impact of learning and teaching styles on behavioural intention to use e-learning in Libyan higher education. Tests were also used to determine the existence of possible differences between the mean among the groups of teaching and learning styles. Results showed that there was statistical significant difference between the four types of perceived learning styles towards the behavioural intent to use e-learning in Libyan higher education. On the other hand, there was no significant difference in the preferred teaching and learning styles which affect the behavioural intention to use e-learning in Libyan higher education. This imply that most teachers and students in Libyan higher education regardless of preferred teaching and learning styles have intention to use e-learning for teaching and learning respectively.

Keywords: e-Learning; higher education; learning styles; behaviour intention; Technology Acceptance Model
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1. Introduction

Using e-learning in education as a tool for teaching and learning has been popular in many developed countries. This represents a new method of learning, which provides an alternative for individuals to access, collect, analyse and acquire knowledge more efficiently (Liaw, Huang, & Chen, 2007; Richards, 2005; Wong, Fung, & Atan, 2008; Wong, Fung, Nawawi, & Hong, 2005; Yee, Luan, Ayub, & Mahmud, 2009). Many educators believe that using e-learning for educational purposes can efficiently propagate and enhance learning and teaching methods. While teachers are asked to use new educational technology to facilitate learning procedures, students are encouraged to enhance their learning experience through e-learning environments (Mahdizadeh, Biemans, & Mulder, 2008).

Individual difference factors have appeared as a main mediator in many models to predict behaviours of students in e-learning systems. According to Lin, Lu, and Liu (2013), most previous research have indicated the typical factors are related to individual differences, including gender, age, experience and education, which significantly determined system implementation. However, a limited number of studies have discussed the individual difference learning and teaching styles towards the adoption of e-learning in higher education sector especially in developing countries. Lin, Lu, et al. (2013) mentioned that teaching and learning styles are significant factors to affect students' and teachers' behavioural intention to use the e-learning systems. According to Umrani-Khan and Iyer (2009), the predominant learning style of students and

teaching style of teachers are considered as mediators affecting the relation between determinants of e-learning acceptance and intention to use the technology. Furthermore, Lin, Liu, and Lu (2013) also believed that students from different learning environments tend to have different ideas about teachers, and their perceived teaching styles usually affect their learning behaviour, particularly when using e-learning systems. There has been evidence that teaching styles can aid the interpretation of the influences of teachers on student achievements (Aitkin & Zuzovsky, 1994; Ebmeier & Good, 1979). Likewise, teaching styles can also help to interpret attitudes towards the subjects. Teaching behaviour and teaching styles can make a significant difference to the learning of students (Centra & Potter, 1980; McDaniel, 1981; Wentzel, 2002).

There are a number of researches that have been conducted to explore and predict user behaviour of an e-learning system (Selim, 2003; Sun, Tsai, Finger, Chen, & Yeh, 2008; Teo, Wong, & Chai, 2008). These researches have also reviewed the main factors that affect the use of e-learning technology in education (Moses, Khambari, & Luan, 2008; Yee et al., 2009). Libya is one of the developing countries where the usage of ICT and the use of e-learning are still in the early stage (Rhema & Miliszewska, 2010). The process of implementing a national ICT policy in particular the development of projects in different domains in general is still at an early stage (Hamdy, 2007). Although, some Libyan universities such as Tripoli University, Benghazi University, and the Academy of Postgraduate Studies and Economic Research, have some basic ICT infrastructure such as computers, local area networks, and Internet access, they still depend heavily on traditional education methods using face-to-face interaction in and out of the classroom between students and teachers. Besides, most learning activities are only available on campus (Rhema & Miliszewska, 2010). Recently, Libyan government has provided some initiatives to move towards the implementation of e-learning in higher education, but there are many challenges and obstacles that need to be resolved for the implementation for e-learning. Therefore, deliverers and developers of e-learning need more understanding of how students perceive and react to elements of e-learning along with how to most effectively apply an e-learning approach to enhance learning (Koohang & Durante, 2003). Moreover, knowledge of the intention of the students and teachers to understand the factors that affect the adoption of e-learning will help decision-makers to adopt such an environment for learning. Therefore, it was suggested in other research that there are relationship between learning and teaching styles to the use of e-learning as a tool for teaching and learning. However, no such research has been conducted in Libya to determine the relationship between teaching and learning styles and the behavioural intention to use. This paper therefore aims to fill this gap.

2. Research objectives

The aim of this empirical study is to identify which teaching and learning styles have a higher possibility of intention to use e-learning as a tool for teaching and learning in Libyan higher education. Both learning and teaching styles and behavioural intentions to use are measured through questionnaire in this research. The specific objective of this research is to identify the effect of different learning and teaching styles in Behavioural Intentions to Use e-learning in Libyan higher education.

