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The Extent of Information Communication Technology Use in the University of Tripoli, Libya

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Author's contribution

This whole work was carried out by author SMKA.

Original Research Article

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ABSTRACT

Aims: The aim of this paper is to explore the extent of information communication technology (ICT) use in University of Tripoli, Libya.
Study Design: Qualitative data collected through semi-structured interviews with forty four graduate students and eleven academic from University of Tripoli, Libya. The interview questions utilize an extended version of the technology acceptance model (TAM).
Participants were asked to specify the main type of ICT tools that they used, and to identify the barriers to and benefits of use of ICT.
Place and Duration of Study: University of Tripoli, Libya 2011-2012.
Methodology: A semi structure interview was used to elicit data from the forty-four participants. Six students from each of the faculty of Law, and faculty of Art. Eight students of each the faculty of Engineering, faculty of Economics, faculty of Science and faculty of Information Technology. One Head of University, Two Library Directors, Two department heads, and the Six Dean of Faculties from University of Tripoli, Libya.
Results: Findings from study show that all the participants have utilized some form of ICT, and they had some basic knowledge of ICT tools such as computer laboratories, and Internet connection. All of them agreed that the use of tools has transformed their ways of teaching and learning. The findings also indicate that the majority of the participants believe that lack of training and a lack of adequate infrastructure as the main barriers that fence to use of ICT. Using ICT in Libyan Universities has not yet been studied

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comprehensively and the present paper therefore, is an attempt in filling this gap. **Conclusion:** The use of ICT tools played an important in University of Tripoli, the information technologies have changed the modes of learning, teaching and administration; it also transforming the way of teaching and learning.

Keywords: ICT; ICT benefits; ICT barriers; Technology Acceptance Model (TAM); Libyan Universities; University of Tripoli.

1. INTRODUCTION

During the last two decades the rapid developments in ICT have had a major positive role on higher education around the world including Libya. Libyan state, as it is in many developing countries, has been flounced by the wave of adopting new ICT in education which are considered as a top priority for the Libyan government in order to reform the content of the Libyan Higher Education System and in enhancing the interaction between lecturers and learners in University of Tripoli , Libya, that have tried to transform themselves to conform to the current applications and extent of ICT development because overall development in the university education sector will not be possible without adopting the use of ICT tools which can improve the quality of teaching, learning and management in universities, However, since year 2005, Libyan Universities has witnessed an extensive range of ICT resources to use for increasing the quality of teaching and learning purposes.

The General People's Committee of Education GPCE [1] reported that the main aim of Libya's Higher Education policy is to strengthen the role of ICT in society in general and in Libyan public universities in particular. The effective use of ICT in university education has been considered as a real and big challenge for policymakers and will require fundamental shifts in the Higher Education policy implementation. Consequently, and in order to further improve ICT in Higher Education institutions including University of Tripoli, the Libyan government has taken proactive steps to prepare a new policy for public sector as a basic plan to ensure that the needs of ICT in the public sector, including in the university education sector, are met. For this reason, the Libyan government decided to establish a New Higher Education Policy Reform NHEPR 2008-2012 in an attempt to increase the quality of Higher Education and its scientific and technological challenges. However, in accordance with the NHEPR 2008-2012.

The University of Tripoli now has strategies to become a research-oriented university because it realised that being a research oriented university will contribute significantly more benefits to the country than being a teaching-oriented university. It is thus questioned whether the implementation of such a research university plan will significantly impact on the influence of ICT usage [1] .In this context, the use of ICT has become more common during the last few years with the existence of the Internet and the World Wide Web. The Libyan government has signed an agreement with regard to the implementation of a national project for the use of ICT in the Libyan Higher Education sector.

According to the World Bank Information for Development Programme, Info Dev report [2] the main aim of this agreement is to assist Libyan Higher Education in establishing a national ICT capacity-building project in the country. It also includes the establishment, and the improvement of the infrastructure for applications in all ICT areas. The agreement aims to provide the Higher Education institutions with computer laboratories and classrooms for

education and training, in addition to the creation of digital libraries and also the establishment of a local information network linking the universities with each other. According to Libyan General Authority for Information and Telecommunication GAIT [3] this project costs 72 million US dollars and needs five years to be implemented, it consists of 450 workshops and laboratories comprising more than 600 computers, as well as the creation of rooms for digital presentation in each university consisting of computers along with display screens.

Use of ICT has greatly influenced Libyan higher education, and it is becoming increasingly important especially for university education sector, it have a vital role to play in changing the Libyan University education sector through enabling both graduate students and faculty members to improving teaching and learning outcomes, and clearly changes the way education is conducted. It also has become an area of growth across the university education sector and is at the very heart of the educational process. We conclude that ICT comprises computers and networks, hardware and software and other technologies as well as the equipment and services associated with these technologies. In the following section we review the literature about the use of ICT in university education

2. LITERATURE REVIEW

ICT is defined, for the purpose and context of this paper, as promoting the application of new ICT for learning, and teaching in University of Tripoli, Libya. Therefore, this paper refers to ICT as the technologies that are used to handle information and communication Technology. A large number of studies, researches and reports have addressed the issue of the use of ICT in education in general and in university education institutions in particular and also discussed computer laboratories and internet use, the benefits and barriers use of ICT. However, this section reviews and summarizes the available literature relating to the use of ICT in the context of University education literature review section is divided into two subsections. Firstly; we discuss the benefits of using ICT for teaching and learning at university level. And secondly, we discuss the obstacles of using ICT for teaching and learning at universities. Finally, we presents the technology acceptance model TAM as a conceptual frame work

