TOWARDS THE ADOPTION OF ENTERPRISE RESOURCE PLANNING SYSTEMS (ERP) AS AN EFFECTIVE TEACHING TOOL IN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

Enterprise resource planning systems are considered as a key to gain competitive advantage and excellence. The purpose of this study is to find out the effect of enterprise resource planning systems as a teaching tool on the quality of teaching process. For the said purpose the available literature over ERP in general and its impact on higher educational institutions has been reviewed. Based on literature four variables have been identified which are supposed to be critical for gaining advantages from the implementation of enterprise resource planning systems as a teaching tool. For the said purpose, the questionnaire was developed, and the data was collected randomly. A sample of 100 was utilized for conducting the analysis. Smart PLS was used for structural equation modelling and the model has been analyzed. The findings of the study revealed that all the independent variables namely, perceived usefulness, awareness, ease flow of data, and facilitating conditions have a significant impact over the teaching quality. The calculated value of Construct Cross Validated Redundancy showed that model has a significant predictive relevance. The findings are significant for teaching staff, top management and for the policy makers in higher educational institutions. The future researchers are guided to identify the pre- and post-impact of enterprise resource planning systems as a teaching tool over the teaching process and quality of learning outcomes within higher educational institutes.

Keywords: Enterprise Resource Planning System, Teaching Quality, Awareness, Perceived Usefulness, Facilitating Conditions.

INTRODUCTION

Enterprise Resource Planning (ERP) systems help in the integration of various functions in all businesses (Chellappa & Saraf, 2010). Therefore, it has a significant role over the driving forces behind organizational environment. It helps to understand the increasing complexity in the huge data. In the current world, ERP system is gaining importance and several institutions are using ERP systems with an expected life of five years or more. ERP is an information system which is particularly designed for the coordination of resources of the businesses. Use of digital technology is helpful in coordinating information related to business activities including accounting, marketing, human resource, procurement, and production (Asad et al., 2018). The planning of organizational resources is dependent on database management through specialized software and programs. ERP system helps organizations to utilize the information as per the need. These systems help the organizations to use the information as per the desired needs (Turek & Dziembek, 2018).

Currently, this segment has become a huge market having billions of dollars investment. Considering the importance, the higher educational institutions can gain advantage by the utilization of ERP systems in their curriculum, as it is equally important not only for the businesses but also for the educationalists. The incorporation of ERP system can have several benefits; however, it has certain challenges too (Menon, 2019). ERP helps in the adoption of innovative systems. Social systems embrace innovations, like ERP system in teaching, which is useful at various stages. Furthermore, it may help in adopting various groups with similar features. Such groups are commonly discussed in several marketing books like early majorities, innovators, early predictors, and retarders (Rogers, 2010). Thus, it's obvious that the importance and significance of ERP systems cannot be ignored.

The basis of ERP systems can be traced back to information technology, computer sciences, mathematics, system theory, and information science. It is a system of information management which mixes management ideas, tools, and methods. Its success is dependent on the implementation of modern management theories. If implemented properly ERP systems have to potential to help businesses in taking effective decisions (Lu, 2020). ERP system not only helps to compete in the current era but also helps in the achievement of the strategic goals of the organizations, and educational institutions have no exception to it (Liuke & Zhiwen, 2018). Therefore, there is no harm in saying that ERP system as a tool is a must in management studies, engineering, and business management in universities. The importance of ERP systems can be realized from the fact that it is based on practical learning which is highly linked with basic and specialized knowledge. If ERP systems are being used as a teaching tool in higher educational institutions, then users can develop the sense of its effect and realize its importance (Shatat & Burtamani, 2019).

The higher educational institutions (i.e. universities) are moving towards the adoption and usage of information systems; however, its success is a big question mark (Chondamrongkul, 2018). Currently universities are using communication channels like emails, telephone conversations, conferences, seminars, and other informal ways, but especially in the current times due to COVID-19 like other businesses, several universities were forced to implement some sort of ERP systems (Kashif et al., 2020).

However, despite the current need, several organizations have even failed in the implementation of the ERP systems (Mahmood et al., 2019). The high rate of failure of organizational resource planning systems in the developed as well as developing countries even costs liquidation of several organizations. The basic reason behind this failure is due to high cost of the system and human resource qualifications required for the successful adoption of the system. This failure instigates to understand the issue in detail and especially in the higher educational sector because the use of ERP in higher education sector is weak even though it is highly needed.

