User Acceptance for E-Learning in Higher Education – TAM Model Study

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Abstract

E-learning is quite rapidly emerging domain in higher education. In Pakistan around 20 universities have introduced learning management systems- LMS for teachers and students. The effectiveness of this LMS is yet questioned. There is a serious need of study to gauge user’s acceptance towards such LMS and redefining the LMS as per needs.

Authors made an attempt to find answer to this question by using Technology Acceptance Model by Fred D. Davis. The study uses LMS of University of Management and Technology – UMT as case to investigate the phenomena. The study made in depth interviews of 15 students and five teachers to produce qualitative insight of LMS acceptance. Based on qualitative input a survey is designed and administered on 200 students and 50 teachers using systematic random sampling in UMT. The TAM instrument by (Ronnie H. Shroff, Christopher C. Deneen and Eugenia M. W. Ng, 2011) used after permission.

The study reveals very useful insights for policy makers in E-learning and practitioners of LMS in higher education. The study has contributed a local perspective on E-learning in the body of knowledge. The study also provided useful guidelines to redefine and improve LMS in the universities.

1. Introduction

1.1. E-learning

User Acceptance for E-Learning in Higher Education: TAM Model Study

The advancements in internet present tremendous benefits to the fields of learning and teaching. The advent of E-learning has made education independent of time and location. This mutual exclusivity has given more innovative options to instructors in terms of devising course material and using novel teaching techniques (Draghici,Popescu,Fistis & Borca, 2014; Kakasevski, Mihajlov, Arsenovski & Chungurski, 2008). It has also been established that self-sufficient learning, novice curriculum development, student-oriented training, high order reflection, team skills acquirement, and clarification of abstract concepts are advantages of e-learning adoption (Rahim,2013). Hence globally, universities are making vigorous efforts to develop and innovate their spectrum of e-learning facilities (Masoumi, & Lindström, 2012). Companies and corporations are important clients of e-learning as well. E-learning has been used to facilitate employee training, aiding e-commerce and knowledge enrichment in the industry (Ho, Yang, & Chang, 2004).

A vital consequence of this e-learning revolution is the emergence of Learning Management Systems (LMS). LMS is an imperative interface with the learners. It can be accessed round the clock from anywhere in the world over the Internet for academic purposes (Hilmi, Pawanchik & Mustapha, 2011). It offers the advantage of keeping information consistent. This means learning material is modified and the artifact is readily available on the internet having no redundancy. Various conferencing options have enabled teachers and learners to collaborate for knowledge acquiring without the limits of time and location. LMS also allows instructors to track progress, and results of the learners. Contemporarily, multi-language support is also being endorsed by many LMS, hence allowing language-unfamiliar learners to benefit from knowledge delivered in more than one

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languages. Moreover, with the dominance of gadgets, LMS have become easily and cheaply accessible, hence knowledge can be attained easily from anywhere over the Internet (“Importance of Learning Management System”, 2013) (“Ten Most Important Features of a Learning Management System”, 2014).

1.2 General Issues of E-Learning: The users have not as readily adopted Learning Management Systems as expected by institutes which made usability important aspects of this novice phenomenon (Sumak, Polancic, & Hericko, 2010). One of the most frequently adopted LMS is Modular Object Oriented Dynamic Learning Environment; Moodle. It is open source software developed to facilitate online dynamic course development (“Moodle”, 2014). Many prominent universities in Pakistan have adopted Moodle to facilitate their academic works (eLearning and Higher Education in Pakistan: What may hamper it”, 2014). Research has proved few usability factors that hinder frequent adoption of LMS facility. Therefore, user acceptance of LMS, particularly Moodle, remains a significant avenue of research (de Porto Alegre Muniz & de Moraes, 2012).

Technology acceptance model - TAM has been an important tool in gauging user acceptance and associated problems of technological endeavors (Davis, 1985). The synopsis of this model presents usefulness and perceived ease of use as vital aspects in determining usage behavior towards technology based learning. This model has been used as a tool to judge user acceptance of various contemporary technological novelties (Tang & Chen, 2011) (Mah, Hissan, & Ch’ng, 2011).

