



Assessing Shazand Petrochemical Employees' Viewpoint on Applying Mobile Learning Using Logical Action Model

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Abstract

Background: The approach of learning at any time and place has largely come to fruition with the advancement of wireless technologies and mobile learning. Mobile learning, as an open-source e-learning model, refers to the acquisition of knowledge, attitude, and skills by utilizing mobile technologies. The purpose of this study was to determine the employees' attitude towards Shazand petrochemical company regarding the use of mobile learning using the TRA model.

Methods: The present research method in terms of purpose is applied and in terms of collecting data is descriptive-survey. The statistical population includes all employees of Shazand petrochemical company, which is 1700, according to the latest statistics of Shazand petrochemical company in 2015. By using the simple random sampling method, 313 employees were selected as samples. The data gathering tool was a researcher-made questionnaire with a reliability of 0.88 that its validity was confirmed by the professors and experts in this field. For data analysis, one-sample t-test and SPSS version 17 software were used. The significance level was considered as 0.05.

Results: Findings showed that the rate of learning tendency ($P = 4, 0, 32 \pm 0.63$), behavioral control ($P = 0.000, 4.19 \pm 1.01$), awareness and subjectivity ($P = 0.000, 4.900 \pm 1.7$), and finally, the intention to learn ($P = 0.000, 3.55 \pm 1.5$), among employees of Shazand Petrochemical Company are high on the use of mobile learning.

Conclusions: According to the results of the study, the level of the desire to learn, the level of behavioral control, awareness and mindfulness, and the intention of learning among employees of Shazand Petrochemical Company, can conclude that there is a very positive and appropriate mentality about this type of learning among employees of the company.

Keywords: Mobile Learning, TRA Model, Shazand Petrochemicals

1. Background

In recent years, the use of mobile technologies has increased in many fields such as banking, economics, tourism, entertainment, library research, etc. (1). Also, the recent breakthrough in mobile device capabilities along with the drop in prices has made the mobile phone a high usability device. In fact, by 2010, there were 3.5 billion mobile subscriptions worldwide, accounting for about 77% of the world's population. Moreover, improvements in mobile and handheld devices has made the use of multimedia facilitates of mobile applications easier, and allows mobile learners to access a wide variety of learning resources (2). Laurillard and Pachler (3) have identified mobile learning as a digital support for adaptive, exploratory, explicit, collaborative, and useful learning activities in remote control situations. Yi et al. (4) states that mobile learning is the way by which people learn or while learning in mobile phones

can communicate with their own learning environments, which includes their classmates, coaches, and their own learning resources. On the other hand, learners' interest is one of the most important questions in assessing learning perceptions of mobile learning in recent studies. In fact, researchers have found in several studies that learning through a mobile device offers a lot of interest among learners (5-7). It has been reported that learners have had a strong and positive response to the integration of classroom learning through the mobile device (7-11). In addition, learners found learning to be enjoyable with mobile devices (5, 12). Learners also identified a high potential for instant learning opportunities through mobile learning (13-15) and requested using these devices in an educational setting in the future (16). Learners have reported that they are qualified to use mobile devices and carry out learning assignments (17). Lots of researches have shown that us-

ing mobile devices ease and empower learning and also brought flexibility of learning and portability of knowledge. As reported by learners, portable and easy learning became correlated with applications and mobile devices (8, 13, 18, 19). On the other hand, few studies have argued that students were already aware of mobile learning and also reveal how their views on learning through the mobile has changed (20). In most of these studies, learners' perceptions of mobile learning have been positively reported, and learners have suggested that learning through a mobile device during the learning process allows it to be more interesting among learners (5-7).

In recent decades, there have been various models of technology acceptance. The patterns or models of modern technology acceptance include the technology acceptance model (TAM), theory of planned behavior (TPB), theory of reasoned action (TRA), and Theory diffusion of innovation. These theories discuss the adoption of modern technologies in social systems. Among these models, the theory of reasoned action (TRA) and the theory of planned behavior, have been most used in the field of studies related to the adoption of information technology (21). Of course, the technology acceptance model is a modified model of the theory of action. Considering this, the factors affecting the adoption of different technologies vary according to the type of technology, the studied users, and the existing environmental conditions, so each of the proposed models will have different functions in different cases (22).