2.1 Benefits and Barriers of Using ICT in Universities

Perceived usefulness (perceived benefits) is defined as the degree to which an individual considers that using a specific technology will enhance his or her job performance. Over past decades ICT has become an area of growth across any country, as well as at the very heart of the educational process that is becoming more and more important and this importance will continue to grow and develop, to keep pace with the latest developments and with the rapidly changing world into digital media and new information within the 21st century. Friedman [4] stated that those countries which do not adequately train their people for the new ICT and the new knowledge economy will be left behind and will not be able to compete effectively in the current global economy.

ICT offers new modes of both learning and teaching for all students and teachers at all educational levels especially at University education level, Within this level ICT has a profound effect in many ways; it can be seen as a major response to changes and it can improve the skills for learners and prepare them for the global economy and the new information society. However, the adoption and use of ICT is not an end in itself for graduate

students and faculty members involved within the University Education sector. Rather the outcome of technological change should be evaluated in terms of the contribution to the broader goals of sustainable development. According to White [5] the adoption and usage of ICT services has changed all mankind's predictable ways of learning, and teaching upon us the necessity to rethink education in terms of Higher Education. Moreover, the use of ICT can provide important drivers for reform or for the better management of Higher Education systems and can also improve learning outcomes and quality. It can also contribute to improving access to Higher Education. Castells [6] confirmed that "development is not possible without the use of ICT, and development without the internet would be the same as development without electricity". He also referred to the internet not only as a technical tool but also as a way of organising power and capacity. In this context, ICT provides developing countries with an unprecedented opportunity to meet vital development aims.

According to UNDP [7] Those countries that succeed in harnessing the potential of ICT can look forward to greatly expanded economic growth and a dramatic improvement in human welfare''. Moreover Rogers [8] considered that the personal productivity aids, the enrichment add-ins, and the paradigms as being the three levels of new technology adoption for Higher Education. Also, Harris [9] mentioned that students use ICT to plan and build models, and use the Internet to bring a new dimension to their learning. By using software and the Internet, students manage and reduce the time typically given to design a prototype. However, there are a number of Arabic studies that focus on the ICT use in Universities. For example, Al- Ansari [10] found that the academic staff in Kuwait University use the computer and internet and other ICT tools because they have helped them to save time, find up-to-date information and compare their work/research with their colleagues. Also, Al-Dubayan [11] examined the potential benefits of access to information using the internet by researchers in Saudi universities. The study found that 97 percent of respondents had a strong internet connection and they could easily connect to the internet. 81.6% Present of the respondents used the internet for academic research purposes, while 78% of the respondents said they used the internet to keep pace with the rapid developments in their field of academic specialization and to keep up with technology.36% of those surveyed said that teaching is the primary purpose of using the internet, while 23.6% of participants using the internet to disseminate their academic research findings .

Further to the above, our perspective is that ICT can be used effectively to support student learning and faculty members teaching because it is interesting and relevant to today's generation, and it enables independent learning, as well as teaching. This has significant implications for both graduate students and faculty members in their universities. However, there are many studies that focus mainly on barriers influencing effective use of ICT. Several of these studies are carried out to examine the factors that impact on the use of ICT in teaching and learning processes in the universities.

A barrier can be regarded as whatever prevents advancement or attainment of any clear aim. Therefore, according to this definition there are several barriers that confront teachers and learners when using ICT in Higher Education, as Baek and Kim [12] found that teacher's lack of experience, skills and knowledge with regard to using computers and the available newer ICT tools made them less ready to integrate ICT into their teaching. Another important study conducted by the Organisation for Economic Cooperation and Development OECD [13] identified a number of barriers inhibiting the use of ICT in education. These barriers, according to this study, were an inconsistent number of computers per students, a deficit in maintenance and technical assistance and, finally, a lack of computer skills and/or knowledge among teachers.

According to Haywood et al [14] there are factors that impede the adoption of educational technology in Higher Education: lack of time, perceptions of low status (and hence rewards) applied to teaching as compared to research, lack of reliable and adequate infrastructure (including technical support) and lack of basic information. Yang [15] established that lack of infrastructure was one of the major obstacles that resulted in computers being used. Howell and Lundall [16] pointed out that the most important factors preventing the use of computers as tools for teaching and learning are '' inadequate fund, inadequate numbers of computers, lack of computer taught teachers, lack of teachers' skills in using computers in different learning areas, and the absence of correctly developed curricula for teaching computer skills''. According to Tearle [17] the major factors that impede the use of ICT in universities are: (1) Poor telecommunication infrastructure, leading to very low teledensity, (2) Low investment in ICT equipment, (3) Linguistic barriers within, and among, Arabic countries, (4) Lack of relevant ICT skills and lack of policies, (5) The lack of capacity to manage and plan, and (6) Inadequate standardisation of ICT equipment. On the other hand, with regard to Arabic literature, many Arab writers have confirmed that there is a serious obstacle that prevent teachers from using ICT in their Universities. An important study prepared by Elzawi et al. [18] investigated the factors that affect internet use by staff members in Libyan universities and how the internet affects research and teaching their study concluded that there were some barriers which prevent academic staff in Libyan universities from using the internet namely lack of internet access, low speed of connection, lack of encouragement and incentives from their educational institutions, lack of skill in the English language, lack of training, lack of computer support and internet skills. Al-Ghaith et al. [19] explored the factors that influence the adoption and usage of online services in Saudi Arabia universities and concluded that the kind of quality of the internet was one of the significant factors impacting on the adoption and usage of ICT in Saudi Arabia universities.

