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## Evaluating the Effectiveness of Web-based Management Information System from the Perception of Educationalists: An Exploratory Study

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**Abstract:** Recently, assessing the effectiveness of the Web-based Management Information Systems (WB MIS) from the perception of employees such as educationalists is increasingly needed as it has important contributions to organizations. Therefore, the primary focus of this study is to develop an assessment model to evaluate the effectiveness/net benefits of WB MIS from the developmental vision of educationalists which in turn positively affect the whole education process. To do so, a preliminary study is conducted through a semi-structured interview for 20 educationalists, in which, the thematic approach is employed for analysis purposes. Second, the theoretical basis of the relationship among study factors: information quality, system quality, service quality, interaction design quality, decision support quality, user satisfaction and the net benefits of WB MIS are explored in a more rigorous and comprehensive manner. In the light of the preliminary study and critical review of Management Information System (MIS) theories, it is found that the user satisfaction has a mediating role in the relationship between equality factors and the WB MIS benefits. Accordingly, an extended assessment model is proposed in order to fill the gap in MIS literature and also, contributes to empirical studies in the fields of Information Systems (IS) development and education technology.

**Key words:** Web-based management information system, user satisfaction, quality factors, effectiveness, decision support

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### INTRODUCTION

During the recent two decades, Web based Management information system WB MIS as a type of information systems has widely spread and becomes one of the most important resources in providing the key organizational activities such as automation of everyday tasks and decision making process (Piccoli, 2012). Therefore, such system has a significant contribution to organization effectiveness at several levels including organization, groups and individuals (Love and Irani, 2004; Wang *et al.*, 2007; Chien and Barthorpe, 2010). The implementation of Web-based management information systems WB MIS within institutions is one of the most important issues for every firm as it has a significant influence on the organization productivity, effectiveness as well as its image (Gichoya, 2005; Panigyrakis and Chartzipanagiotou, 2006; Al-Adaileh, 2009).

Furthermore, it is highlighted by researchers that any institution including educational institutions should conduct evaluation for its management information

system in order to explore the problems and flaw in its information system to improve the administrative efficiency (Ferrell and Wachholz, 2003). In addition, the MIS researchers mentioned that the ongoing assessment for WB MIS leads to avoid the potential decrease of satisfaction on the user's part which in turn affects the effectiveness of organization negatively (Ives and Olson, 1984; Barki and Hartwick, 1994; Lin and Shao, 2000). However, the achievement of such features requires the consideration of the factors which affect the WB MIS. For this reason, organizations such as United Nations Relief and Works Agency for Palestine Refugees (UNRWA), the largest international organization for serving Palestinian refugees at Middle East region in the field of crucial services (UNRWA, 2007), are increasingly concerned with checking whether the cost of investment on IT and IS functions is effective and reasonable or not (McKinsey, 2008; Sedera and Tan, 2005; DeLone and McLean, 1992; Farbey *et al.*, 1992).

Based on review, little is known about the net benefits and the user satisfaction with the quality of web-based management information systems from the

Perception of educationalists and academic researchers (Khan, 2011; Abugabah and Sanzogni, 2010; Cheung and Lee, 2008; Wang *et al.*, 2007; Coates *et al.*, 2005; Passey, 2002) and consequently, additional efforts on refining WBMIS evaluation is significant to be paid for the effective management and sustained enhancement of WBMIS functions and the organization itself (Petter *et al.*, 2008; Wang *et al.*, 2007). Regarding the evaluation of information systems at Palestine and specially those managed by UNRWA at Gaza, this study is the leading study in the field of the WBMIS assessment and enhancement.

Therefore, the current study seeks to investigate and deeply explore the factors affecting the net benefits, or effectiveness of WBMIS from the view point of educationalists (i.e., teachers and school principals) as well as it explores the theoretical basis of the relationships between study factors including quality, user satisfaction and net benefits towards the development of a theoretical model. This model is developed based on DeLone and McLean (2003) which is considered as the most broadly used model in evaluating such management information system (Petter *et al.*, 2008; Gable *et al.*, 2003; Wang *et al.*, 2007; DeLone and McLean, 2003).