Theory of reasoned action (TRA): this theory is proposed by Fischbine and Agzen in the book of "Belief, Attitude, Intention, and Behavior: An Introduction to Theory and Research", and is based on the assumption that individuals act logically. They collect and regularly evaluate all available information about the target's behavior, also consider the effect and outcome of the actions, then decide on their reasoning to do or not to act (23). Figure 1 illustrates this theory.

The subjective norm refers to the social pressure perceived by the individual to accomplish or not to carry out target behavior. People often act on the basis of their perceptions of what others (friends, family, colleagues, etc.) think they must do and their intention to accept behavior is potentially affected by those who have close connections with them. In the Theory of Reasoned Action, the individual's subjective norm is the product of the multiplication of normative beliefs (the expectations perceived by individuals or specific reference groups) in individual motivation for pursuing a behavioral purpose in spite of these expectations (24). Attitude is defined as the positive or negative feelings about doing the intended behavior. Individual attitudes toward behavior is the product of the multiplication of attitude beliefs (the individual's mental prob-

ability of having a target's behavior has the result) in evaluating those outcomes (the explicitly evaluated response to the result) (25). Behavioral intention expresses the intensity of intention and individual willing to perform the target's behavior. The relationship between behavioral intention and behavior indicates that individuals tend to engage in behaviors that they intend to do. Therefore, behavior is always after the intention of the behavior and is connected to it (25). On the other hand, the theory of reasoned action (TRA) has been used extensively in social studies. Studies also show that several schemes in the field of information systems have been implemented with the theory of planned behavior. These studies have considered a variety of applications for technology acceptance. Such as the remote medical system, e-commerce, technology ethics, and virtual banking. These studies show that the theory of reasoned action can be appropriate for some research fields (26). In fact, the main mechanism of the reasoned action theory is based on the assumption that the behavior of the individual is influenced by his tendencies. According to these studies, it has been shown that reasoned action theory can be appropriate for some research fields. Human behavior is guided by 3 categories of beliefs: behavioral, obligatory, and control. The theory of planned behavior claims that the main determinants of behavioral tendencies are the desire to learn through mobile, behavioral control, and the mentality of learning through mobile. The reason for using this model is its ease of implementation, considering the simplicity of this model compared to other models, and it also covers a wide range of features compared to other models. In addition, the model is actually the mother model for other models. It can be said that other models are somehow derived from this model. This model includes a dependent variable that is intended to be mobile through learning, and 3 independent variables including the desire to learn through mobile, behavioral control, and learning mentality through mobile phones. To be sure, the benefits of learning through a mobile device encourages all organizations and companies to move toward this great development. According to the research, it is clear that any company, including the Shazand Arak petrochemical company, which has continuously trained in its strategies and has always been one of the leading companies in performing necessary changes and continuous improvement, has the intention to move on to a mobile learning system and must overcome the difficulties to invest in this deal, in addition to interest and belief of company management. Considering the history of research, literature study, and research purpose of this study, which is to assess the views of employees of Shazand petrochemical company on the use of mobile learning using the TRA model, assumptions about research are presented at the