Passed on the previous, we expected that faculty members and graduate students would use ICT to the extent they believed it would help them improve their learning or teaching as well as their work performance. When graduate students and academic staff believe that a new ICT system is useful for tasks and enhances their performance, they will use it, because the system provides benefits for them. Conversely, if they believe that a system is not useful, they will not use it. Next section outlines the Technology Acceptance Model TAM that explain the adoption, acceptance and use of technology.

2.2 Technology Acceptance Model TAM

The theoretical framework for this study is based on the Technology Acceptance Model (TAM). TAM is one amongst the foremost dominant analysis models that are used worldwide. It is mainly about how individuals accept and use introduced technology. However, many research findings show that there are many factors that affect technology acceptance and use. According to Teo [20], TAM is a theoretical model used to model the causal linkages between perceived usefulness and perceived ease of use, thus looking at users' intention and actual computer adoption behaviour. However, several previous studies, such as Davis et al. [21] have shown that there are various external factors that indirectly influence the acceptance of technology and ICT such as perceived usefulness and perceived ease of use. TAM also helps to understand the causal linking of external constructs which directly or indirectly affect ICT usage [22]. The TAM because of its simplicity and economy can be applied in different technology settings. It also has been, and continues to be, a popular research topic for information systems researchers and is widely used by them.

TAM has become one of the most influential and used models in information system research over the past two decades and practitioners use it to predict and explain user acceptance of information technologies. It is a very well-known and robust model in the information system and information technology field [23]. Since the TAM model was introduced by Davis [21] in his doctoral thesis, it has become well established as a powerful and economical model for predicting user acceptance. This were further reinforced by Shu-Hsun et al. [24] who examined 689 articles that concerned TAM in a literature review of technology acceptance model and reported that ''over the 1992-2009 period the number of researchers, scholars, authors and academicians, who published TAM literature comes from more than forty countries around the world. The U.S.A. (37.32%) is the primary country. The second one is Taiwan (13.67%) which contributes 111 literatures, followed by South Korea (54 record counts, 6.65%), China (52 record counts, 6.40%) and Canada (45 record count, 5.54%).

The involvement of researchers in many countries indicates that TAM has been able to draw the attention in the academic field''. In this vain, Legris, Inghamp and Collerette [25] concluded that overall TAM has proved to be a useful theoretical model in helping to understand and explain user behaviour in information system implementation. Therefore, the TAM has been commonly used for considering user acceptance of information systems in many fields. This with many alternative explanations. This means that the TAM model is a support model used to research users' acceptance when applying a particular technology. As such, the TAM model is a logical choice as an analytical framework for this study.

This formed the basis of the original TAM. As this paper is concerned with exploring the extent of ICT use in University of Tripoli, Libya, this model should therefore be expandable to include more constructs from different yet similar theories. According to Davis et al [21].The aim of TAM is to offer a clarification of the factors of computer acceptance which will then be adept at clarifying user behaviour through a wide variety of end-user computing technologies and by differing users. According to this model, when users are presented with a new technology a number of factors influence their decision about how and when they will use it. perceived usefulness; perceived ease of use; are factors that influence their decision. Fig. 1 shows the generic TAM model

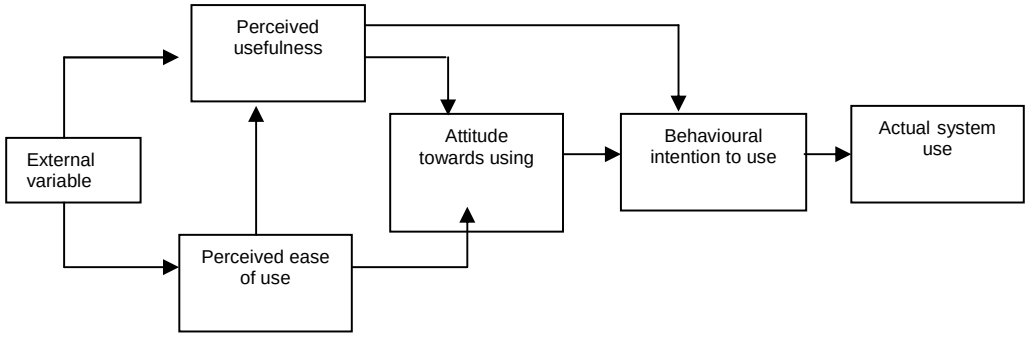

Fig. 1. Technology Acceptance Model (TAM) (Adopted from Davis [21])

According to the TAM, there are two specific variables, perceived ease of use and perceived usefulness, [21]. These two variables are motivational factors for accepting and using new technologies. The TAM theorizes that the effects of external factors like the system's

characteristics and exposure on intention to use are determined by perceived usefulness and perceived ease of use

2.2.1 External variables in TAM

As shown in Fig. 1 TAM starts off with the external variables leading to perceived ease of use, perceived usefulness, attitude to use, and behavioural intention to use. This is pointers on whether and how the user is actually going to use the technology. However, most studies on the external factors for example, Lee et al. [26] that the TAM has required a consistent outline of external variables. The role of external variables in impacting on usage behaviour within the TAM has been explored. Many studies have paid specific attention to the external variables.