The Perceived learning style term is referred to a person's characteristics in the ways of gathering, organizing, and thinking about information. Moreover, it is a student's way to interpret and understand what they see and observe. It can be classified into visual, aural, reading/writing and kinaesthetic. One of the most common and widely used instruments measuring learner perceived information is the VARK learning styles (ND Fleming & C Mills, 1992). Preferred learning styles is the behaviours and attitudes which determine a person's preferred method of learning. It can be classified into four types of learners: Activist, Pragmatist, Reflectors and Theorist (Honey & Mumford, 1986).

The purpose and objectives of this research were formulated for testing the following three hypotheses. Section 3.2 and 3.3, show the detailed description of how the perceived learning styles, preferred learning styles and preferred teaching styles were classified.

H1: Students with different perceived Learning Styles have different Behavioural Intentions to Use e-learning in Libyan higher education.

H2: Students with different preferred Learning Styles have different Behavioural Intentions to Use e-learning in Libyan higher education.

H3: Teachers with different preferred Teaching Styles have different Behavioural intentions to Use e-learning in Libyan higher education.

3. Background

3.1 Review of Behaviour Intention model

A review of previous studies suggested that Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), and Unified Theory of Acceptance and Use of Technology (UTAUT) were the most common theoretical models for explaining and understanding an individual's adoption of technologies. These theoretical models have the same belief-attitude-intention-behaviour causality and they were widely accepted in a number of empirical researches. The technology acceptance model (TAM) was developed from the Ajzen and Fishbein's Theory of Reasoned Action (TRA) in intended to describe an individual's IT acceptance behaviour (Legris, Ingham, & Collerette, 2003). The objective of TAM is to examine why users' attitudes and beliefs influence their acceptance or rejection of information technology. TAM aims to provide an explanation of the determinants of the adoption and use of information technology (Davis, 1989). TAM, illustrated in Figure 1, suggests two specific attitudes: perceived usefulness (PU) and perceived ease of use (PEOU) that determines one's behavioural intention to use a technology (Wahid, 2007). TAM is one of the most influential models used in the Information System research discipline and a number of researches have successfully employed TAM to evaluate the acceptance of different technologies (Adams, Nelson, & Todd, 1992; Szajna, 1994). Therefore, TAM has been considered as an effective model over different available technologies that are mainly used in an educational environment (Adams et al., 1992; Davis, 1989). This research therefore uses TAM as the Behavioural Intention Model.
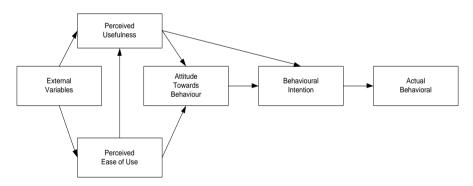

Figure 1: Technology Acceptance Model

3.2 Learning styles

Learning style is the method that an individual prefers to receive information from the surrounding and is assumed to be the best way for learning by the individual. Reed and Oughton (1997) mentioned that learning styles refer to how people prefer to represent and organize information. Grasha (1996) described a learning style as simply a person's preferred method of learning. Price (2004) offered another definition, "learning style is often used as a metaphor for considering the range of individual differences in learning." The term 'learning style' when used in this way is considered to include a range of constructs describing the variations in the manner in which individuals learn". In the past decades, many models of learning styles have been introduced to allow learners to be categorised according to different learning types. The importance of identifying the learning style is it could be used to provide the learner with suitable content that may lead to

learning enhancement. Moran (1991) reported that there are at least 21 various models of learning style which makes it difficult to provide a definite single definition. Furthermore, N Fleming and C Mills (1992) stated that more than 30 learning style models have been developed in the last three decades. Some of the most well-known and widely used theoretical models of learning styles are Myers-Brigss Type Indicator (Myers, McCaulley, & Hammer, 1998), Kolb learning styles Theory (A. Y. Kolb, 2005), Felder and Silverman models (Felder & Silverman, 1988), VARK (ND Fleming & C Mills, 1992), and, Honey and Mumford (Honey & Mumford, 1986). In this research, the VARK model is selected to evaluate the perceived learning styles because it provides the most concise tool and with many relevant questions that are suitable for this research. The model also contains a small number of questions that can be completed in a short time frame. Another reason why VARK is selected is because it can clearly map to the type of learning materials used. VARK, as illustrated in Table 1, is divided into visual learning, auditory learning, verbal learning (read/write) and kinaesthetic learning.