Those universities utilizing ERP systems as a teaching tool is performing better especially in terms of teaching quality (Andrianto, 2018). The importance of ERP system cannot be ignored in higher educational institutes (Al-Hadi & Al-Shaibany, 2017). From the literature it seems that either its educational institutes or business organizations, internal factors cause failure. When employees' perceived usefulness of the system is weak or they lack awareness of the importance and use of the system, this causes lack of benefits and ERP system remains as a cost factor only. Secondly, if the systems are not developed efficiently it may become a hurdle rather than facilitation, and likewise if the facilitation conditions are not good enough, even then ERP systems will be unable to perform effectively and show intended advantages.

Therefore, it is right to say that perceived usefulness, awareness, ease flow of data, and facilitating conditions play a significant role over the quality of teaching techniques. On the other

hand, it has been observed that ERP systems are not applied in most of the higher educational institutions in Jordan, which could help in improving the teaching quality of faculty members at these universities. It has also been observed that faculty members at these institutions lack knowledge of ERP systems which is a major reason behind the fact that implementation of ERP systems have yet been ignored by universities in Jordan. Thus, considering this problem the current study will focus on identifying the impact and usefulness of ERP systems as a teaching tool over the quality of the teaching process and will identify the perception of the faculty members towards the perceived usefulness, awareness, ease flow of data, and facilitating conditions at higher educational institutions in Jordan.

To fulfill the objectives of the study, following research questions have been framed.

- Does the "perceived usefulness level" of Enterprise Resource Planning Systems have an impact over the quality of the teaching process in higher educational institutions?
- Does the "awareness level" of Enterprise Resource Planning Systems have an impact over the quality of the teaching process in higher educational institutions?
- Does the "ease flow data" of Enterprise Resource Planning Systems have an impact over the quality of the teaching process in higher educational institutions?
- Does the "facilitating conditions level" of Enterprise Resource Planning Systems have an impact over the quality of the teaching process in higher educational institutions?

Answers to the above-mentioned research questions are very helpful in many aspects. The importance of the study comes from the fact that it adds new knowledge to the theoretical literature related to adopting and using ERP systems as a teaching tool and its impact over the quality of the teaching process in higher educational institutions in Jordan. The results of the study may benefit officials at the Ministry of Higher Education to set standards for effective teaching techniques capable of advancing the educational system at universities in Jordan. It is also expected that the results of the study will be reflected on the creation of ERP systems among Jordanian universities by motivating the faculty members and staff of adopting and using such systems in the process of teaching as a teaching tool. As ERP systems help in the teaching process and reflect on the success of educational institutions in a way that raises the level of their teaching quality to the highest level. Furthermore, the current study may benefit researchers and scholars in the fields of ERP systems and educational teaching to enrich the library with more studies on these topics. It is expected that the results of this study will be reflected in raising the level of teaching quality in Jordanian universities. Finally, the findings will provide users with the necessary and special skills in enterprise systems and qualifying them to use ERP systems in line with the requirements of the local and global market.

LITERATURE REVIEW

Literature over the impact of ERP systems usage has been analyzed, most of which deals with the usage of such tools as a teaching technique and its effect on the quality of teaching and variety of teaching techniques. The literature review for the study focused on the variety and quality of teaching because of utilization of ERP. Initially the literature over variety of teaching has been analyzed and later quality of teaching, followed by the variables that influence both.

The core of implementing ERP in universities is to enhance the quality of teaching in a variety of ways. This implementation requires certain adjustments which may be fundamental or simple. The purpose of all the activities is to enhance the learning of the students in variety of ways. Variety

means the ways through learners' access information, skills, and concepts that they are supposed to learn. Variety of teaching is helpful in several ways which helps students to understand according to their abilities and preferences.

Thus, promoting equal opportunities for all regardless of their capabilities and interests (Kang & Keinonen, 2018). Here it is important to understand the teaching requirements for a successful teaching process. The solution to this is in the ERP system as it contains data of student using it in their learning process regarding their background qualification and their performance in various subjects (Noaman & Ahmed, 2015). ERP system is helpful in designing, understanding, and identifying the teaching techniques required.

Second important reason for which ERP system is required in improving the quality of the teaching process. As educational institutes are expanding the need for ERP systems is increasing, enhancing and maintaining the quality of the teaching process. In the developed countries the academicians have paid serious attention towards the quality of education and have placed it at the forefront of their priorities. Its importance can be realized from the fact that maximum efforts and funds are allocated towards the satisfying of learner's needs and most importantly the quality of teaching process.