These external variables can be computer training, organisational characteristics and computer experience; also computer user skills and the perceived complexity of a technology had an impact on perceived usefulness (Bourgonjon et al. [27]; Zahra, [28]; Santos and Pedro [29];). On the other hand, external variables such as user training, management support, organisational support, and system quality and computer experience have been confirmed as having direct effects on perceived ease of use [30].

A new study has been published recently by Santos and Pedro [29] on the relationship between teachers' training, personal sense of efficacy and ICT integration. One of most important results in this study confirmed that training has a positive effect on ICT use in teachers' teaching practices. There is a link between direct experience with technology and its characteristics (Lucas and Spitler, [31]). Also there is a link between an individual's computer self-efficacy (Sriwidharmanely and Vina Syafrudin, [32]; AL Dubayan, [33]; Igbaria and Livari, [34];) and motivation. Perceived ease of use has a significant impact on behavioural intention.

According to Davis et al [21]; the external variables can be considered as a bridge between beliefs, attitudes and behavioural intentions and other more or less controllable interventions impinging on behaviour. People's attitudes might not be changed simply with some slight effort. But present academic staff and students with, for example, extra technology training. As Wang et al. [22]; reported ''out of all the external variables, only computer self-efficacy can be manipulated by practitioners through promotion and training approaches''. Therefore, the concept of external variables is important to keep in mind when attempting to research into actual user or acceptance of ICT. Against this backdrop, this explore, therefore, examines the direct and indirect influences of selected external variables which may influence perceived ease of use, perceived usefulness and ICT usage. However, there are several external variables which have been established by specific research in the fields of ICT, information technology (IT), and information Systems (IS). Some literature also found that culture, implementation processes, adaptations, user features, compatibility and credibility of systems, and administrative structures, along with political and social impacts might have possible external impacts on the TAM (Singh et al. [35]; Kaba, N'Da and Mbarika, [36];)

2.2.2 Perceived usefulness

Perceived usefulness is defined as the degree to which an individual considers that using a specific technology will enhance his or her job performance [21]. A significant number of studies have shown that perceived usefulness is a strong antecedent of user acceptance

behaviour, for example, in studying word processing and spreadsheet systems' acceptance [21], predicting user intentions, telecommuting technology [37] measuring web and wireless site usability [38].

Perceived usefulness is the primary determinant, positively affecting users' actual use of the system. According to the TAM, perceived usefulness is a very important determinant of usage. When users believe that a new technology is useful for jobs and enhances their performance, they will accept it. Perceived usefulness is the primary determinant which positively affects users' beliefs on, and intentions towards, the technology. Other research debates that perceived usefulness is a determinant of continual system use [39].

Bourgonjon et al. [40] reported that a student's preference for using computer is directly affected by usefulness, ease of use, learning opportunities and personal experience. According to Al- Ansari [10] academic staff in Kuwait University use the computer and internet and other ICT tools because they have helped them to save time, find up-to-date information and compare their work/research with their colleagues. Bhattacherje [41] found that a post use view of perceived usefulness is determined by pre-use perceived usefulness which predicts actual system use.

The results of Venkatesh and Davis' [42] study demonstrated the importance of social influence and cognitive instruments in increasing a user's perception of usefulness. The results explained almost 60%of the difference of perceived usefulness. They found that external variables affect perceived usefulness directly or indirectly through perceived ease of use. Supposed usefulness is the degree to which a possible adopter (or user) views ICT as offering advantages over previous ways of learning and teaching in the university sector.

We expected that academic staff and graduate students would use ICT to the extent they believed it would help them improve their learning or teaching as well as their work performance. When graduate students and faculty members believe that a new ICT system is useful for tasks and enhances their performance, they will use it, because the system provides benefits for them. Conversely, if they believe that a system is not useful, they will not use it.

3. PERCEIVED EASE OF USE

This Perceived ease of use is the degree to which a person has confidence in the fact that using a particular technology will be free of effort. Although they recognize the importance advantages of using ICT some users are reluctant to use some ICT tools due to the fact that they are hard to use. In this vein, there have been several studies presenting various results of the influence of perceived ease of use. Sriwidharmanely and Vina Syafrudin [32] confirmed that perceived ease of use had a positive significant impact on the perceived usefulness of accounting software. According to them, accounting students argued that when they could easily use accounting software, it would be useful/of benefit to them. Other studies support this result, that perceived ease of use has a significant influence on use such as predicting the usage of information technology, online banking use [43] online shopping use [44]) and mobile internet acceptance [45].