**CONCEPTUAL LITERATURE**

In the context of the evaluation of the effectiveness of WMIS as a type of MIS, the assessment models of DeLone and McLean (1992, 2003) are considered as the most commonly used models (Petter *et al.*, 2008; Gable *et al.*, 2003; Wang *et al.*, 2007; DeLone and McLean, 2003). However, this study is mainly concerned with DeLone and McLean (2003) model which has a six dimensions of IS success or effectiveness including information quality, system quality, service quality, user satisfaction, use and net benefits. Figure 1 shows the IS model of DeLone and McLean (2003).

Based on the definitions of IS researchers (Petter *et al.*, 2008; DeLone and McLean, 2003) and the context of study, the definitions of Deloneand McLean’s

factors which affect the effectiveness of WBMIS are adapted and conceptualized. The conceptualization of these factors are considered as a first step towards the development of the theoretical framework for assessing WBMIS effectiveness. Table 1 reveals the summary of the concepts of success factors: quality factors including system quality, information quality and service quality.

**PRELIMINARY STUDY**

The main objective of this section is to ensure and extensively explore the problem of the current study and its factors. To this effect, preliminary study is conducted through performing interviews with the users (i.e., teachers and school principal) of the web based management information system at UNRWA (Sekaran and Roger, 2010).

The preliminary interview is concerned with the users’ response regarding the effectiveness of WBMIS. The following sections explain in details the Methodology, data collection, respondents selection, data analysis and results.

**Methodology of preliminary study:** Basically, the methodology of this preliminary study is a straight forward where it consists of four stages including

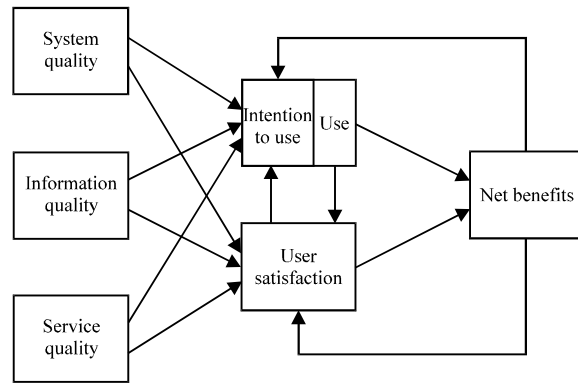


Fig. 1: IS Success Model (DeLone and McLean, 2003)

Table 1: Summary of the definitions of success factors

Study variable	Definition	References
Information quality (IQ)	Information quality is defined as one of the most common factors of effectiveness used to assess the effectiveness of WBMIS through focusing on the characteristics of information output.	DeLone and McLean (2003)
System quality (SQ)	System quality is defined as a well-known factor of effectiveness used to assess the effectiveness of WBMIS through focusing on technical system properties	DeLone and McLean (2003)
Service quality (SERQ)	Service quality is defined as a well-known quality factor which is concerned with the support provided by from IT support personnel and IS department to the users of system	Petter <i>et al.</i> (2008)
Use	The extent to which users utilize the IS capabilities in terms of frequent use.	Petter <i>et al.</i> (2008)
User satisfaction	The level of satisfaction with the services provided by WBMIS from the education staff viewpoints.	Petter <i>et al.</i> (2008)
Net benefits/ effectiveness	The extent to which WBMIS are contributing to the educationalist’s success and competencies.	DeLone and McLean (2003)

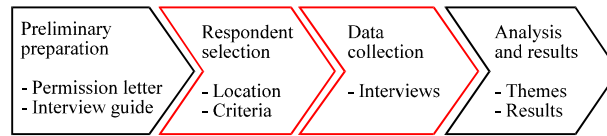


Fig. 2: Methodological steps of preliminary study

preliminary preparation, respondents selection, data collection and analysis and results (Sekaran and Roger, 2010).