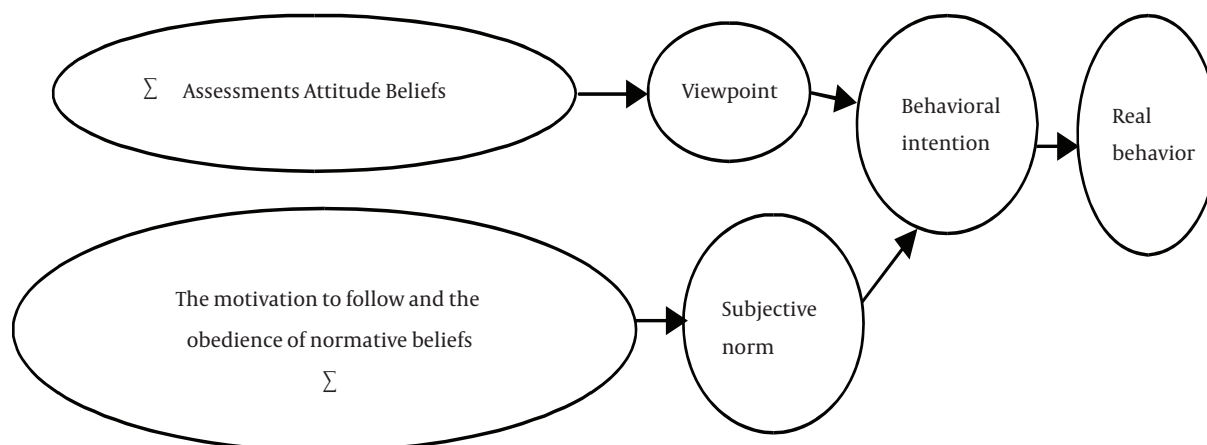


Figure 1. Theory of Reasoned Action (TRA) (23)

following.

1. What is the viewpoint of Shazand petrochemical company employees regarding using mobile devices learning by TRA in terms of the desire to learn, behavioral control, mental norm, and learning intention?

2. Is there a relation between sex, marital status, work record as well as employee education level, and each of the 4 dimensions of reasoned action?

2. Methods

This research is done with a quantitative approach. According to its aim, it can be considered as an applied research because it assesses an applied knowledge in a particular field. In terms of nature, it is in the category of explanatory research, and in terms of data collection method it is in category of descriptive-survey research. A library study has been used to formulate theoretical foundations and theoretical model. The research area of this research is Shazand Petrochemical Company and its subject matter is mobile learning. The used sampling method was simple random sampling with respect to the characteristics of all members of the community. The statistical population of the study consisted of all employees of Shazand petrochemical company, and according to the latest statistics of Shazand petrochemical company in 2015, the population in total was 1,700 people. By using the Cochran formula at error level of 0.5, the Sample size is equal to 313 people. A total of 330 questionnaires were distributed and 313 questionnaires were returned correctly and became a bases of this research. The research tool was Ahmadi's researcher-made questionnaire for mobile learning using the reasoned action theory, which has 4 com-

ponents, a willingness to learn, behavioral control, consciousness and mentality, as well as the intention to learn (26). This questionnaire is based on the 5-degree Likert scale from very little to very large and has 34 questions and 4 dimensions, which are tendency to learning, behavioral control, subjective norm, and intention to learn. Its validity has been provided by Ahmadi (26). In order to assess the validity of questions of questionnaire, despite the fact that the questionnaire used in this research is provided by its constructor, the validity of the content of the questionnaire has been confirmed by academicians and scholars, therefore it is completely valid. Cronbach's alpha method was used to determine the reliability of the questionnaires. For this purpose, 30 questionnaires were distributed among the members of the statistical community. The reliability coefficient of the questionnaire was 0.88. Therefore, the reliability of the questionnaire was confirmed. After identification of the sample and coordination of the relevant organization authorities, the questionnaire was carried out. The methodology was that after providing the written permission from that organization, the researchers meet the staffs of Shazand petrochemical company. After justifying the research project and gaining their cooperation, the date and time of completing the questionnaire were coordinated so that the employees' working time wasn't damaged. Then, on the appointed day, the researchers described the purpose of the research for communicating with the employees and encouraging their desire to respond the questionnaire. Before the questionnaires were distributed, they were told that participation was completely voluntary and they were assured that the collected information will be kept confidential to the researcher. In addition, it will also be noted that there are

no correct or incorrect answers and they should choose the option that best matches their views, after distributing the questionnaire among the statistical sample, data was gathered.

The criteria for entering the study included being employees of Petrochemical Company of Shazand, all respondents with awareness and who voluntarily consented to complete the questionnaire, as well as have collaborated in performing this study. Doing this research has not had any financial and benefit losses for respondents. The researchers are committed to compensate the respondent for possible damages in the course of their work. Respondents' information will remain confidential to researchers and will not be reflected. The benefits and results of research will be available to all respondents. Also, in this study, people who did not want to cooperate to fill in the questionnaires were excluded from the scope of the research.