Perceived ease of use has a significant impact on behavioural intention but this impact is less than the impact of perceived usefulness. Because perceived ease of use does not impact directly on users' behavioural intention, it has an effect on behavioural intention through perceived usefulness. Therefore, if users do not have perceptions of the usefulness

of new technology perceived ease of use will not have any effect on intention. However, this perceived usefulness scale was found to be valid and reliable in measuring users' perceptions of ease of use of the new system. Perceived ease of use refers to the degree in which ICT tools are perceived as easy to understand and use and which the users will interact with technology if they feel that little effort is needed for using the technology in order to accomplish their tasks. Usefulness refers to the user's perception that the use of the technology could enhance their performance, as Zahra [28] reported that the perceived ease of use has a positive impact on the perceived usefulness of the using the internet and ICT by students for reference purposes. The study by Davis [21] found six factors for both perceived usefulness and perceived ease of use, by which technology acceptance can be evaluated. These factors, which are presented in Table 1, will be used as a basis for the interview questions asked in this research study.

Table 1. Evaluation factors (collected from Davis [21]**)**

Variables	Scale item	Evaluation factors	Variables	Scale item	Evaluation factors
Perceived Usefulness	Working more quickly	Using (ICT) in my teaching/learning would enable me to accomplish tasks more quickly	Perceived Ease of Use	Easy to learn	Learning to operate (ICT) would be easy for me
	Job performance	Using (ICT) would improve my teaching/learning performance		Controllable	would find it easy to get (ICT) to do what I want it to do
	Increase productivity	Using(ICT) in my job would increase my productivity		Clear and understand able	My interaction with (ICT) would be clear and understandable
	Effectiveness	Using (ICT) would enhance my effectiveness on the teaching/learning		Flexible	I would find (ICT) to be flexible to interact with.
	Makes job easier	Using (ICT) would make it easier to do my job		Easy to become skilful	It would be easy for me to become skilful at using (ICT)
	Useful	I would find (ICT) useful in my teaching/learning		Easy to use	I would find (ICT) easy to use

4. METHODOLOGY

This paper explores the use of ICT in the context of higher education, the focus of this paper therefore is on studying the extent of ICT use among graduate students and academic staff in University of Tripoli, Libya, with a particular emphasis on university education, shown by university of Tripoli. This technique allowed the researchers to achieve the main research aim of this paper which is to explore the extent of ICT adoption and use among graduate students and academic staff in University of Tripoli, Libya. However, in order to achieve this aim, the following two objectives were highlighted:

1) To identify the main type of ICT tools that used in University of Tripoli, Libya.
2) To explore the potential benefits from the use of ICT in University of Tripoli, Libya.
3) To identify the barriers that they faced with regard to the use of ICT in University of Tripoli, Libya.

We used qualitative research design and methods to achieve the above two objectives. The qualitative design was chosen because its inductive approach emphasises the processes and meanings that are not experimentation studied in terms of quantity, or frequency.

3.1 University of Tripoli

As mentioned above University of Tripoli has select as a context of this study to choose the participants, and to decide their nature and number, the researchers carried out an extensive and detailed investigation of the "population" of the University of Tripoli ,Libya, that were in existence at the time of conducting the research. However, the choice of university of Tripoli as being appropriate for this paper was also based on strategic selection. Given below are the brief description of University of Tripoli with the main reasons for selecting University of Tripoli as the context for this study.

The main campus of the University of Tripoli is located in Tripoli the capital city of Libya. It (formerly known as Al-Fateh University) started 1954 with Faculty of Science, the Faculty of agriculture was added in 1966, It is the most important institute of higher education in Libya providing undergraduate, and post-graduate stages of study. Four reasons to choose the University of Tripoli as follow:

1. The significance and contribution of the information got from the selected institution to explaining the research questions was considered.
2. Older-established university is assumed to be more resilient and resistant to change than universities which have been established more recently.
3. Institution located in or nearby one of the Capital city is assumed to be less preoccupied with regional development than universities located in rural areas, and
4. The researcher chose to get participants from University of Tripoli because it is a public university that have been using ICT equipments for quite some time compared to other public Libyan Universities.

Statistics indicate University of Tripoli takes more graduate students than any other public universities in the country. The total students were 43258 male and female students. 12 faculties in Tripoli while, 2 branch faculties of Teachers training outside University. About the academic staff in the University of Tripoli, they are necessary to hold a Master or Ph. D. degree from any higher institutions recognized by the Ministry of Higher Education and Scientific Research. According to decision No. 501 [46] there are five ranks are used for academic staff in University of Tripoli and all other Libyan public Universities Libyan These ranks are as (1) Assistant lecturer, (2) Lecturer, (3) Assistant professor, (4) Associate professor and (5) Professor Academic staff with Ph. D. degree. Each faculty in the University is represented by its dean. These deans implement the general policies of higher education set by the Ministry of Higher Education and Scientific Research at university level.

5. PARTICIPANTS, INTERVIEWS AND ORGANIZATION OF DATA ANALYSIS

For the purpose of this paper. The selection of the sample in this study used a snowball sampling, the researchers was able to use snowball sampling to get participants from the University of Tripoli. Snowball sampling is a type of purposeful sampling that identifies cases of interest from people who know people who would be willing to participate in the study and these people know other people who could be referred and the chain continues. The snowball gets larger and greater mutually as one accumulates new information-rich cases

[47]. Through this method of selecting participants from the University of Tripoli. These participants also provided the researchers with information that was rich, with the assistance of their key informants the researchers ensured that all of the participants had used some of ICT tools before. This was important, as it provided a variety of additional information from a different perspective. We interview people who are in capacity and concerned in Libyan University education and have a deep understanding and a great deal of information on the issue relating to use ICT in University of Tripoli , Libya. However, in order to discover as much data as possible in relation to the propose of this paper, it was decided, in addition to conduct semi structured face to face interviews with a number of key figures that have a direct connection with the overall subject. The breakdown of students with respect to each specialty and gender is not a matter of interest in this paper as the purpose of this paper was to find the graduate students use of ICT as a whole and not with respect to each gender or specialty.