Figure 2 shows the methodological steps for conducting preliminary study in terms of steps. As shown, at the first stage, permission letter has been given from the School of Computer Science, Universiti Sains Malaysia (USM) in order to allow the researcher to conduct the preliminary study at UNRWA. Then, the interview guide structure and questions are constructed where these questions are concerned with the effectiveness of the existing web based systems (Appendix A). In the second stage, sampling location and participants' criteria are determined. Once the interview guide and sampling process are accomplished, the data collection is conducted through interviews as the third stage. In the last stage, the steps of thematic analysis process is followed in order to analyze the collected data. Once the analysis is completed, the results of the thematic analysis are summarized.

**Respondent selection:** Since, this preliminary study aims to, first, obtain the maximum of information that can be collected regarding the impacts or the net benefits of WB MIS from the viewpoints of education staff in a quick and inexpensive way. Second, the selection process is concerned with a specific type of people who used the web systems at UNRWA and have the desired information. Therefore, 20 informants are purposively selected from the education department of UNRWA to be the representative of the population (Sekaran and Roger, 2010).

**Data collection:** Qualitative approach including interviewing is one of the most important tools for surveying extensive information regarding the worth and importance of the problem and its causes (Miles and Huberman, 1994; Yin 1994; Miles, 1979). Moreover, it is used to determine the relationships among the variables of the proposed effectiveness model through deeply exploration of groups or individuals (Lindlof and Taylor, 2002). In this context, Sekaran and Roger (2010) highlighted that preliminary interview is considered as an efficient tool for deeply exploring the contextual factors of the problem.

The interviews can be classified into three categories: unstructured interviews, structured interviews, semi-structured interviews (Fontana and Frey, 2005). With respect to the structured interview, it is formalized and has limited number of questions (Patton, 2001). While semi-structured is flexible, there is possibility for new questions to obtain related meaningful answers and the interviewer practically has the general skeleton (i.e., the study goal is well defined) of topics to be explored in-depth (Zhang and Wildemuth, 2009). This issue brings forth the need for preparing an interview guide which is informal classification of topics and questions (Appendix A), in order to have the ability to ask the question in different ways for different interviewees (Lindlof and Taylor, 2002).

The questions of the interview guide can be categorized into four parts including the services introduced by WB MIS to employees, how far the employees satisfied with the system, the problem that encountered the existing system and proposed solution from the Perception of users. Practically, the semi-structured interviews were conducted via telephone calls where informants' answers are written and sorted out separately, according to informants names .

**Data analysis and results:** Based on the early sections in this study, It is obvious that qualitative preliminary study could include sampling, data collection and consequently, data analysis can start after that. Generally, there are three steps in qualitative data analysis including data reduction, data display and the drawing of conclusion (Miles and Huberman, 1994).

According to Sekaran and Roger (2010), data reduction is a process that involves three steps: selecting, coding and categorizing the data. Data display can be defined as the methods by which data is represented. While conclusion drawing is the final analytical step in the process of data analysis which aims to draw summary of results based on the identified themes. Additionally, they mentioned that data analysis is not a step by step process where some of its steps such as coding might be done in a repetitively manner.

**Data reduction:** As the amount of qualitative data is huge, there is a need for data reduction through the coding and

categorizing data. In this context, the interview guide’s questions are designed to get the desired information regarding study problem as much as possible. The following questions are intended to collect the respondent’s feedback and opinion about effectiveness and user satisfaction with WB MIS:

- What do you feel regarding the difficulty of the system?
- What are the main points/causes that lead to the existence of this difficulty?
- What are the main indicators that show this difficulty?
- As you have a wide experience in IT, What is the problem that actually existed as a result of the current gap?
- According to your understanding what is the possible solution/(s)?