The concept of cognitive skills along with ethical aspects and problem solving has become the top priority for the universities, which calls for effective utilization of ERP systems. However, implementation of ERP systems requires the willingness towards adopting and using such a system (Arsenijević et al., 2010). The quality of teaching is highly dependent over the capability level of the teaching staff. An important thing which should not be ignored is the awareness and willingness of the teaching staff towards the same. The leadership intention in this regard is crucial (Dezdar & Ainin, 2011). The quality of teaching in universities depends on spreading the two cultures of evaluation and correction within the educational institution by providing mechanisms to collect information to enable the concerned parties to take appropriate decisions to improve and develop the programs offered (Elkhani, 2014).

Whenever any higher educational institute intends to implement ERP system as a teaching tool, it must consider that relative advantage to users must be highlighted properly to motivate those (Dezdar & Ainin, 2011). The developed system must be compatible with the human resource or the human resource should be trained for compatibility. Any type of complexity observed during the trial phase should be removed by the top management through proper support system, thus, the top management should act as a facilitating condition (Le Duc, 2015).

There is a need to develop a new methodology for implementing ERP systems to address the current high failure rate in ERP implementation (Alturkistani, 2018). There are certain strategic as well as tactical factors which result in successful implementation of ERP systems. Educational sector being the art of service sector need support of top management, roper training, support, and awareness s mandatory for the successful implementation of ERP systems in any service sector (Migdadi & Zaid, 2016).

There is no one best solution to get the best outcomes, however several things are involved from awareness to skills to support. Therefore, there are several ideas and strategies for implementing ERP systems as a teaching tool, however, the most important needs to be identified especially with respect to teaching (Fan et al., 2011).

In majority of the developed countries, higher educational institutes are using ERP systems efficiently and effectively. As a result, they are achieving several benefits like advanced teaching techniques, which are helping them in implementing variety of teaching as well as bringing quality in the variety of teaching. Those higher educational institutes that have invested in ERP systems

succeed in achieving improvement in the variety of quality teaching (Shatat & Burtamani, 2019). Such higher educational institutions also increased the pace of teaching and enriched the content of teaching, through implementing diversified teaching methodology.

Implementation of ERP systems is not only important for the management and the teaching staff but also for the receivers (i.e., students). Even the students believe that they will be benefitted through the implementation of ERP systems in enhancing their learning experience (Turek & Dziembek, 2018). The students were observed as more motivated towards the implementation of ERP systems, as they believe that they can learn better and can adopt the latest ways of working, furthermore get better examination formats, and can enhance their IT skills. Because of ERP systems they can phrase their goals better and can plan in a better way, how to achieve those goals (Granbom et al., 2019).

Such systems also help in quick information exchange, enhanced productivity, and developing tacit knowledge (Al-hadi & Al-Shaibany, 2017). Despite successful implementation of the ERP systems in majority of the universities in developed countries many universities in developing countries have faced failure (Al-Hadi & Al-Shaibany, 2017). The failure rate was previously very high due to which many universities were reluctant in implementing ERP systems (Hawari & Heeks, 2010). The basis reason behind this failure is not the system itself, but the inability to meet the requirements for the successful implementation of the system. One major reason behind reluctance of the teaching staff is that they believe that ERP systems cause information and communication overload (Chethiyar et al., 2019) and they are all the time linked with their job and lose their personal freedom.

Therefore, identifying the human element and that is why the current study is based in the perceptions of the users of the ERP in a higher educational institution and its effect on the quality of teaching when using it as teaching tool. Considering the factors identified in the literature, this study will particularly focus on perceived usefulness, awareness, ease flow of data, and facilitating conditions for the variety in education and especially quality of education through ERP. Therefore, the following framework has been established.