1.3 The E-Learning Study: University of Management and Technology, UMT, Lahore Pakistan has a diversified academic population of 9000 + students and 360 full time faculty members in the disciplines of Commerce, Accounting, Business Administration, Banking and Finance, Business and IT, Computer Science, Economics, Education, Electrical Engineering, Aviation, Management, Supply Chain, Textile Engineering, Industrial Engineering, Information Systems, Linguistics, Media and Communication, Agri-business, School Management, Social Sciences, Educational Leadership Management, Law, English Language Teaching, and many more. UMT has incorporated Moodle in its academic circle and all faculty members and students are required to extensively use Moodle for their academic activities. The large users’ population and diversified disciplines make it an ideal specimen for Moodle usability study. This research aims at studying the user acceptance of Moodle UMT, Lahore, Pakistan. The criterion defined by Technology Acceptance Model of Davis includes perception about usefulness, perception towards ease of use, attitude towards using LMS and actual usage. In the first phase 15 students and 5 faculty members from different departments at University of Management and Technology were interviewed to develop qualitative insight of Moodle acceptance in UMT community. Based on qualitative input, a survey was designed and administrated on 200 students and 50 faculty members using systematic random sampling in UMT. The questionnaire was adapted from (Ronnie H. Shroff, Christopher C. Deneen and Eugenia M. W. Ng, 2011) and used after permission.

2. Literature Survey

All over the globe, educational institutes are realizing the potential of Learning Management Systems, in facilitating e-learning. The e-learning is reportedly aiding effectiveness of academic works and performance. Moodle being open source, yet incredibly useful and functionally rich, has become a popular choice in contemporary Learning Management Systems (Kumar, Gankotiya, & Dutta, 2011). It has also been understood that users’ comfort to use Learning Management Systems is a very vital aspect in making these technological innovations a success.

Therefore, user opinions, expectations and possible reasons of reluctance to use LMS are studied extensively. Such studies are devised to determine the weak areas in e-Learning for improvement. A survey from Serbia and Slovenia shows students were mostly satisfied with Moodle. They objected only two features: i.e. anyone can see when one person submits an assignment and online and offline status of every user is visible to others. (Ivanović, Putnik, Komlenov, Welzer, Hölbl, & Schweighofer, 2013).
2.1 E-Learning and User Comfort: A similar survey from Skopje Macedonia concluded that majority of faculty and students agreed when questioned about Moodle’s ease of use, efficiency, effectiveness, memorability and satisfaction. However 75 unique problems were identified with Moodle (Kakasevski, Mihajlov, Arsenovski, & Chungurski, 2008). A usage feasibility survey from Malaysia deduced that users want a more interactive interface in Moodle. Some other issue identified by this survey were confusion on operating Moodle without its manual, difficulty in understanding its operation process, and vague icons and structure. (Tee, Wook & Zainudin, 2013). An analysis was conducted in Brazil to analyze if teachers have usability issues with Moodle. The results determined that users were not satisfied with Moodle interface ( de Porto Alegre Muniz & de Moraes, 2012).A Moodle usability study from Birmingham demonstrated that users; both faculty and students demanded improvement in experience design. The problems identified include complex multi-step forms, complex home page, terminology for buttons and icons needed improvement and uploading file option needed simplification (Walker, Prytherch, & Turner, 2013).

Technology Acceptance Model ( TAM ) has been declared as an established tool in studying users’ acknowledgment of technology (Tang & Chen,2011). A Moodle usability study was conducted in Taiwan, in light of TAM and concluded that system quality determined students satisfaction and comfort with Moodle usage (Chen, Lee, Wu, Qiu, Lin, Tang, & Chen, 2012). Another Moodle usability study, in light of TAM from Spain deduced that perceived ease of use and perceived usefulness are directly related (Escobar-Rodriguez, & Monge-Lozano,2012). Research at another university determined that students were enthusiastic about Moodle usefulness and ease of use ( Padilla-Meléndez, del Aguila-Obra, & Garrido-Moreno, 2013). These studies are very useful in determining user comfort level with Moodle. The administrators can use these results to improve the functionalities of Moodle in their respective institutes.