Table 1 VARK perceived learning style

Learning styles	Characteristics
Visual	Prefer information depicted in maps, diagrams and watch presentations involving pictures and visual media.
Aural/Auditory	Prefer information that is "heard or spoken", learn best from lectures, tapes, group discussion, email and radio.
Verbal (read/write)	Prefer information displayed as words favours modes such as reports, essays, PowerPoint, internet learn best by reading and taking note.
Kinesthetic	Prefer experience and practice either through personal experience, practical applications or simulation.

With respect to preferred learning style, some people prefer to learn by reading and making reflections on how it could be utilized to their own situation. While others prefer learning by trying the ideas out and also by reviewing their experience before proceeding to the next step. D. A. Kolb (1984) believes persons' methods using the Learning Styles Inventory, in which four stages of learning requiring specific learning abilities are identified. Based on Kolb's theories, Honey and Mumford (1986) advanced the Learning Styles Questionnaire (LSQ) and proposed four basic learning styles which are activist, reflector, theorist and pragmatist. Characteristics of Honey and Mumford (Honey & Mumford, 1986) learning styles are illustrated in Table2:

Table 2 Honey and Mumford learning styles

Learning styles	Characteristics
Activists	Involving themselves fully and without bias in new experiences, enjoys new challenges and solutions, enjoy here and now, have an open-minded approach to learning, enthusiastic about anything new, days are filled with activity
Reflectors	Careful, methodical, thoughtful, good at listening, stand back and ponder about experiences, collecting data and taking the time to work towards an appropriate conclusion
Theorists	Think in a logical manner, objectively and rationally, observe and make theories, they need models, concepts and facts in order to engage in the learning process.
Pragmatists	Keen on trying out new ideas, theories and techniques into practice, search for new idea and experimental, act quickly and confidently on ideas, go straight to the point.

3.3 Teaching Style

Since 1930, teaching style has been emphasized in education sector and educational psychology, and scholars have continually introduced theoretical discussions and classifications of teaching styles from different perspectives. Reinsmith (1994) mentioned that teaching style is teacher's presence, and the quality and nature of encounter between teachers and the students. According to Crossroads (2006) teaching styles can also differ from teacher to teacher because they are strongly impacted by the teacher's personal qualities, educational philosophy, philosophy in life, and attitude. Gregorc (1979) stated that teaching styles made up of personal teaching behaviours and the media which used to receive and transmit. Teaching styles are determined by teaching preferences, assessment of learning tools, classically acknowledged by the delivery of instruction, and enhance of student individual learning needs (Grasha, 1996; Hunt, 1971). Grasha (1996) believed that teaching style is considered as a special pattern of needs, behaviours, and beliefs that teachers show in the schoolroom. Grasha also mentioned that teaching style is multidimensional and influence how teachers introduce information, manage classroom tasks, interact with students, supervise coursework, mentor students, and socialize students to the field. In this research, teaching styles refer to five distinct teaching styles of Grasha's teaching style model (1996) which are Expert teaching, Formal Authority teaching, Personal Model teaching, Facilitator teaching, and Delegator teaching. The Grasha-Richman teaching style is illustrated in Table 3.

Table 3: Grasha-Richman teaching style

Style	Characteristics
Expert	Possesses knowledge and experts that learners need, guides, focuses on facts and work to ensure all students are well prepared.
Formal Authority	Responsible for providing and controlling the flow of curriculum, supervises learners closely with critical eye toward standard practices and procedures, concerned with providing positive or negative feedbacks.
Personal Model	Demonstrates & models what is expected, believes in teaching by personal examples, show students how to do things, wants students to observe and emulate approach.
Facilitator	Facilitates and focuses on activities, ask questions, explores options with students responsibility, independence, and initiative
Delegator	Delegator puts much control for learning on individual or group, and allows learners to explore and design their learning project

4. Methodology

4.1 Research Design

Qualitative and quantitative research methods are two widely well known approaches which have been used in social science studies, including education and Information Systems Management (Palys, 1997). In this research, both of these research methods are used and implemented throughout the study. Survey research is most commonly used in non-experimental design and is considered mostly appropriate for theory testing. A survey research could support the external validity of the study results from managerial perspectives (Bakos & Treacy, 1986).

There are many types of surveys such as oral survey, written survey, online survey and example survey. This study focuses on oral and written surveys. According to Fowler (2009), a written survey can be group administered questionnaires, mail survey or drop-off survey. A mail survey was used in this study. After receiving the consent from the participating universities, advertisements were announced on the campuses, students and teachers who would like to participate in this study could send an email or call the researcher. Arrangements were made to post the questionnaire and information letters to the interested participants. The letter was clearly stated that the participation in the research is entirely voluntary and the participants may withdraw their consent to participate without returning the questionnaire. Participants could answer the

questionnaire at their convenience and return the questionnaire by post. An envelope with return local address and postage stamp were provided.