Data analysis was performed on descriptive and inferential statistics by SPSS software version 17. For describing statistics, typical descriptive statistics such as frequency, mean, and standard deviation were used. In addition, for testing questionnaires, depending on the nature of the question, a suitable statistical test of t-single-variable was used. Furthermore, to show the desirability or undesirability of components, the standard range of Bazargan et al. (undesirable 1 to -2.33, relatively favorable -2.33 to -3.67, and desirable 3.68 to 5) was used.

3. Results

According to available data, 26.5% of participants were female and 73.5% were male. Of the participants, 32.3% of the sample population were between the ages of 25 and 35, 52.4% from the age group of 36 to 45, 8.6% from 46 to 55 years old, and 6.7% from the age of 55 and above. In terms of education, 10.5% had an undergraduate degree, 53% had a bachelor's degree, 31.3% had a master's degree, and 1.5% of the participants had a Ph.D. In terms of service experience, 26.8% of the participants were from 1 to up to 5 years of service experience, 31.9% have been between 6 and 10 years of service experience, 14.4% have been 11 to 15 years of service experience, 24.6% have been between 20 and 16 years of service experience, and 2.2% have been between 20 years of service experience and more (Table 1).

As shown in Table 1, the results obtained from the one-sample t-test reveals that the employees were in an ideal situation in the context of the desire to learn with an average of 4.32. Also, the results of one-sample t-test reveals that the staff in the context of learning intention with an average (3.55) were in a relatively favorable situation (Table 2).

Table 1. Single-Sample T-Test for Dimensions of Logical Action Model

Component	Mean \pm Standard Deviation	T Value	Degree of Freedom	Level of Significance
Tendency to learn	4.32 \pm 0.63	42.14	312	< 0.001
Control of learning	4.19 \pm 1.01	34.312	312	< 0.001
Subjective norm	4.09 \pm 1.07	38.73	312	< 0.001
Behavioral control	55.3 \pm 1.5	34.91	312	< 0.001

Table 2. Independent T-Test for Components of Logical Action and Gender

Components	Gender	Mean \pm Standard Deviation	T Ready	P Value
Tendency to Learn	Male	6.01 \pm 1.81	7.14	0.008
	Female	5.74 \pm 2.10		
Control of Learning	Male	5.33 \pm 1.29	10.01	0.002
	Female	5.35 \pm 1.70		
Subjective Norm	Male	6.61 \pm 1.85	2.36	0.12
	Female	5.94 \pm 2.12		
Behavioral Control	Male	6.77 \pm 1.40	1.45	0.22
	Female	6.56 \pm 1.51		

As the results of Table 2 show, there is a positive and significant relationship between gender and the tendency to learn and control learning ($P < 0.05$), ($t = 7.21 - 14.10$). In other words, according to this result in tendency to learn, women were higher than men, and based on learning control men had a higher mean than male. In the other 2 dimensions, there was no significant difference between men and women ($P > 0.05$) (Table 3).

As the results of Table 3 show, there is a positive and significant relationship between marital status and all aspects of logical action. In other words, the average of married people in all dimensions is higher than single population. Therefore, there is a relationship between logical action and marital status ($P < 0.05$) (Table 4).

According to the data of Table 4 and the significance levels obtained in the logical action dimensions, only behavioral control with the value ($t = 8.62$) and the significance level below (0.05) had relationship with the work experience of individuals (Table 5).

According to information in Table 5 and significant levels gained in dimensions of logical action among these dimensions, none were related to the level of education ($P > 0.05$).

Table 3. Independent T-Test for the Dimensions of Logical Action and Marital Status

Component	Gender	Mean ± Standard Deviation	Ready T	P Value
Tendency To Learn	Single	4.01 ± 1.20	5.6	0.04
	Married	6.55 ± 2.80		
Learning Control	Single	4.33 ± 1.90	8.50	0.03
	Married	5 ± 1.20		
Subjective Norm	Single	4.50 ± 1.99	8.90	0.001
	Married	6.69 ± 3.12		
Behavioral Control	Single	4.20 ± 4.2	7.50	0.003
	Married	6.23 ± 5.88		

Table 4. Independent T-Test for Dimensions of Logical Action and Work History (Experience)