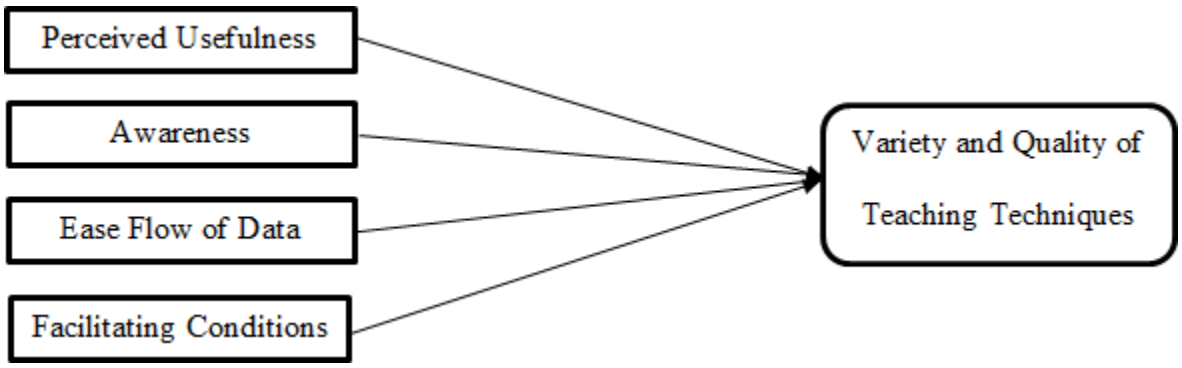

FIGURE 1
FRAME WORK

Based on the framework developed which has been drawn after reviewing the existing literature in the field. Following hypothesis has been drawn.

H01: There is no statistically significant impact of perceived usefulness for the (ERP) system on the variety and quality of Teaching Techniques.

H02: There is no statistically significant impact of awareness for the (ERP) system on the variety and quality of Teaching Techniques.
H03: There is no statistically significant impact of ease flow of data for the (ERP) system on the variety and quality of Teaching Techniques.
H04: There is no statistically significant impact of facilitating conditions for the (ERP) system on the variety and quality of Teaching Techniques.

METHODOLOGY

The purpose of the study is to identify the impact of perceptional attitude towards the usage of ERP system as a teaching tool over the variety and quality of teaching. The attitude and perceptions towards applying ERP system was measured in terms of perceived usefulness, awareness, ease of flow of data, and facilitating conditions. Initially, the methodology discussions start with the population and sample, followed by the tools and data collection, validity of the instrument, reliability of the instrument. The researcher designed a survey instrument that was administrated to the research sample. The purpose of the survey instrument was to collect data about the perceptions toward the impact of applying Enterprise Recourse Planning Systems (ERPs) as an effective teaching tool and its effect on the quality of teaching techniques. To measure the answers precisely 5-point Likert scale has been applied. For testing the effects of independent variables, PLS-SEM has been used.

The study population consists of faculty members from different higher education institutions in Jordan. The study used primary data collected by the researcher through online forms. Data were collected from the faculties of Business and Sciences of information. The questionnaire was built via Google forms and distributed to the targeted respondents through their personal e-mails; emails were obtained from the website of multiple Jordanian universities. The researcher distributed the questionnaire among the faculty members and 100 questionnaires were returned. The response rate was (86%); Table (1) shows the demographic characteristics of the study sample as below:

Table 1
DEMOGRAPHIC CHARACTERISTICS FOR SAMPLE OF THE STUDY

Educational Level	Quantity/Percentage
Master's	27
PhD	73
Total	100
Experience	
Less than 5 years	30
5 – 10 years	45
More than 10 years	25
Total	100

Analysis

For identifying the impact of four independent variables over the dependent variable which is variety and quality of teaching structural equation modelling technique has been conducted using SMART PLS. The purpose behind using this technique is that it is supposed to be very useful for theory building. Initially, the outer model also known as measurement model has been checked for getting reliable results. The figure of the measurement model is mentioned below:

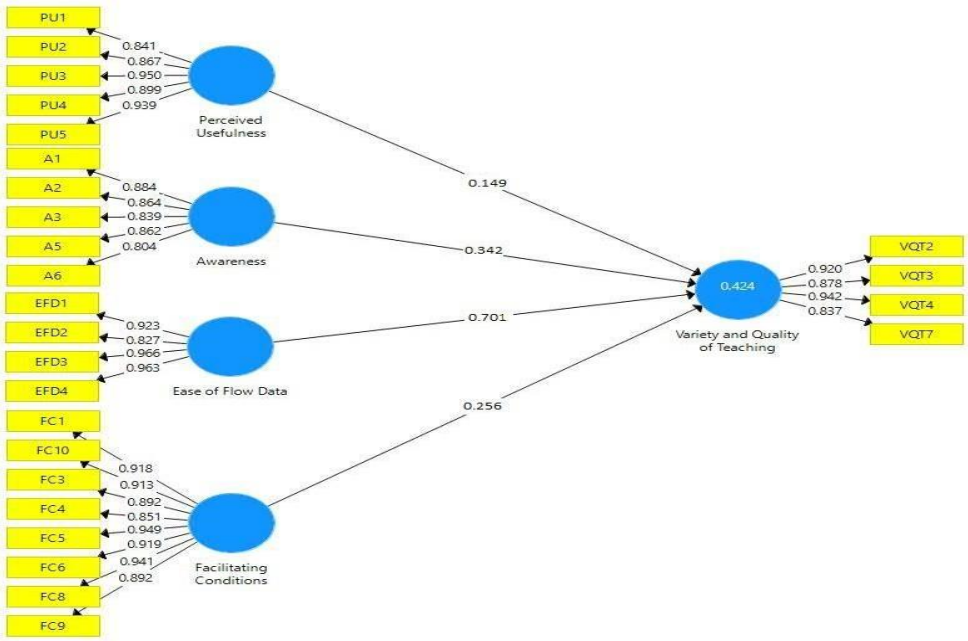

FIGURE 2
MEASUREMENT MODEL

Figure 1 mentioned above represents measurement model. Developing measurement model is the first step towards structural equation modelling. All the items in the variables were sustained because the factor loadings of all the variables were above the threshold level of 0.7 (Hair, Ringle, & Sarstedt, 2013). The item loadings of all the variables used in the study are mentioned in the Table 2 below.

Table 2
ITEM LOADINGS

Variables	Awareness	Ease Flow of Data	Facilitating Conditions	Perceived Utility	Variety and Quality of Teaching
A1	0.884				
A2	0.864				
A3	0.839				
A5	0.862				
A6	0.804				
EFD1		0.923			

EFD2		0.827			
EFD3		0.966			
EFD4		0.963			
FC1			0.918		
FC10			0.913		
FC3			0.892		
FC4			0.851		
FC5			0.949		
FC6			0.919		
FC8			0.941		
FC9			0.892		
PU1				0.841	
PU2				0.867	
PU3				0.95	
PU4				0.899	
PU5				0.939	
VQT2					0.92
VQ13					0.878
VQ1T4					0.942
VQT7					0.837

After ensuing that all the items used are worth keeping in the model because of having factor loading above the threshold level next step is to analyse the reliability and validity of the constructs. Table 3 shows the reliability and validity of the constructs. The cut off values for reliability and validity are 0.6, 0.7, and 2.5 for Cronbach's alpha, composite reliability, and average variance extracted respectively (Henseler, Ringle, & Sarstedt, 2015). Table 3 shows the reliability and validity of the instrument:

Table 3
CONSTRUCT RELIABILITY AND VALIDITY

	Cronbach's Alpha	**Composite Reliability**	**Average Variance Extracted (AVE)**
Awareness	0.905	0.929	0.724
Ease of Flow Data	0.939	0.957	0.849
Facilitating Conditions	0.97	0.975	0.828
Perceived Usefulness	0.941	0.955	0.811
Variety and Quality of Teaching	0.917	0.942	0.802

All the values for measuring the reliability and validity are above the threshold level which shows that the instrument is fit for further analysis. Another important aspect is measurement of

discriminant validity. Discriminant validity confirms that items of a variable measure the variable more than measuring any other variable. The results are mentioned in Table3 below and are as per the criteria set by Henseler, Ringle, and Sarstedt (2015).

Table 4
DISCRIMINANT VALIDITY

Variables	Awareness	Ease of Flow Data	Facilitating Conditions	Perceived Usefulness	Variety and Quality of Teaching
Awareness	0.851				
Ease of Flow Data	0.269	0.921			
Facilitating Conditions	0.381	0.741	0.91		
Perceived Usefulness	0.572	0.515	0.515	0.9	
Variety and Quality of Teaching	0.543	0.429	0.515	0.512	0.895

In the Table 4 discriminant validity is confirmed. After ensuring the outer model is reliable and valid, next step is to develop structural model also known as inner model. The figure 3 mentioned below shows direct impact of perceived usefulness, awareness, ease of flow data, and facilitating conditions over the variety and quality of teaching.