As sample answers for the questions related to the effectiveness:” The system does not have a significant contribution” and “ the system is not effective”. Similarly with regards to satisfaction, some informants said: “ the system not meets their needs” and “ they are not satisfied”. In order to reduce, display and then conclude regarding the collected data, the informants responses are coded using a theme as a unit of content analysis (Kassarjian, 1977). Accordingly, the similar repetitive expressions are grouped together into themes which are identified based on the standard definitions of effectiveness and satisfaction of several researchers (Aggelidis and Chatzoglou, 2008; Griffiths *et al.*, 2007; Bayo-Moriones and Lera-Lopez, 2007; DeLone and McLean, 2003; Lin and Shao, 2000; Thong and Yap, 1996; Grover *et al.*, 1996; Torkzadeh and Doll, 1999; Ives *et al.*, 1983; Hamilton and Chervany, 1981). Table 2 explains the definition of the sub categories for each themes including ineffectiveness and dissatisfaction themes. While Table 3 shows a sample of expressions and their codes in term of themes.

**Data display:** Concerning this analysis step, the reduced data should be displayed in an organized manner

Table 2: Identification of themes and sub categories

Theme/Category	Sub categories	Definition
ineffectiveness	Development	WB MIS does not assist employee to develop their competencies
	Contribution	WB MIS has no significant contribution to employee’s competencies.
	Value	WB MIS has no value in term of its impacts or benefits
Dissatisfaction	Needs consistency	WB MIS doesn’t meet user needs
	User participation	User of the systems has not involved in the development phase of the system.
	System Design	The available WB MIS design facilities and features are not satisfactorily to the users

using charts, diagrams, matrices, graphs and frequently mentioned phrases (Sekaran and Roger, 2010; Miles and Huberman, 1994) so that the drawing of conclusion is eventually facilitated. In this study the frequent mentioned phrases and charts are used as tools for displaying data. Regarding the effectiveness of WB MIS, the response of 20 employees were as follows: 12 ineffective, 4 don’t know and 4 effective. While the answers of employees with regard to satisfaction were as follows: 10 dissatisfied, 3 don’t know and 7. Figure 3 shows the informants answers with respect to effectiveness and satisfaction.

It is clearly seen in Fig. 3 that the informants responses regarding effectiveness whether the system is effective or not; 60% answered ineffective while 20% answered effective. The remaining 20% answered don’t know or answers not relevant with the question. With respect to the satisfaction with WB MIS, 55% answered dissatisfied while 35% answered satisfied. The remaining 10% answered don’t know or answers not relevant with the question.

**Drawing conclusion:** The percentages shown in Fig. 4 and 5 strictly explain the respondent’s answers with respect to both the effectiveness and user satisfaction with the current WB MIS. It is considerably obvious that the majority of employees mentioned that the system is not efficient where the percentage of the informants who say ineffective is 60%. Similarly, they also highlighted

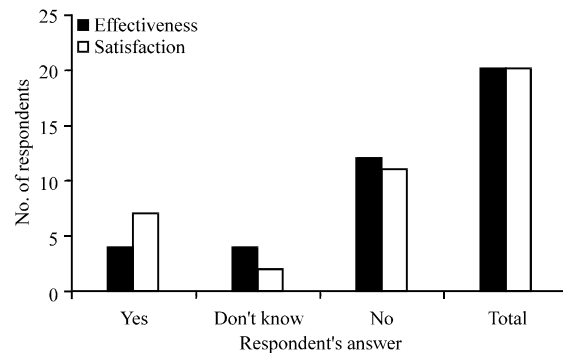


Fig. 3: Informant response regarding effectiveness and satisfaction with WB MIS

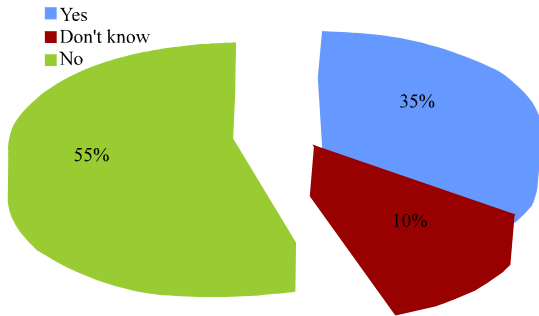


Fig. 4: The percentage of satisfaction with WBMS from educationalists' perception