As shown in Table 2 the participants were a total of 55 male interviewees .Forty four graduate students in the Masters level and 11 academic staff, at university of Tripoli. All of them were provided with different ICT.

Table 2. Candidates for Interviews

Graduate students	Six students from each of the faculties of Law, and Art Eight students of each the faculties of Engineering Economics, Science ,and Information Technology	44
Academic staff	One Head of University, Two Library Director, Two department heads, and the Six Dean of Faculties	11
Total		**55**

Although, the forty four graduate students is the larger than academic staff group which was ten. However, the differences in the number of two groups of interviewees are due to the large variation in the number of the graduate students, and despite the small sample size (N=55), one can see many trends related to the different knowledge with participants in using ICT. Moreover they expressed different views about the issues related with ICT usage. The 44 graduate students and the eleven academic staff were selected from six faculties that had varying levels of ICT (Science, Engineering, Economics And political Science, Arts, Law, and Information Technology).

We conducted semi structured interviews with all the participants. All the interviews were audio recorded and then transcribed, recording each interview on a separate document. In addition, the respondents, the written questions are exactly what are asked orally, and the researchers took notes during each interview. A combination was used basic productivity software (Word) to facilitate the coding, and sorting, of the research data. In this vein and in an attempt to avoid bias and data invalidity this study and once all interviews had been conducted. Each interview started with ask an initial question at the beginning of each interview, and at the end of the interviews all the participants were asked if they would like to add any additional information relating to any of the issues contained in the questions. This increases the trustworthiness of qualitative findings considerably, because these facilities can confirm that the questions are actually stranded in the data and not based on lone and extremely untypical events.

The next stage after conduct the interviews was coding the words, paragraphs, items, themes, and concepts were coded in the data. After the data set had been collected and organized by the results were coded. Finally, additional codes had been extracted from the raw data, the researcher searched for links between codes in order to begin creating new categories or to discover whether they were appropriate to existing categories. The feedback from the interviewees was placed under three main themes.

The following section combines the data obtained from the fifty five participants' perceptions during interviews stage into themes.

6. RESULTS AND DISCUSSION

The researcher argues that before reviewing the finding of this paper, it is necessary to understand the background of the respondents. This information is significant to this paper because it aids the person who reads it to understand specific relevant subjects that may have an impact on the analysis, for example how the background researchers argues that the characteristics of the respondents will provide a full picture of the suitability of the respondents for this paper. An understanding of the background of the respondents sheds some light on the extent of ICT use among the University of Tripoli by the respondents. Data for this objective was obtained from 54 semi-structured interviews with 54 users of ICT. All of them were male, and directly involved in the Libyan university education sector. They used ICT and they could provide important information about the use of ICT within the Libyan University Education context.

Table 3 presents background information on the participants in terms of qualifications and work experience (presented only for the academic staff)

All of the graduate students (N=44) held a graduate higher diploma. They consisted of six students from the faculties of Law and Art, and eight students from each of the faculties of Engineering, Economics, Science and Information Technology. Out of the 11 academic staff one was Head of the University, one was a library Head, three were department Heads and six were Deans of Faculties. Data shows that a large majority of the academic staff (N=8) hold a PhD degree; whilst only three of them hold Master's degrees.

The researchers believes that this indicates that the responses of the interviewees can be regarded as reliable. With regard to the subject area, majority most of them hold higher degrees in different fields of knowledge. Table 3 also presents the academic specialty of the 11 academic staff in the University of Tripoli. The respondents were asked to answer the interview questions to the best of their knowledge. If the questions related to situations in which some of the respondents had no personal experience the respondents were asked to give their perception of the overall situation at the University of Tripoli. For instance, if a question about using a particular ICT application in the university could not be answered for a specific learning or teaching context by the respondent then the participants gave their views in relation to the whole university context.

Table 3. The Interviewees background

	Level of education		
	Graduate students	**Academic staff**	**Total**
PhD	-	8	8
MSc	-	3	3
Graduated Higher Diploma	44	-	44
Total	**44**	**11**	**55**
	Experience years		
	Graduate students	**Academic staff**	**Total**
5 years or less	-	2	2
6 -10 years	-	5	5
11 -15 years	-	2	2
Over 15 years	-	2	2
Total	**-**	**11**	**11**
	Subject area		
	Graduate students	**Academic staff**	**Total**
Engineering	8	1	9
Science	8	2	10
Libraries	-	1	1
Administration	-	2	2
Law	6	1	7
Art	6	1	7
Economics	8	2	10
IT	8	1	9
Total	**44**	**11**	**55**

The researchers attempted to identify the forms of ICT that are used by graduate students and faculty members at the University of Tripoli. This was achieved by ask to evaluate how much computer and ICT they use? and what were the main ICT tools, main ICT software and ICT hardware that they used. The finding indicted that computers in the University of Tripoli are understood to comprise a basic computer system configuration with a systems' unit, a mouse, a keyboard and a monitor together with a generic operating system and application software. Some faculties in the University of Tripoli have gone beyond the basic configuration and have added internet connectivity and additional peripheral devices such as multimedia speakers, compact discs (CDs), digital versatile discs (DVDs), scanners and data view projectors, etc. These have been used variously for teaching and learning by learners and lecturers the university. The results, with regard to the form of ICT that is used at the University of Tripoli, is presented in Table 4.