Pakistan is a developing country, paying special attention to improving e-Learning spectrum. Therefore, Moodle is extensively being adopted in Pakistani Universities (Looking Ahead”, 2013).The usability analyses discussed before apply to Pakistani Moodle using community as well but no such research exists in Pakistan. Our research study is the first that inquires user comfort, and satisfaction with Moodle in a Pakistani University.

2.2 E-Learning User Acceptance Issues in Developing Countries

Research has indicated that developing countries are reluctant in adopting new technological ventures, as compared to developed countries. Technological user acceptance in E-learning is quiet immature in developing countries and acceptance ratio is low as compared to that in developed countries (Bhusirisir, Xaymoungkhoun, Zo,, Rho, & Ciganek, 2012). A research study from Iran has indicated that there is a need to groom and expand the human resource available in IT for effective integration of technology in facilitating education. The same study also concludes that financial support for IT incorporation in academia should be enhanced (Hamidi, Meshkat, Rezaee, Jafari, 2011).Another research study has established that English literacy rate in developing countries is low. Most of the new technological endeavors are developed in English, hence English incompetence becomes a vital factor in reluctance towards technology users. The same research specimen emphasizes the need of technological usability studies in developing countries, to improve technological underutilization (Park, Roman, Lee, & Chung,2009).Pakistan is a developing country where E-Learning infrastructure is in embryonic stage. A research endeavor has indicated that technology usage rate in academia in Pakistan is very low. This research study narrates that a large number of teachers are not qualified enough to appropriately incorporate technology in their academic ventures. This ineptitude is the reason of reluctant in introducing E-Learning facilities in their classes. The same study resulted that lack of funds is also a vital factor in the grim situation of E-Learning ventures in Pakistan. Moreover, it was also concluded that weak English language skills, continuous power failures, lack of skilled personnel to provide training for E-Learning novices, ineffective examination system and over burdened teachers were vital hindrances to appropriate introduction of technology in academia. This study emphasized the significance of technology usability studies to improve
technology acceptance in Pakistan (Hassan & Sajid, 2013). This established significance of technology usability studies in Pakistan, is our motivation for this research on usability of Moodle.

3. The Study

The study aims to investigate usage phenomena of learning management system – LMS. The moodle as LMS is studied in terms of its user acceptance using TAM model. Both qualitative and quantitative results are presented. The study has following objectives:

- How effective the usage of LMS is, for teacher and students
- To know about the impact of TAM on users’ behavior while adoption of technology
- To know correlation among TAM factors

In this study, technology acceptance model (TAM) is used to know about trend of users’ acceptance of technology and relationship between Perceived usefulness (PU), Perceived ease-of-use (PEOU), Attitude towards usage (ATU) and Behavioral intention (BI) According to this model, when user has to accept new technology, number of factor affect regarding its usability i-e; how to use it? Is it easy to use? And what will the impact of adoption of new technology on their attitude and development of behavior.

4. Research Methodology and Data Collection

According to the objective of study, it is required to check the effectiveness of usage of LMS (learning management system) for teachers and students. Researchers selected the LMS (Moodle) of University of management and technology to test the hypothesis of study. First step was an interview of 10 students and 5 faculty members conducted by authors. This was a source of getting perception of users’ regarding UMT Moodle, leads to construct a questionnaire. Questionnaire consisted of 20 questions, divided under 4 variables. Total 55 responses gathered from faculty and 410 responses from students. Web-based technique was used for data collection. The reliability of scale tested through Cronbach’s alpha on SPSS, which yield that study had a power of 0.89 and 0.92 in scale of faculty and students respectively.

4.1 Operational Definition of Variables

**Perceived usefulness** (PU) - the degree to which a person believes that using a particular system would enhance his or her job performance.