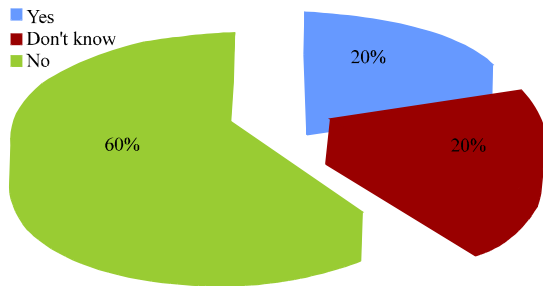


Fig. 5: The percentage of the WBMS effectiveness from educationalists' perception

Table 3: Coding Informants response using themes

Expression	Theme
The system does not have a significant contribution	Ineffectiveness
The system has no significant value	Ineffectiveness
I'm not satisfied with WBMS	Dissatisfied
The system does not meet users needs	Dissatisfied

Table 4: The results of data analysis

Theme	Responses	Percentage	Remarks
Ineffectiveness	12/20	60	Majority of responses mentioned the ineffectiveness of WBMS in terms of its contribution to their performance.
Dissatisfaction	11/20	55	Majority of employees sample are not satisfied with the WBMS

their dissatisfaction with the system where the percentage of dissatisfied informants is 55%. Table 4 summarizes the results of the data analysis steps.

The following Figures 4 and 5 show the percentage of respondent answers based on the identified themes.

Regarding the causes of the problems and the proposed solutions or development ideas (i.e., questions 5, 6), the informants suggest the following: (1) enhancing the available design facilities to provide an effective communication system, (2) providing support for them in terms of their assigned responsibilities and performance evaluation.

**Reliability and validity:** It is very essential to verify the reliability and validity of the conclusion obtained in the analysis process. Concerning reliability, category reliability is already applied through formulating and identifying categories or themes including ineffectiveness and dissatisfaction in accordance with standard definitions of effectiveness and satisfaction (Kassarjian, 1977). In addition, the identified themes are built to cover the several different respondents' answers where the definition of themes are mentioned in section 2.5.

According to Sekaran and Roger (2010), validity of qualitative data refers to the degree to which the findings of study: (1) represent the collected data and (2) can be applied to other contexts or generalized. Regarding the representation of cases, our respondents sample involves 20 employees of unlike levels of IT skills who have been working at different administrative levels at education. For generalization purpose, the themes and sub categories are identified based on standard definitions in order to have the ability to generalize the results of study to other contexts. As an additional point, the method triangulation can be used. However, this study is mainly a quantitative study as well as the purpose of this preliminary study primarily is to ensure and extensively explore the contextual factors of the study.

**Critical analysis of MIS theoretical basis:** This section is to highlight the critical analysis of theoretical basis according to which the relationships among the study variables is explored and consequently, it represents the second step toward the development of the theoretical framework.

**Existing theoretical framework:** Most of related IS study have just mentioned that their studies factors are built based on DeLone and McLean (1992, 2003) and sometimes they might mention Technology Acceptance Model (TAM) without providing a supportive and comprehensive explanation regarding the basis theory (Urbach *et al.*, 2010; Abugabah and Sanzogni, 2010; Rahim, 2008; Al-Adaileh, 2009; Gable *et al.*, 2003; Tojib *et al.*, 2006; Sugianto *et al.*, 2007; DeLone and McLean, 2003; Torkzadeh and Doll, 1999). Accordingly, they consider either D and M models or TAM as a basis theory. Consequently, there is a gap in the conceptualization and theoretical framework of the related IS study variables. To this end, this gap is actually filled by explaining both the base theory and the theoretical model through which our proposed model is originated.