From Table 4 it can be observed that the University of Tripoli make substantial use of combinations of ICT applications; this is indicated by the respondents who stated that the University of Tripoli wants to be an ICT university with campus-wide electronic learning, teaching and administrative processes as a support for all faculty members and students. However, observations that can be made based on table relate to the use of ICT hardware and software and indicate that the use of computer and internet websites is often combined with the use of other applications, such as printers or email programmes. Also from Table 4 it is clearly evident that the use of computer laboratories laptop is the most frequently used hardware while the internet and word processors are the most frequently used software. This

indicates that computer hardware, internet and word processors are greatly used in teaching, learning and administration in selected faculties in the University of Tripoli.

Table 4. Mean of ICT adoption and use in the University of Tripoli

Respondents	Computer laboratories			Phones and mobiles			Printers and scanner		
	Always	Sometimes	Never	Always	Sometimes	Never	Always	Sometimes	Never
Graduate students	44	0	0	44	0	0	0	29	15
Academic staff	11	0	0	11	0	0	9	2	0
Respondents	**internet connection**			**Email and social network sites**			**Word excel and power point**		
	Always	Sometimes	Never	Always	sometimes	Never	Always	Sometimes	Never
Graduate Students	40	3	1	35	8	1	43	0	1
Academic Staff	11	0	0	7	3	0	10	0	0

All of interviewees' responses concurred that Word, power point and Excel processing for writing documents and designing presentations were the main software programmes they used. Each used ICT differently. However, phones and mobile phones also seem to be common and commonly used by all the participants. All interviewees in this study were clear on the benefits of ICT in education. They had positive views about the importance of ICT introduction, and considered that ICT and computers had benefits that could not be overlooked, and had a relative advantage over other technologies, also all the interviewees who had access to ICT considered that ICT had a relative advantage over other technologies and felt that its use was helping them to improve their performance in learning, teaching and administrative.

Participants provided detailed answers to the question: what do you believe are the main benefits of adopting and using ICT? They gave some examples from their teaching, learning, and administrative experiences that supported their positive view. All participants provided detailed answers to the question, which indicated they were trying to convince the researcher of ICT advantages, giving some examples from their teaching, learning and administrative experiences that supported their positive view. None of the comments was limited to participants views on ICT in Universities , they extended to cover advantages of ICT, therefore, there was a strong link between participants views on ICT in Universities and the advantages they believed it offers the teaching, administrative and learning process.

According to interviewees' responses the most vital reasons for using computers in the education and management of Higher Education are to create a highly skilled labour force that supports the demands for ICT to teach and educate all students and teachers about the

technologies; to change the curriculum frequently by using computer; to support change in education, and to give access to the web and email.

Some participants used computers for internet-based research during studies as well for their research assignments. Moreover the graduate students and the academic staff used computers to practice their learning and teaching. In this context, usage of the internet and other ICTs were also identified as important areas. Determining their information needs and the extent to which ICTs were used in seeking information. It is widely accepted that ICT tools has become more important now than ever before because of its countless contributions in advancing the quality of all works of life including the university education field. This is in line with the findings of a study which investigated the views of some faculty members at Kuwait University about internet use [10] which found that the majority of faculty members at Kuwait University had been using ICT, including the internet; because it helped them save time, find up-to-date information. The study found also that almost all the participants wanted to improve their internet usage skills through formal training. The internet connections in the university were very important.

The previous results concurs and this point of view can also be linked with Zahra [28] who found that the perceived ease of use has a positive influence on the perceived usefulness of the Internet as a student's reference. In the same context, there was a strong link between academic staff views on ICT in universities and the advantages they believed it offers the teaching and learning process. Besides helping students to become independent learners, faculty members thought that computers helped to make their work easier because one is able to manage his work much better. The following section outline the potential obstacles that would prevent to use ICT from the participants' point of view.

As barrier can be defined as anything that inhibits progress or the achievement of an objective or aim. However, some studies have been conducted regarding ICT competence among HEIs in Libya, and several Libyan researchers (e.g. Al-Badri,[48]; Al-Dhaif et al. [49]; Attir, [50]; El -Hawat, [51]) claim that a lack of ICT infrastructure in the workplace and lack of trining is a significant barrier to ICT use. The researchers also argued that most Libyan people are not able to effectively use. ICT because they lack necessary skills. For this reason the Libyan government demands confidence and efficiency in ICT use in all areas, at both the academic and industry levels, in order to succeed in education and work as well as in everyday life. However, in the studies of Sriwidharmanely and Vina Syafrudin [32] the perceived ease of use had a significant positive impact on the perceived usefulness of the accounting software. This is in line with the study conducted by Wang et al. [22] which reported that computer self-efficacy can be manipulated by practitioners through promotion and training approaches. This finding also concurs with the study of Lassar et al. [52] who found that, the more customers have skills in using both computer and the Internet, the easier for them to accept the use of Internet banking.