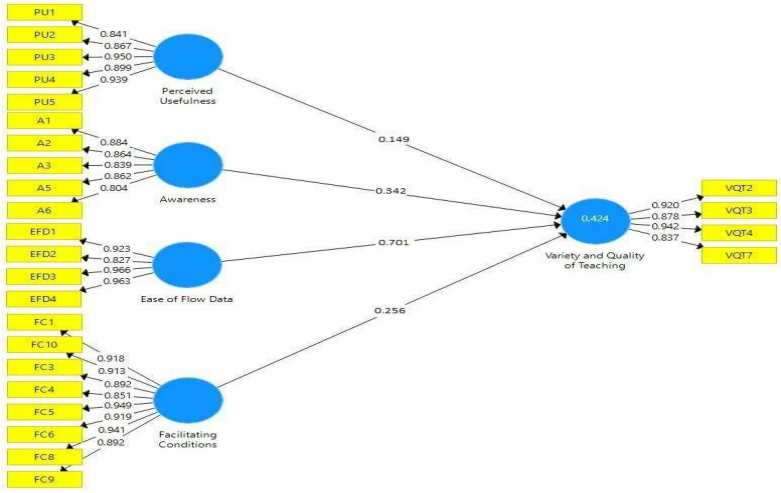

FIGURE 3
PLS ALGORITHMS

PLS Algorithms shows the direct impact and helps in understanding the overall impact which is termed as r2 also known as explained variation. The calculated value is 0.424 which shows that the model is 42.4% explaining variation in variety and quality of teaching which is because of

perceived usefulness, awareness, ease of flow data, and facilitating conditions. To find the significance of each variable boot strapping has been done which is shown in Figure 4 below:

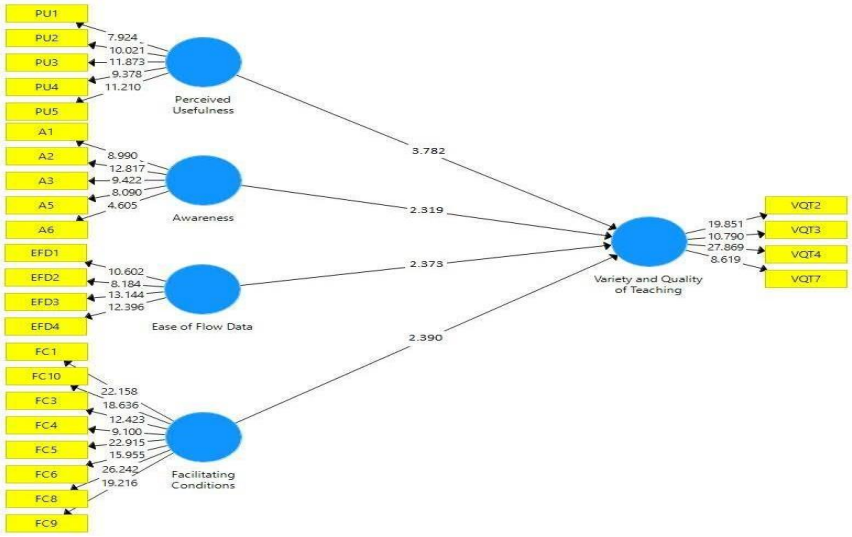

FIGURE 4
BOOTSTRAPPING

Bootstrapping has been conducted to check the significance of the relationships. For detailed explanation the results of all the relationships have been discussed in detail in the Table 5.

Table 5
PATH COEFFICIENTS

Relationships	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (|O/STDEV|)	P Values
Awareness->Variety and Quality of Teaching	0.342	0.316	0.147	2.319	0.001
Ease of Flow Data -> Variety and Quality of Teaching	0.701	0.091	0.189	2.373	0.001
Facilitating Conditions ->Variety and Quality of Teaching	0.256	0.234	0.184	2.39	0.001
Perceived Usefulness-> Variety and Quality of Teaching	0.149	0.157	0.19	3.782	0

From Table 5 it can be observed that all the independent variables have a significant impact over the dependent variable. The overall model fitness has been calculated using the blindfolding technique.

The results of predictive relevance which has been measured through blindfolding showed that the model has significant predictive relevance. In the rest part of the paper the discussions and conclusions have been mentioned.

DISCUSSION

In the abovementioned analysis, direct impact of the four variables has been analysed. The purpose of the analysis was to test the hypothesis of the study. The analysis has rejected the entire four-null hypothesis.