**Related information system theories:** The IS researchers such as Assael (1998), Davis (1989) and Davis *et al.* (1989)

divided the information system theories in accordance with the direction of linkage between the attitude and behavior. They actually classified these theories into two main types of which are behavior- attitude and attitude-behavior theories. The first category consists of Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB) and Technology Acceptance Model (TAM). The second category includes cognitive dissonance theory, social judgment theory, theory of passive learning and self perception theory. Based on Cooper *et al.* (2007), the third category such as flow theory, capacity processing and cognitive theory can be also used in some context of IS literature. Table 5 explains the classifications of IS theories with respect to the type of predictor.

However, the study focuses on the attitude-behavior theories as they have a sense and closely related to current study. Regarding to this type of theories, the attitude can predict the behavior. The second point, Theory of Reasoned Action (TRA) which is proposed by Fishbein and Ajzen (1975), suggested that the prior intention in conjunction with the beliefs and attitudes that the individuals have towards the given behavior is the determinant of the real behavior (Ajzen and Fishbein, 1980); whereas Hale *et al.* (2002) mentioned that, The purpose of the TRA is to explore volitional behavior. Third, regarding TPR theory, It is extended from theory of reasoned action (Ajzen, 1991), where TPB includes a new predictor called perceived behavioral control which practically added to the model of TRA. This predictor was

added to make recovery for the cases in which the employees lack the confidence and control on behavior (Miller, 2005). However, with regard to our study the participants have enough control on their behavior as all of them are university graduates, at suitable age and they have to have commitment toward their responsibilities and duties. Accordingly, it does not make sense to our study. Fourth, the original Technology Acceptance Model (TAM) was proposed by Davis (1989). According to Dwivedi *et al.* (2009), TAM is derived from Theory of Reasoned Action (TRA), however TAM does not contain the subjective norms as they were actually neglected by the authors of the model themselves. Moreover, TAM is the most commonly used theory in IS literature and it has been found to be consistent with numerous empirical studies (Venkatesh *et al.*, 2003; Venkatesh and Bala, 2008; Davis, 1989; Davis *et al.*, 1989) which actually establishes a chain of causal relationships among beliefs about technology, attitudes towards the use of technology, behavioral intention of use and the actual behavioral actions of technology. According the above mentioned four points, user satisfaction as an attitude functions as a mediator, therefore there is a realistic *evidence* for the mediation of user satisfaction in the relationship between beliefs (i.e., quality variables) and performance behavior(i.e. WBMS effectiveness). Thus, TRA and TAM could be considered as a theoretical basis through the study model is originated.

The second evidence of the mediating role of user satisfaction can be obtained and concluded from the adaptation of closely related model (Doll and Torkzadeh, 1991) which is derived from TAM. In an effort to find the base theory or model for user satisfaction, Doll and Torkzadeh (1991) have stated the dependency model, in which user satisfaction is mediated. Figure 6 reveals the theoretical framework through which the IS effectiveness can be assessed.

In accordance with the theoretical framework revealed in Fig. 6, if the study domain concerns with factors that affect user satisfaction (upstream domain), then user satisfaction is considered as the dependent variable. Also, it could be independent variable if the study concerns with some outcome affected by user satisfaction

Table 5: Classification of IS literature theories according to the type of predictors

Category of theory	Theories included with in category
Attitude-behavior	Theory of reasoned action (TRA) Theory of planned behavior (TPB) Technology acceptance model (TAM)
Behavior- attitude	Cognitive dissonance theory Social judgment theory Theory of passive learning Self perception theory
Others	Flow theory Capacity of information Cognitive load theory Information processing

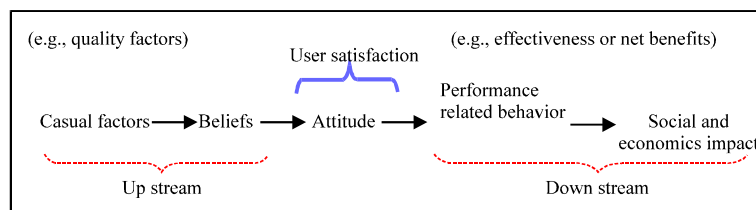


Fig. 6: The theoretical framework for measuring Effectiveness (Doll and Torkzadeh, 1991)