Components	Experience	Mean ± Standard Deviation	Ready t	P Value
Tendency to learn	I - 10	2.5 ± 1.50	81.2	0.06
	II - 20	2.8 ± 1.00		
Control of learning	I - 10	2.30 ± 1.60	57.1	0.20
	II - 20	3.80 ± 1.10		
Subjective norm	I - 10	2.2 ± 1.8	64.2	0.07
	II - 20	2.3 ± 1.8		
Behavioral control	I - 10	2.5 ± 1.1	62.8	0.00
	II - 20	3.23 ± 1.8		

Table 5. Independent T-Test for the Dimensions of Logical Action and Education

Component	Education	Mean ± Standard Deviation	Ready T	P Value
Tendency To Learn	Under B.A	3.5 ± 2.33	20.3	0.086
	Above B.A	3.6 ± 2.20		
Control Of Learning	Under B.A	4.80 ± 1.11	80.2	0.56
	Above B.A	4 ± 1.22		
Subjective Norm	Under B.A	3.90 ± 1.55	60.2	0.66
	Above B.A	3.50 ± 2.33		
Behavioral Control	Under B.A	3.50 ± 2.65	50.3	0.88
	Above B.A	3.20 ± 2.30		

4. Discussion and Conclusions

In recent decades, various patterns and models have emerged in the field of technology acceptance in line with the advancement of technology and information as well

as its application in various fields. The results of the research show that these models have different functions in the study of different technologies and their acceptance. The present study is also designed to assess the Shazand Petrochemical Company employees' view about using mobile learning by the TRA model. Mobile learning clearly turns out to be a new generation of changing the learning paradigm that tracks traditional lecture-based learning and introduces e-learning pedagogy (27). According to studies that have been conducted, new education in 3 main ways became attracted to learning through mobile. Firstly, the abundance is said that the new generation, the mobile generation, affects modern education to get a tendency to use mobile devices. The innovation and popularity of mobile devices has penetrated the public, so that cellular awareness has not been just as a means of communication. Mobile as well as digital information assistants, is a key element for individuals (28). Secondly, with the growth of mobile technologies and services, it seems that mobile learning will be further supported in the near future. Recently, mobile phones with widespread applications of mobile technologies and services such as Bluetooth, WAP, GPS, etc. have become more complex. That's why these small gadgets are not just a device for long conversations but as personal aids as well (29, 30).

As a result, these services and mobile technologies enable mobile learning more than before. Finally, learning from a mobile with high confidence provides mobility benefits. As a result, the younger generation of learners prefer to expect a lot of learning by a mobile device. Unlike school students, academic learners are not often in attendance in the classroom, therefore, the mobility issue is clearly very important. Academic learners need effective educational support to access their learning activities at any time and place. Hence, mobile phones, as personal aids, should always provide academic learners with an appropriate way of acquiring learning materials. It should also transfer their learning activities without time or positional constraints. In addition, mobile learning can facilitate communication and collaboration between learners and trainer or between learner and learner (28). If educational institutions and organizations accept personal mobile devices in the classroom, learners' and educators' views should also be analyzed for mobile learning. Most previous studies have only analyzed the views of learners and focused on implementing mobile learning activities in the classroom. In any case, the views and the desire to learn from learning through the mobile should be understood on a wider scale. Even large-scale research has been done for learners and educators, however, no separate results and analysis have been provided for both groups (13). This study is useful to provide information on how to change

the way students learn and change their thinking about learning. This study also examines any potential obstacles that may prevent the use of mobile devices in classrooms as educational tools. In the first question of the study, what is the view of employees of Shazand Petrochemical Company about the use of mobile learning using the TRA model in terms of the desire to learn?, the results of the t-test showed that "t", which is calculated with the value of 42.14 in the willingness to learn with a degree of freedom of 312 for oddity tests is at a level of 0.05 greater than the critical value of t (1.96). Therefore, the 0 assumption in this test is that the difference between the mean of the sample and the average of the society (theoretical) is rejected. As a result, the willingness of employees of Shazand Petrochemical Company to learn about the use of high-level mobile learning is evaluated. Therefore, the results of this study are consistent with the results of Wang et al. (7), Ozon Boyle et al. (14), and Kan'ani Nairi (31). In contrast to the results of this hypothesis, it can be said that the great benefits of mobile learning encourages all organizations and companies to move toward this great transformation.