PU is impact of using a particular technology on improvement of performance. It depicts that how the adoption of new technology facilitates in improvement of performance. The incorporation of new technology in routine tasks plays an important role in building up of mental awareness regarding its benefits.

**Perceived ease-of-use** (PEOU) - the degree to which a person believes that using a particular system would be free from effort.

PEOU is a factor of TAM, deals with users’ perception about simplicity of technology. It explains about the users’ comfort level about usage of technology frequently. It plays an important role in adoption of new technology, as; it leads to building up of attitude and behavior of user.

**Attitude towards usage**: Individual's positive or negative feeling about performing the target behavior (e.g., using a system).

When the users become aware of new technology and incorporate it in daily practices, it may leads to development of specific attitude or feeling about its facilitating features. That attitude towards usage may also
be known as affective response, which can be both positive and negative. That feeling of user about performance is a source of decision about acceptance level of technology.

**Behavioral intention:** The degree to which a person has formulated conscious plans to perform or not perform some specified future behavior.

Behavioral intention is a kind of final development of users’ perception about technology. At this stage user’s behavior with the support of perception in the beginning bring about the plan of its usage in future. Behavior elaborates about use’s final decision and future plan about usage of technology.

In accordance with research objective, following hypothesis has been constructed to test significant relationship among variables.

H1: There is significant relationship between (PU) and (ATU)
H2: There is significant relationship between (PEOU) and (ATU)
H3: There is significant relationship between (PEOU) and (PU)
H4: There is significant relationship between (ATU) and (BIU)

Above hypothesis give rise to the following model, named as TAM (Technology acceptance model), which represents the relationship among variable according to hypothesis.

![TAM Model](image)

### 5. Results and Analyses

#### 5.1 Qualitative Results

Following are the response of interviews conducted for the topic “Users’ Acceptance for E-learning in higher education”. As, decided earlier about in depth interviews of 10 students and 5 faculty members from UMT related to different departments will be conducted using the criteria of technology acceptance model TAM. Questions of interview were divided into three dimensions of TAM (Cognitive Response, Affective Response, and Behavioral Response).

**Cognitive Response** (Thoughts that occur while we are listening to someone talk.)

1. How do you think about the effectiveness of moodle?
2. How do perceive the rapid adoption of LMS by universities?
3. Do you want to suggest any improvement for UMT moodle?

**Affective Response** (Attitude towards using technology)

1. Is it easy to use this facility or you use to get bothered of its complications?
2. How effective is it for student and teacher communication?

**Behavioral Response** (The actual use of system)

1. How do you perceive the change in your attitude towards work with the facility of moodle?
2. Do you use the facility of moodle during course planning only or till the end of the semester?

**Faculty Responses**

**Respondent 1: Miss Farah Sarwar**  
Assistant Professor  
Electrical Engineering Department UMT

**Cognitive Response**
According to her moodle of UMT is an average entity. Before this facility of LMS, instructors used to have yahoo groups. One advantage is that, academic material shared on moodle becomes endorsed by the university. She is satisfied with current features of UMT moodle.

**Affective Response**
She finds it very easy to use and it is a good trend in enhancing student teacher communication.

**Behavioral Response**
Availability of moodle has no impact on her professional attitude, however since it is an administrative requirement; she is using it throughout the semester.

**Respondent 2: Miss Tayyaba Anjum**  
Lecturer  
Department of Computer Science, UMT

**Cognitive Response**
She said that LMS is a very effective facility; otherwise she would have had to create an email group which would not have had many advanced facilities like assignment marking. According to her, this rapid adoption of LMS by universities is very useful trend. She also gave an example of a scenario, like if a student is absent in her class, he/she can get updates from moodle’s announcement feature and will neither annoy her nor will miss the important upcoming activity.

She also said that file upload limit on moodle is 50MB and suggested an improvement for that it must be increased for smooth academic functioning.

**Affective Response**
She didn’t ever find the UMT moodle complicated to use. Secondly, she thinks it facilitates the student and teacher communication by giving an example that news can be rapidly shared.