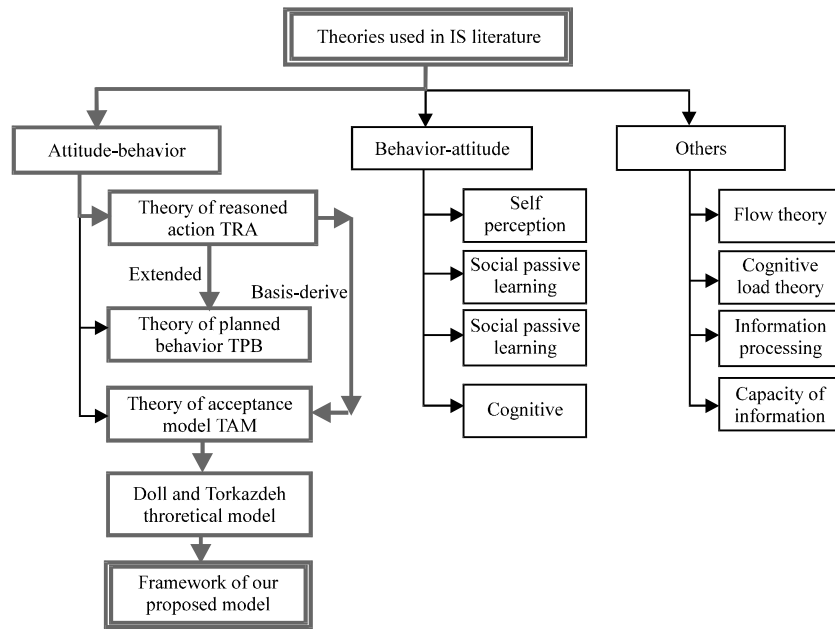


Fig. 7: Derivation of research theoretical framework

(downstream). In addition, Melone (1990) mentioned that attitudes (e.g., user satisfaction) influence the performance behavior.

Therefore, study seems to be combination of both upstream (i.e., in case of using perceptions or beliefs to decide regarding some attitude: IVs→US) and downstream (i.e., in case of using user satisfaction as a determinant of other outcome variable: Us→Effectiveness). Thus, user satisfaction is the central mediator of effective behavior and performance which actually associates quality factors beliefs to performance related behavior at both individual and organizational levels and therefore, the effectiveness of WB MIS. From our Perception, it is important to construct the hierarchy of theories that can be used for deriving the proposed model. To this end, the hierarchal structure, through which the proposed model can be derived, is developed. Figure 7 reveals the methodological steps through which our proposed model is derived.

## RESULTS AND DISCUSSION

Based on the preliminary study summary in Table 4, it can be concluded that (1) the system did not contribute a significant value to their performance which means that this system is not effective in terms of employee success's competencies (Grover *et al.*, 1996; Hamilton and Chervany, 1981), (2) The participation of users during the analysis and design phases is considerably little which in turn leads to low level of

Satisfaction (Lin and Shao, 2000; DeLone and McLean, 2003), (3) the system effectiveness has not been evaluated since its adoption which also leads to user dissatisfaction (Alsabawy *et al.*, 2011). Hence, it can be inferred that there would be a relationship between user satisfaction and effectiveness as the majority of employees' responses explained this. Also, it is obvious that there would be a realistic problem encountered both outcomes/ net benefits and user satisfaction with the existing WB MIS system.

As another important point, they suggest important constructive comments regarding the enhancement of the interactivity and decision support and therefore, there is a need to add new evaluation factors called interaction design quality and decision support quality. Accordingly, some standard definitions are adapted in order to conceptualize the additional two assessment's factors. Table 6 explains the adapted concepts of the two newly factors including interaction design and decision support.