The interview was conducted after respondents had completed the questionnaire survey. At the end of the questionnaire, participants were asked to participate in the interview. The interview was voluntary. They were informed on the estimated time for the interview and were provided with the questions for the interview prior to the interview session. The purpose of the interview was to seek qualitative data regarding the factors affecting the adoption of e-learning in Libyan higher education and to get students' and teachers' comments and opinions on e-learning. Findings from these interviews were used to extend and to provide further details in addition to the questionnaire. Interviews can elicit more in-depth details and information from the respondents and allow researchers to discover a significant amount of knowledge about the respondent's perceptual experience, values, attitudes, feelings and views of events (Gorman, Clayton, Shep, & Clayton, 2005).

4.2   Population and Sample

The population in the study consists of students and teachers from Libyan Higher education. The surveys were divided in two parts. The first part was a self-administered survey, which were targeted at students and teachers. The second part was a follow up interview for students and teachers.

The sampling for the self-administered survey was described as follows:

First: participants were recruited from four universities: two private and two public universities. These universities had been chosen for the following reasons:

1.   These universities reflect the geographical diversity in Libya, where two of them are in urban areas and two of them from rural areas.

2.   For public universities, University of Tripoli and Elmergib University had been chosen because they were larger universities in the region and they had students coming from all surrounding areas thus covering a large geographical area.

3.   Private universities had been chosen because they are under different funding system.

The proportion of the students and teachers obtained from each university is not important, since the minimum sample size was achieved.

In the second part, the interview was conducted after respondents had completed the questionnaire survey. At the end of the questionnaire, participants were asked to participate in voluntary interview. The sample size in an interview survey depends on the number of voluntary participants and there was no minimum size required for this part of the study.

The target population in this research was the students and teachers from four universities: two public and two private from Libyan higher education. Therefore 400 students' questionnaires and 400 teachers' questionnaires were distributed to the students and teachers in four universities. From the 400 questionnaires distributed to the students, 318 were returned in a form eligible for the analysis and 27 questionnaires were dismissed because they were missing data due to lack of completeness by the participants. The overall students' responses rate for this study is 79.5%. From the 400 questionnaires distributed to the teachers, 182 were returned in a form eligible for the analysis and 7 questionnaires were dismissed because they were also missing data, as a result of lack of completeness by the participants. The overall teacher's responses rate for this study was 45.5%. The questionnaire responses were analysed using version 20 of the Statistical Package for Social Program (SSPS).

5   Results of the study

The result of this study concentrates on the impact of teaching and learning styles on behavioural intention to use e-learning in Libyan higher education. In order to answer the research question: "Which are the learning and teaching styles that will benefit most from the implementation of the e-learning in Libya higher education?". Additionally, this will also help to test the research hypothesis. H1: Students with different perceived Learning Styles have different behavioural intentions to use e-learning in Libyan higher education. H2: Students with different Learning Styles have different behavioural intentions to use e-learning in Libyan higher education. H3: Teachers with different Teaching Styles have different behavioural intentions to use e-learning in higher education.

5.1   Testing of H1

One-way ANOVA is utilised to test Hypothesis 1. Table 4 shows the descriptive statistics of the four learning styles: the mean (M), the standard deviation (SD), minimum (Min), and maximum (Max).

Table 4: Descriptive statistics for perceived learning styles

Learning styles	M	SD	Min	Max
Visual	10.9020	1.60318	7.00	15.00
Auditory	10.7000	1.42971	8.00	15.00
Read/Write	10.4592	2.24834	4.00	15.00
Kinaesthetic	10.0367	1.75292	3.00	15.00

One-way ANOVA was also conducted to determine the existence of possible differences between the mean among the four groups of perceived learning styles. The results of the analysis are presented in Table 5 where the data show an $F (3, 314) = 3.193$, $P<.05$. Based on the analysis of the results, sig. was less than 0.05, there was statistical significant difference between the four types of perceived learning styles towards the behavioural intent to use e-learning in Libyan higher education.

Table 5: one-way ANOVA Hypothesis 1

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	32.678	3	10.893	3.193	.024
Within Group	1071.300	314	3.412		
Total	1103.978	317			

To test which perceived learning style between the four affect behavioural intent to use, the Post Hoc Test can be used. The Post Hoc can present the mean difference between each pair among the four perceived learning styles as shown in Table 6.