**Behavioral Response**
She is using the UMT moodle regularly and expressed her behavior in a relax way that her work load or constant nagging with students has reduced by using the LMS facility.

**Respondent 3: Miss Faseeha**  
Assistant Professor  
Computer science department, UMT

**Cognitive Response**  
According to her LMS is very important and necessary facility to use in teaching and its rapid adoption by universities have positive effect in collaboration between industry and universities and among departments as well. It is very effective, growth oriented and issues can stay on board to discuss. On the contrary she was totally dissatisfaction with UMT moodle and suggested to improve the interface, searching algorithms, accessibility issues and scalability address.

**Affective Response**  
She narrated about UMT moodle that it is very easy to use, secondly, it is effective to make announcements and material provision.

**Behavioral Response**  
She is regularly using this facility and thought that without LMS work was creating frustration and she is taking more interest in teaching now.

**Respondent 4: Mr. Manan Aslam**  
Lecturer  
Social sciences Department, UMT

**Cognitive Response**  
According to him LMS facility is not much effective due to its misuse by students. He said that students either tell a lie that they didn’t get the material on time or they use to avoid classes with the content that lecture will be available on moodle. He suggested that moodle should only be used for student and teacher communication and other features supposed to be removed.

**Affective Response**  
He said that, it is easy to use UMT moodle and he has removed the ambiguities through trainings on demand. Secondly he gave very positive response in favor of LMS for teacher and student communication.

**Behavioral Response**  
He only use the UMT moodle when university order strictly but he do not feel good positive change in his behavior. On the contrary he felt burden and upset when got bad responses of students like telling a lie or being absent in class. Therefore, he used to give hard copies instead of uploading on moodle.

**Students Responses**

1) **Respondent Specialization**  
Bachelors of Electrical Engineering

**Cognitive Response**
This gentleman remarked that he finds Moodle fairly easy to use and is a supporter of LMS introduction in universities. He stated that Moodle’s message sending feature doesn’t work promptly and needs to be improved.

Affective Response
He uses it quite comfortably instead of considering it a burden.

Behavioral Response
He uses it regularly during the semester to get timely updates about his semester courses and to submit his course modules like assignments etc.

2) **Respondent Specialization**  **Bachelors of Fashion Designing**

Cognitive Response
The lady stated that she doesn’t use Moodle a lot as most of her assignments involve practical work that cannot be done via Moodle. She only uses Moodle when instructors share theoretical notes. She was neutral to introduction of LMS in universities as most of her work could not be done on LMS so she didn’t comment a lot on its advantages.

Affective Response
She finds it a slight burden as she is not a technical person.

Behavioral Response
However she has to use it when her instructors and courses demand it.

3) **Respondent Specialization**  **Masters in Applied Linguistics**

Cognitive Response
She narrated that she considers using Mood le a burden, due to its frequent crashing and difficult user interface. She is a supporter of LMS introduction in universities for facilitating academic activities however she feels that UMT Moodle is a failure.

Affective Response
She considers using UMT Moodle a burden and only uses it because her instructors demand it.

Behavioral Response
She considers it a burden and thinks there’s no escape from using it since her instructors demand.

4) **Respondent Specialization**  **MBA Evening**

Cognitive Response
The respondent narrates that she is quite comfortable with using Moodle and happily uses it. She is a fan of LMS introduction in universities and feels that technology should be used to the maximum for facilitating all positive activities. No comment on improvement.

Affective Response
She uses Moodle throughout the semester.

Behavioral Response
She happily uses it.

5) **Respondent Specialization**  **Bachelors in Chemistry**

Cognitive Response
The respondent is quite comfortable with using Moodle. He uses it regularly in the semester. He couldn’t comment on any improvements.

Affective Response
He is quite comfortable in using it.

Behavioral Response
He uses it when courses and instructors demand.

6) **Respondent Specialization**  **Bachelors in Business and Information Systems**

Cognitive Response
She considered herself a non-technical person and could not comment on improvements in moodle. However she is a supporter of LMS introduction in universities.