Comments from the participants also revealed that lack of ICT training and lack of ICT infrastructure are different barriers preventing them from adopting or using ICT. Most of the participants believed that they needed more skills' training. This finding was supported by answers to the question: what do you believe are the main problems with using ICT in your University. Passed on the response of this question by the participants' these barriers to ICT adoption and use mentioned by the participants are very much in line with the barriers discussed in the literature review .The results indicate that lack of training and lack of ICT equipment is two of the major factors that hinder the adoption and use of ICT is one of the most significant factors often cited institutions barriers to ICT use in university of Tripoli .The

results also shown that only 11 of 44 graduate students had undertaken ICT training, and all of the training funds were not from government sources. While all higher education official (N=6) had received their training from the ministry of higher education program. The graduate students reported that their lack of expertise with using computers strongly. In this context, results of the interviews revealed that the majority of the respondents believed that lack of good training is a negative factor and that increasing/providing good training would be a positive factor in increasing use of knowledge of computers and ICT tools.

The findings points to the fact that the vast majority of respondents confirmed that internet access and computer system were inadequate. In the same vein, the findings clearly indicated that the Libyan government is failing to adequately provide hardware and software, and the participant are still not prepared well to use ICT and there is always low availability of internet connection. These Findings from the interviews confirmed previous findings from the literature review. For example, Afsshari et al [53] confirmed that Hardware, software and network infrastructure must be available to integrate ICT in education.

7. LIMITATIONS OF THE RESEARCH

As with any research project, this paper has certain number of limitations that should be mentioned for consideration by those using this paper's findings or evaluating the results. The limitations of this are:

- The events of 2011 in Libya disrupted the research somewhat but also possibly made this research more valid within the public discourse in the region.
- Generally, a generic challenge to all interpretive researchers is the need to triangulate. However, this research paper had to rely solely on semi-structured interviews; there was no observation or policy document analysis and this feature made the paper incur more limitations.
- Being research for a paper with limited resources and time limitations, it was not possible to cover the research beyond interviews undertaken, with more students in various stages at many public or private Libyan universities or to undertake an analysis of government and institutional documents relating to the ICT use.
- Ideally, a survey of all the stakeholders, including all the staff members and parents, should have been carried out in order to collate the views of all concerned. This was, however, not possible. Therefore, this research paper was limited to the two particular groups concerned, and it only focused on University of Tripoli, Libya, so the results might not be relevant to other education sectors or other countries.
- In this research data were collected using interviews. These were undertaken to get in-depth information to augment the current results. However, given the limited time allotted for data collection (alongside some financial difficulties) in addition to the extensive distances between Libyan universities, it was considered essential to select only one university instead of drawing a sample from Libyan universities in other cities and towns. Finally, a study of this nature may not capture the whole picture which is why its findings should be viewed as exploratory and preliminary.

8. CONCLUSION AND RECOMMENDATIONS

As shown previously this paper was conducted at the University of Tripoli located in Tripoli in Libya. The fifty five participants were asked many different questions during the semi-structured interviews. This study focuses on ICT use within University of Tripoli. ICT is now

viewed as a necessary element. Information technologies have changed the modes of learning, teaching and administration; transforming the way of teaching and learning. However, the introduction of ICT into the University of Tripoli has brought with it many problems for users. The results found that the hardware and software that were more easily available to the user were more repeatedly used. The study found that basic ICT technologies such as telephone, fax, e-mail and internet are already available in all six faculties in the University of Tripoli.

The study explore the perceived benefits of, and the perceived barriers to, ICT and the kind of ICT tools that have been used by the participants in the context of educational process in Higher Education in university education in Libya. The paper found that all the participants who were interviewed had some basic knowledge of ICT tools and all of them agreed that the use of ICT tools played an important part in their learning and, teaching. Each used some form of ICT, and had a different approach but each was effective in its own way. Each participant stated that they felt that ICT can be a useful tool in the University. However, they felt that it should not replace some forms of traditional methods of teaching and learning such as face-to-face interactions, books and the blackboard. Respondents were asked to indicate what barriers that they think limit the effective utilisation of ICTs for learning, and teaching in the Libyan university education context. Different barriers were mentioned by the participants. These barriers made it difficult for them to overcome the problems they were facing in ICT use. Respondents were required to name the barriers that they faced with regard to the use of ICT.

According to the participants, the biggest barrier to competitive adoption and effective use of ICT in their learning, and teaching is a lack of training and a lack of adequate infrastructure. These barriers, according to them, leads to poor adoption and implementation of ICT and leads to failure to take full advantage of the benefits that that are expected from the adoption and use of ICT. However, in view of the findings of this study, the recommendations that are made in relation to the research's aim and objectives are: (1) The Heads of universities and deans of faculties should consider training students and faculty members, not only to involve them in the use of ICT tools, but also in general university activities (2) Based on the findings of this paper, ICT tools should be made more accessible to both faculty members and students, and (3) The various Libyan educational institutions should build an ICT culture within the educational process by making the education process more reliant on ICT and less on manual processes

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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