Table 6 The Significant Mean Difference in the comparisons of perceived learning styles

	Visual	Auditory	Read/Write	Kinaesthetic
Visual		0.20196	0.44278	0.86526*
Auditory	-020196		0.24082	0.66330*
Read/Write	-0.44278	-0.24082		0.42249
Kinaesthetic	-0.86526*	-0.66330*	-0.42249	

*   The mean difference is significant at the 0.05 level

The table above shows the significant mean difference comparisons of perceived learning styles by using Fisher's Least Significant Difference (LSD) method. The results show that there are four pairs of perceived learning styles that have a statistical significant difference a 0.86526, 0.66330, -0.86526 and-0.66330. The pairs are Visual and Kinaesthetic, Auditory and Kinaesthetic, Kinaesthetic and Visual, and Kinaesthetic and Auditory. Regarding perceived learning styles, the more impact pairs are Visual and kinaesthetic (0.86526), followed by Auditory and Kinaesthetic (0.66330), Kinaesthetic and Visual (-0.86526) and Kinaesthetic and Auditory (-0.66330).

5.2 Testing of H2

One-way ANOVA is utilised to test Hypothesis 2. Table 7 shows descriptive statistics of the four learning styles: the mean (M), the standard deviation (SD), minimum (Min), and maximum (Max).

Table 7: Descriptive statistics for preferred learning styles

Learning styles	M	SD	Min	Max
Activist	10.6852	1.68034	7.00	15.00
Reflector	10.3906	2.15006	4.00	15.00
Theorist	10.5479	1.98635	4.00	15.00
Pragmatist	10.2756	1.71676	3.00	15.00

One-way ANOVA was also conducted to determine the existence of possible differences between the mean among the four groups of learning styles. The results of the analysis are presented in Table 8 where the data show an F (3, 314) = .731, P<.05. Based on the analysis of the results, sig. was more than 0.05, there was no statistical significant difference at between the four types of learning styles towards the behavioural intent to use. This test result failed to validate hypothesis H2. "Students with different preferred learning Styles have different Behavioural intentions to Use e-learning in higher education". This study concluded that there are no significant differences among the four learning styles towards the Behaviour intention to use e-learning in Libyan higher education.

Table 8: one-way ANOVA Hypothesis 2

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7.659	3	2.553	.731	.534
Within Group	1096.319	314	3.491		
Total	1103.978	317			

5.3 Testing of H3

One-way ANOVA is utilised to test Hypothesis 3. Table 9 shows the descriptive statistics of the five teaching styles: the mean (M), the standard deviation (SD), minimum (Min), and maximum (Max).

Table 9: Descriptive statistics for preferred teaching styles

Teaching styles	N	M	SD	Min	Max
Expert	74	10.2568	1.44356	7.00	15.00
Formal	16	9.8750	1.20416	7.00	12.00
Personal	16	10.2500	1.98326	7.00	14.00
Facilitator	67	10.0448	1.59955	3.00	15.00
Delegator	9	9.5556	3.00463	3.00	13.00

One-way ANOVA was also applied to determine whether there are significant differences between the mean among the five groups of teaching style. The results of the analysis are displayed in Table 10, show an F (4, 177) = .545, P<.05. Based on the analysis of the results, sig. was more than 0.05, there was no statistical significant difference between the five types of teaching styles towards the Behavioural Intent to Use. This test result failed to validate hypothesis H3. "Teachers with different preferred Teaching Styles have different Behavioural intentions to Use e-learning in higher education". This study concluded that there are no significant differences among the five teaching styles towards the behaviour intention to use e-learning in Libyan higher education.

Table 10: one-way ANOVA Hypothesis 3

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	5.843	4	1.461	.545	.703
Within Group	473.960	177	2.678		
Total	479.802	181			

6 Conclusion and discussion

This paper has presented the study of the impact of teaching and learning styles on behavioural intention to use e-learning in Libyan higher education. Based on the study outcomes, ANOVA was conduct to test H1 students with different perceived learning styles have different behavioural intentions to use e-learning in Libyan higher education. The hypothesis test shows that H1 is accepted. This implies that there is significance difference among these four types of perceived learning styles towards the behavioural intention to use e-learning in Libyan higher education. On the other hand, there was no significant difference in preferred teaching and learning styles which affect the behavioural intention to use e-learning in Libyan higher education. In other words, all students and teachers regardless of their preferred teaching and learning styles had a similar behavioural intention to use e-learning in Libyan higher education. This implies that student and teachers irrespective of their learning and teaching styles are willing to adopt e-learning and thus will have a higher impact on the success to implement e-learning in Libyan higher education.

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