According to the critical analysis of the existing model and MIS theories, it is clearly seen that user satisfaction as an attitude functions as a mediator in the relationship between quality factors and WB MIS effectiveness (i.e., net benefits). Additionally, as WB MIS is mandatory to be used by employees, "the use factor can covered through one question regarding the frequent use" and therefore the use factor could be ignored from the original model of DeLone and McLean (Gable *et al.*, 2003; Sedera and Tan, 2005; DeLone and McLean, 2003).



Table 6: The Concepts of two additional quality factors\* (interaction design and decision support)

Study variable	Definition/concept	References
Interaction design quality (IDQ)	Interaction design is defined as the degree to which WB MIS enable the organization employees to engage in online exchange with others through the available online design's facilities and tools.	Albrecht <i>et al.</i> (2005) and Julier (2006)
Decision support quality	It refers to the degree to which the organization's WB MIS help the employees in identifying and solving their problems through providing web-based decision support.	Power (1999) and Hicks (1990)

\*\*New Factors are added based on the response of Educationalists

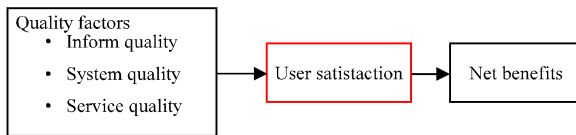


Fig. 8: Proposed theoretical framework from the perception of educationalists

Thus, in the light of the above analysis, discussion and results, the proposed theoretical assessment model would be appropriate and helpful to measure the effectiveness of WB MIS. Figure 8 illustrates the proposed theoretical model which is developed based on the critical analysis of IS theories and the findings of preliminary study.

It is worth mentioning that this exploratory study is the first to mediate user satisfaction between quality factors including information, system, service, interaction and decision support and net benefits. While MIS researchers did not focus on the mediating role user satisfaction and they have just concerned with user satisfaction as a dimension of success.

### CONCLUSION

This study is one of the fewest studies conducted in the field of the assessment at Palestine and specially at UNRWA. UNRWA is considered as the largest international organization operating at Middle East and has served several millions of Palestinian refugees in many critical sectors such as education.

This study aims to evaluate the net benefits or the contribution of WB MIS to the employees in the field of education sectors as the development of this sector is highly important. First, a preliminary study is conducted to investigate the contextual factors of problem that could encounter the effectiveness and user satisfaction of WB MIS. Second, the critical analysis of the related MIS theories has been reviewed, in a more supportive and comprehensive manner, as a second step towards the development of the assessment model.

With regards to the findings of this study, The analysis of preliminary study reveals strong evidence for the relationship that would exist between the effectiveness and user satisfaction level with WB MIS (20, 35%, respectively). Moreover, the educationalists

suggest many valuable comments regarding design facilities and features which then classified into two additional independent factors: interaction design quality and decision support quality. Secondly, in terms of relationships, the theoretical basis gives a strong evidence for the mediating role of user satisfaction in the relationship between quality factors and WB MIS effectiveness. In the light of these findings, a theoretical model is developed based on DeLone and McLean (2003) with special concern to perceptions of the educationalists at different administrative levels.

It is expected that this study would help to fill the gap in MIS literature and also contributes to the empirical studies in the field of assessment of education management systems and technology. As future point of study, it is highly important to test the model and check the importance and impact of integrating decision support model with WB MIS. Any opinion and findings expressed in this materials are of authors and do not necessarily reflect the views of UNRWA.

### APPENDIX

#### Appendix A: Interview Guide's Questions

To explore full details regarding the factors affecting the effectiveness of WB MIS, the following questions are used during the semi-structured interview. These questions are actually asked to 20 employees working at UNRWA, education department, Palestine, Gaza. Concerning the informants, they are selected from different administrative level including teachers and head teachers / school principals.

#### Questions:

- What are the major services that can be provided to employees by the Web-based Management Information System (WB MIS)?
- What do you feel regarding the difficulty of the system?
- What are the main points/causes that lead to the existence of this difficulty?
- What are the main indicators that show this difficulty?
- What is the problem that actually existed as a result of the current gap?
- According to your understanding what is the possible solution/(s)?
- Do you have any more details regarding the problem or something related?

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