**Affective Response**
Now she considers herself comfortable in using moodle.

**Behavioral Response**
After one year she has become fairly comfortable in using it, although initially she had problems understanding it because she doesn’t use computer a lot.

7) **Respondent Specialization**  Bachelors in Fashion Designing

**Cognitive Response**
Respondent told that most of her assignments involve work that cannot be done on moodle, like finding patches of clothes, laces, beads, etc., so she rarely uses moodle when instructors share theoretical notes. She is a supporter of LMS adoption by universities to facilitate academia; however she considers herself amateur to suggest any improvements in UMT moodle.

**Affective Response**
She has become comfortable in using moodle now.

**Behavioral Response**
Initially she found it difficult however now she has become fairly comfortable with the use of moodle.

8) **Respondent Specialization** BS-IT

**Cognitive Response**
Respondent was satisfied with UMT Moodle but according to him it is required to be more efficient. It sometime stopped working in the hour of need due to accessibility issue. But he also expressed that it is good for universities to adopt this technology. It supports not only students but also teachers to communicate and get announcement of quizzes and assignments. Some of his suggestions for UMT Moodle includes; emailing facility and efficient networking.

**Affective Response**
Respondent found it easy to use and said it not much effective for communication between teacher and student.

**Behavioral Response**
He could not found any change in his attitude while using this technology but he is using due to requirement of course.

9) **Respondent Specialization** BS-IT

**Cognitive Response**
Respondent pointed out a very commonly practiced negativity of LMS. According to him Moodle is providing all the facilities on portal for which student has to attend the class. That’s why this facility is making students lazy. As, they are avoiding o attend classes and getting lectures material from LMS. But he also suggested for improvement of networking of moodle.

**Affective Response**
He told that; it is easy to use for those who have IT background. On the other hand it is creating gap between teacher and student due to availability of all the solutions of their problems on moodle.

**Behavioral Response**
He is using moodle continuously and also found change in attitude like feeling himself professional.

10) **Respondent specialization** BS-IT

**Cognitive response**
Respondent found her free of time boundaries for assignment submission to teacher in class. She said that she can submit her work on moodle even after the class. According to her it is effective but creating problem due to issue of networking. 90% it doesn’t log in the hour of need. She suggested for improvement in efficiency of UMT-Moodle.

**Affective response**
According to her it is easy to use it and also good for student and teacher communication.

**Behavioral Response**

She is using this facility regularly and found no change in her attitude.

### 5.2 Quantitative Results

After collection and entry of data in SPSS, different statistical tests used to check the constructed hypothesis. Firstly the frequency distribution of demographic questions is checked and presented in following results.

#### 2.1.1. i. Descriptive Results

| Table 01 Age and gender distribution in faculty sample respondents N=55 |
|-----------------------------|---|
| **Age**                    | Percent |
| Less than 30 years         | 53.70%   |
| More than 30 years         | 46.30%   |

| **Gender**                |       |
| Male                      | 56.60%   |
| Female                    | 43.40%   |

Table 01 shows the frequency distribution of faculty’s Age and Gender in percentage. It depicts that; in faculty, more than 50% respondents were male and less than 30 years in age. Graphical representation is shown in appendix.

<table>
<thead>
<tr>
<th>Table 02 Age and gender distribution in students sample respondents N=410</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
</tr>
<tr>
<td>Less than 30 years</td>
</tr>
<tr>
<td>More than 30 years</td>
</tr>
</tbody>
</table>

| **Gender**                |       |
| Male                      | 77.6%   |
| Female                    | 22.4%   |

Table 02 shows the frequency distribution of age and gender from student respondents. It depicts the similar trend as of faculty but at higher level i.e; male respondents are 77.6% and 95% of them were less than 30 years old.