In addition, the results of scientists' research have shown the high effectiveness and low cost of these courses. Initial studies around the world have provided pleasant results for using mobile devices to support teaching and learning (18, 21, 32). Also, it is shown that learners have a tendency to use mobile devices to learn. Then, employees by using mobile devices become encouraged and committed (5, 7, 8). Furthermore, when learners use mobile technologies, their levels of advancement increase (12, 15, 17, 20). Studies show that mobile devices are used for classroom and non-classroom learning and can be considered as educational tools. When many employees, especially corporate executives, do not have the opportunity to participate in the training courses due to their high level of attendance, learning through mobile will help them by eliminating time and space constraints. Next, it is important to enter the learning courses through mobile phones, carry out initial studies, and measure the degree of acceptance by the organization to accomplish this aim. In the 2nd question, the study examines whether there is a relationship between sex, marital status, work experience and level of education, as well as each of the 4 dimensions of logical action. The results show that there is a positive and significant relationship between gender and the tendency to learn and control learning ($P < 0.05$), ($t = 7.14 - 10.21$). In other words, according to this result, in terms of controlling the learning, women in comparison with men, had a higher mean for learning control. In addition, in learning, men have higher mean. In the other 2 dimensions, there was no significant difference between men and women ($P > 0.05$). The results also showed that there is a positive and

significant relationship between marital status and all aspects of logical action, however, in the work experience, the dimensions of behavioral control value ($t = 8.62$) was related to the work experience of the individuals. Finally, in the dimension of education, none of the dimensions of the reasoned model was related to the level of education. The results of this study were compared with the results of Ahmadi et al. (26), Kavooos and Ozon Bowile (19), Rogers et al. (5), and Williams and Bremen (20).

Since learning through a mobile device is in its infancy, it still needs a lot of work to grow and complete. However, considering advancements in technology and the unique social changes taking place in the world, increasing dependence on mobile devices is evident. In our country, in order to compensate for the backwardness in this area, there is a need for a great deal of research. Through these studies, we have to fill in the gaps in the research and help build the basis for future research regarding learning through a mobile device (31). There are also good reasons for mobile learning. Obviously, the change is permanent and it keeps "the learners' require for development" up-to-date. People tend to focus their attention on the constant improvement of their skills, so the environment with extensive program on mobile learning become attractive for learners. Cost and effectiveness is also important in mobile learning. Traditional learning is what people are used to and in the form of places is expensive. Mobile learning cuts those costs. Mobile screening seems to be more responsive and measurable, due to the fact that it enables teachers to assign the right kind of training to specified individuals. Furthermore, we can be sure of measuring the results that we have achieved our goals (33). Undoubtedly, mobile devices have changed the way we live, work, and even socialize. We can quickly access our e-mail using mobile devices, read articles, pay bills, play games, interact with others through social networks, as well as many other things. However, despite this, there is a disadvantage in using mobile devices too, most notably the issue of mobile device addiction. Many psychologists believe that a person should not depend on his phone because he will encounter different problems in his social and family relationships. Among other disadvantages of mobile devices, losing your phone as well as the loss of many confidential information, confusion and isolation, and the incidence of depression in people, reluctance to study and sport activities, the development of early maturity in adolescents and negative effects on the natural growth of the body and mind, the emergence of neurotic and unpredictable behavior, and so on can all occur. This research also has some limitations that are mentioned. The statistical samples of this study are employees of Shazand Petrochemical Company, therefore, the results have no generalizability capability to other organi-

zations. Lack of a standard measurement scale to measure the inclination, behavioral control, awareness and mentality of sample individuals in the field of mobile learning within the country, the use of researcher-made tools using external research theories due to the existing cultural differences, and the degree of validity, affects the research. The inability of the researcher to control the individual's mentality in responding to the questionnaires' questions, the unwillingness of sample individuals to accurately handle the process of answering the questions due to personal motivation, and the reluctance to respond were other research constraints.

Footnote

Conflict of Interest: None Declared.

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