The first hypothesis was related to perceived usefulness of ERP systems in the light of its impact over the variety and quality of teaching. The findings are consistent with the previous studies that if the teaching staff perceives ERP useful then the chances of getting desired output increases (JosephBradley, 2008). Therefore, it can be claimed with confidence that if the teaching staff perceive ERP useful then quality and variety can be brought in teaching by using ERP systems.

The second hypothesis was related to awareness, which shows that if the teaching staff is aware of the importance of ERP and they know how to use ERP then teaching techniques can be improved. The findings are consistent with the previous studies that awareness increases the success of ERP systems (Rehman & Ali, 2019). Therefore, it can be said with confidence that if the teaching staffs are aware of ERP systems then quality and variety can be brought in teaching.

The third hypothesis is related to ease of flow data, which shows that if the teaching staff feels easy of flow data because of ERP and they get benefits using ERP then teaching techniques can be improved and positive outcomes can be achieved. The findings are consistent with the previous studies that ease of data flow increases the success of ERP systems (Ullah et al., 2018). Therefore, it can be said with confidence that if the teaching staff is aware of the importance and benefits of ERP systems then higher quality and more variety can be brought into the teaching techniques.

The last hypothesis was related to facilitating conditions which in actual shows the support of the top management during implementation of the ERP systems. The findings are consistent with the prior research that if the facilitating conditions are there the successful outcomes of ERP can be achieved (Menon, 2019). Therefore, there is no harm in claiming that if the facilitating conditions are provided to the faculty members and teaching staff, ERP systems can be successfully implemented and used as an effective teaching tool and therefore the quality and variety in teaching techniques can be achieved.

There is no doubt that technological advancement has brought about an information revolution, as it includes various advanced and accelerating modern forms that make everyone who wants to enter the new world order to search and create the ingredients and mechanisms that help him in this race. The use of information technology contributed to the emergence of the concept of electronic knowledge. Today's interest of higher educational institutions in applying the information system has become great as it has become the main engine for accomplishing tasks and improving performance.

During recent years, ERP systems, which allow improving performance through effective control of its resources and properly directing them, is considered as improvement tool by linking all the operations in a single system linked with a central database that provides all data, information and knowledge of departments and functional units at the exact time.

Currently ERP systems are considered as major source of achievement for developing latest teaching techniques. It has the potential to provide solutions for potential problems.

As ERP systems facilitate the user to get readily available information therefore, collecting, analysing, and storing data is not nor can more a challenge, rather any kind of reports be generated easily. Without ERP systems, the faculty members must face a lot of hurdles in completing practical course objectives and teaching process more effectively, secondly, adopting these systems as teaching tools helps in improving the quality of the teaching process experienced by academics, and the quality of the learning process experienced by students, and therefore, the burden on the quality of the teaching process and quality of techniques being used can be reduced significantly.

From the abovementioned analysis and discussion, it is obvious that implementing ERP system as a teaching tool is necessary for enhancing the variety and quality of teaching techniques and improves the overall learning experience for students, and the teaching process experience for the teaching staff. Therefore, higher education institutions in Jordan should not do any delay in implementing the ERP system as an effective tool of teaching to remain competitive in the region. Even though implementing ERP system as a teaching tool is costly because of investment that should be made when applying such a system, as well as the training costs needed to assure the successful adoption of such a tool, other than the running costs of maintaining such a system, however, the benefits outweigh the costs easily.

RECOMMENDATIONS

Based on the literature reviewed and the analysis of the data collected, it is strongly recommended that higher educational institutions in Jordan should implement ERP systems as a teaching tool without any further delay. The most important thing that needs to be mentioned here is that the system should not only be implemented suddenly, but users should be trained first, so that they may not face any difficulties in using such a system in their teaching and learning experience and be able to reach the benefits of applying such a tool in the teaching process. ERP system should be flexible and should be capable of responding to the challenges and changing needs in regard to the educational outcomes to be achieved and covered. A comprehensive ERP system should be implemented and included as a main teaching tool to cover the latest technological advancements and trends within the fields of business and technologies.

ERPS systems should be characterized by a unified database at the level of the institute, as this database can store data through a central database system. The database should improve the sharing of information between modules of business functions and departments for teaching purposes, with the ability to analyse large amounts of data to access a high level of diversification and preservation of reports and improve the overall quality of the teaching techniques being used within these institutes. Finally, ERP system should be characterized by its instantaneous nature of operations, which reflects reduced overall processing time and allows instantaneous feedback to manage teaching operations more efficiently and effectively in a way that helps in reaching out to the educational objectives.

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