<table>
<thead>
<tr>
<th>Table 03 Moodle usability of faculty and student respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Percentage of students N=410</strong></td>
</tr>
<tr>
<td>Never</td>
</tr>
<tr>
<td>Daily</td>
</tr>
<tr>
<td>Weekly</td>
</tr>
<tr>
<td>Monthly</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Table 03 shows the difference between Moodle usability of students and faculty respondents in percentage. More than 50% of students use to check their Moodle account on daily basis. On the contrary 61% of faculty members use this LMS weekly. It has been clear from the results that students are more regular checking the.
updates on their account than faculty. It also depicts that students of UMT are more conscious to keep themselves up to date in their academic session, as, they don’t afford to miss any announcement. While faculty takes it like to check once a week is enough for communication with students.

ii. Inferential Results

Hypothesis testing of faculty

H1: There is significant relationship between (PU) and (ATU)
H2: There is significant relationship between (PEOU) and (ATU)
H2: There is significant relationship between (PEOU) and (PU)
H3: There is significant relationship between (ATU) and (BIU)

According to the objectives of this research and above hypothesis, it was required to check the correlation among factors of technology acceptance model. Following diagram shows the correlation through figures and also tests the hypothesis. It depicts that there exist higher relationship between faculty’s perception regarding usefulness of Moodle and their attitude towards its usage. On the contrary, there exists lowest relationship between their perception regarding its usefulness and its ease of usefulness. Therefore, refer to the above null hypothesis; all of them have been rejected, as p-value is < 0.05 in all cases, shown in appendix tables below. And coefficients of r are greater than 0.5, which shows that there exists positive linear relationship in all cases.

Correlation Statistics of Faculty

![Correlation Diagram]

Hypothesis testing of students

H1: There is significant relationship between (PU) and (ATU)
H2: There is significant relationship between (PEOU) and (ATU)
H3: There is significant relationship between (PEOU) and (PU)
H4: There is significant relationship between (ATU) and (BIU)

Similarly, following figure shows the correlation among the factors of TAM, in case of students’ responses. In reference to the result tables in appendix, all the above null hypothesis have been rejected, as, p-values are < 0.05. On the other hand, there exists positive linear relationship among factors of TAM, tested under constructed hypothesis. The values of r mentioned in the figure shows highest positive relation between students’ attitude towards usage of moodle and their specified behavior. On the contrary there exists lowest
positive relationship between students’ perception regarding perceived usefulness and perceived ease of usefulness. This shows that moodle usability has more impact on students’ attitude and behavior. Whereas, perceived usefulness of moodle has less impact on its ease of usefulness.

Correlation Statistics of students

Correlation Comparison of Students and Faculty

By comparing the correlation statistics of students and faculty, it brought about that faculty has stronger positive correlation between perceived usefulness and their attitude towards usability of UMT moodle. On the contrary, students have stronger positive relationship between their attitude towards using UMT moodle and the development of their behavior regarding its further benefits and usability. This depicts that, in line with the correlation among TAM factors students have more influence on their attitude leads to change in behavior. One of the reasons includes; more than 50% of students check their moodle account on daily basis. In contrast, faculty has strong influence due to relationship between perceived usefulness and change in attitude. Reasons may include; more than 60% of faculty uses their moodle account once a week only. To cut short, it can be concluded from results that increase in usage of technology may leads to increase in its influence regarding change in attitude and development of behavior.

<table>
<thead>
<tr>
<th>Table 04 Variables</th>
<th>Faculty r</th>
<th>Students r</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PU (Perceived usefulness)</strong></td>
<td>0.58</td>
<td>0.75</td>
</tr>
<tr>
<td><strong>PEOU (Perceived ease of usefulness)</strong></td>
<td>0.87</td>
<td>0.78</td>
</tr>
<tr>
<td><strong>PU (Perceived usefulness) → AR (Affective Response)</strong></td>
<td>0.62</td>
<td>0.77</td>
</tr>
<tr>
<td><strong>PEOU (Perceived ease of usefulness) → AR (Affective Response)</strong></td>
<td>0.78</td>
<td>0.79</td>
</tr>
<tr>
<td><strong>AR (Affective Response) → BR (Behavioral Response)</strong></td>
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</table>

Conclusion

E-learning has been adopted by around 20 Universities in Pakistan. It was introduced by Universities for teacher and student communication. Students before this technology had to get hard copies of handouts and lecture
notes from teacher. Teacher also had to contact with difficulty to students or class representative for special announcement. But with the help of LMS anything can be announced at anytime.

Authors made an attempt to study the uses of LMS of University of Management and Technology – UMT, as a case to investigate the phenomenon. The study made in depth interview of 15 students and 5 faculty members of UMT to produce qualitative insight of LMS acceptance. It came to front after interview that, both students and faculty are enjoying facility of easy communication but both of them facing problem regarding network. According to them, it never worked fast in the hour of need. Students complained that they always face problem in the time of assignment submission and in the time of exams to get notes or learning material, due to overload. Similarly, faculty members complained that it took lots time to upload large size of files.

Some of faculty members and also students talked against this technology. According to them, this facility is creating communication gap between student and teacher, as, students are avoiding classes and getting everything from Moodle. It is also causing short attendance because students don’t have to bother for getting lecture slides, they are available on Moodle. To cut short, qualitative analysis reveals that UMT Moodle is facilitating for making announcement, providing course material, assignment submission etc, but there is a major problem of slow networking and difficulty in uploading large size files.

Based on qualitative input a survey is designed and administered on 200 students and 50 teachers using systematic random sampling in UMT. The TAM instrument by (Ronnie H. Shroff, Christopher C. Deneen and Eugenia M. W. Ng, 2011) used after permission.

The study revealed both descriptive and inferential results by applying different tests on SPSS. Descriptive results showed that more than 50% respondents were male and less than 30 years in age, both in faculty and students. By calculating mean difference of Moodle usability, it came to know that more than 50% students check their Moodle account on daily basis, while more than 50% of faculty members use their moodle account once a week.

On the other hand inferential statistics data analysis found the correlation between factors of TAM (Technology acceptance model). It depicts that faculty have stronger positive linear correlation between perceived usefulness and affective response. On the contrary students have stronger positive correlation between affective response and behavioral response. It has been clear from inferential statistical results that faculty has more influence on their attitude towards technology due to change in their perception regarding its usefulness. While students have more influence on their behavior for further planning due to change in their attitude towards using this technology.

The study reveals very useful insights for policy makers in E-learning and practitioners of LMS in higher education. The study has contributed a local perspective on E-learning in the body of knowledge. The study also provided useful guidelines to redefine and improve LMS in the universities.

Appendix

<table>
<thead>
<tr>
<th>Age distribution in faculty sample respondents N=55</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 30 years: 46%</td>
</tr>
</tbody>
</table>

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### Table 05 Correlation Statistics of faculty

<table>
<thead>
<tr>
<th></th>
<th>r</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean for PU Variable VS Mean for PEOU Variable</td>
<td>0.58</td>
<td>0</td>
</tr>
<tr>
<td>Mean for AR Variable VS Mean for BR variable</td>
<td>0.78</td>
<td>0</td>
</tr>
<tr>
<td>Mean for PU Variable VS Mean for AR Variable</td>
<td>0.87</td>
<td>0</td>
</tr>
<tr>
<td>Mean for PEOU Variable VS Mean for AR Variable</td>
<td>0.62</td>
<td>0</td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed).

### Table 06 Correlation Statistics of students

<table>
<thead>
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<th>sig</th>
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</thead>
<tbody>
<tr>
<td>Mean for PU Variable VS Mean for PEOU Variable</td>
<td>0.75</td>
<td>0.00</td>
</tr>
<tr>
<td>Mean for AR Variable VS Mean for BR variable</td>
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<td>0.00</td>
</tr>
<tr>
<td>Mean for PU Variable VS Mean for AR Variable</td>
<td>0.78</td>
<td>0.00</td>
</tr>
<tr>
<td>Mean for PEOU Variable VS Mean for AR Variable</td>
<td>0.77</td>
<td>0.00</td>
</tr>
</tbody>
</table>

*. Correlation is significant at the 0.05 level (2-tailed).
References


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