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Original Article

A Study of E-Learning Maturity in Higher Agricultural Education Using Artificial Neural Network

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ABSTRACT

Background: Being a relatively new learning mode, e-learning offers a comprehensive solution for those institutions seeking to adopt modern technologies and transform their teaching methods and environments. The present study employed Misra and Dhingra model to assess e-learning maturity in the field of agriculture in Iran using artificial neural network.

Methods: This cross-sectional study was performed based on six levels of Misra and Dhingra model. It was conducted among 340 graduate agriculture students and 177 faculty members at four universities including Bu Ali Sina, Tehran, Hormozgan, and Mashahd universities. The participants were selected based on proportional sampling method from July 1 to September 28, 2019. A validated researcher-made questionnaire was used for data collection, and WEKA software version 3.9.2 was employed for data analysis.

Results: The results indicated that the level of academic achievement in the field of agriculture can be predicted based on the Misra and Dhingra model. Furthermore, e-learning was at the fourth level in this field in Iran's higher education.

Conclusions: In general, educational facilities and infrastructures were identified to be suitable for e-learning implementation in Iran's higher education institutions.

Keywords: E-learning, Electronic maturation, Weka software, ANN

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Introduction

Electronic education entails the use of information and communication technology to expand the activities of higher education institutions and universities, and to serve learners at any time and place (1). This mode of education can be considered complementary to traditional methods, with the difference lying in the context of using technologies and providing services. Implementing e-learning would enhance the efficiency and effectiveness of the learning process resulting in cost reduction in educational activities (2, 3). In addition, spatial autonomy in e-learning entails certain benefits such as greater student access to the services, easy and low-cost use of educational tools, and higher volume of service delivery (4, 5). E-learning in higher education is only effective when it reaches a certain level of maturity. There are two different approaches for creating and applying maturity models. The first approach involves a step-by-step process (mostly in 5 levels or stages) in which

a series of related capabilities are more or less achieved. In fact, a set of capabilities should be obtained before proceeding to the next set. In this view, the maturity levels are determined and an organization is either at a particular level or in the process of moving from one level to another. The second approach, however, involves a combination of different capabilities. For example, an organization may have some capabilities at level two and some others at level four. Therefore, the key question is whether attempts are made to avoid focusing on specific capabilities which distinguish an organization, as well as on the capabilities achieved so far. Different units within a single organization may be at different levels of maturity. Some groups within an organization may incorporate an incompatible combination of features from different levels. Every major organization will inevitably display some contradictions and conflicts between the activities in different areas.

In any event, universities and higher education institutions should focus on establishing a means of data and system alignment which guides them towards the final levels of maturity. There are several models for evaluating e-learning maturity, using which the status of an organization and its desired condition can be determined. Some of the most prominent models include Nolan's Stages Theory of Information Technology adoption (6), Misra and Dhingra (7), Electronic Democracy (8), two-dimensional maturity (9), and five-stage model of Scott (10). Other electronic maturation models are designed to assess the maturity of e-government and the only model of organizational e-maturation was presented by Misera and Dhinhra (11). Thus, this model appears to be suitable for an assessment of electronic maturity in universities and higher education institutions; it demonstrates the extent to which there is an alignment in the internal processes of an organization. Misra and Dhingra (7), in their model, adopted an organizational view of e-learning. In the other words, the emphasis in this model—which is used in the present study—is on the steps taken by educational institutions to implement e-learning (12). In addition, it can be utilized to identify six levels of maturity.

In the first level, namely the limited stage, educational institutions do not use information and communication technology in educational affairs and there is no plan to use this technology in the near future. In the second level, that is, the preliminary level, the institutions take the first steps in pursuit of electronic processes, but this pursuit is basically lacking in generality. At this level, there is no organized effort to provide preconditions for e-learning. As for the planned stage (third level), a systematic approach is used, where the educational centers have a clearly defined vision, general goals, and sub-goals for e-learning. In addition, needs assessment is conducted at this stage. Further, in the achieved stage (fourth level), an educational system is put in place based on the offered programs. Regarding the fifth level, the educational centers have already established their real status and their attention is focused on removing the existing gaps between what is in the program and the real developments. In the optimization stage (sixth level), the educational centers are committed to continuous improvement and optimization of service delivery. At this level, the centers are mainly looking for innovative technologies and work processes that could contribute to the full implementation of e-learning.

In this study, we define the term 'e-learning' as the use of information and communication technology in learning procedures such as learning transfer, skill diagnostics, help and support, management, as well as formal and informal learning. In this learning mode the use of ICT is emphasized throughout the learning process. In addition, it entails the deployment of numerous software and hardware technologies such as popular learning services, e-assessment, e-context, and learning management systems. This shows that e-learning implementation has been subject to substantial changes in its rather short history (13). In this respect,

maintaining an effective technological infrastructure has remained a key strategic objective for university leaders (14, 15). There are reports about universities struggling with technology adoption since they cannot provide the required infrastructure (16-19). Maintaining quality in higher education is a complex undertaking and needs infrastructural preparations. Many methods of quality measurement in commercial fields are used in higher education (20-25). In this regard, a model for the assessment of e-learning maturity is a suitable framework since it helps educational institutions improve their performance.

Basically, developing a better understanding of the present situation in an organization will lead to more effective policy planning. Having a clear picture of the current state of affairs would help educators and higher education leaders realize the potentials of their institutions. Without such an insight, one cannot make any major progress towards achieving the desired objectives and ideals. Therefore, in this study, an attempt was made to evaluate the maturity status and development rate of e-learning in the field of agriculture in Iran's higher education. The objective here is to familiarize policymakers and higher education planners with e-learning maturity in this academic discipline. Such information will pave the way for sound and principled policymaking, and can contribute to the general development and maturity of e-learning across the country. Thus, the present study aimed at assessing the development rate and e-maturity of colleges of agriculture in Iran based on Misra and Dingra models.

Methods

Study Design and Setting

The present cross-sectional study was conducted in 2019 to evaluate educational development and e-maturity of Iran's agricultural colleges based on Misra and Dingra models. Graduate students (master's and doctoral) and faculty members at agricultural faculties of universities and higher education institutions at the time of the study were selected to participate. The reason for choosing agricultural colleges was the fact that the students and faculty members were available to the researchers. All of the participants who were unwilling to continue their participation and failed to complete the questionnaire were excluded.

To select the sample, the latest national ranking report was used where universities higher education centers were ranked in four levels. In consultation with supervisors and consultants, University of Tehran (first level), Bu Ali Sina University (second level), Hormozgan University (third level), and Torbat Heydariyeh University (fourth level) were selected during July 1 to September 28, 2019.

Participants

The total number of graduate students in all four universities was 2943, among whom 340 graduate students were selected based on random sampling method. The contribution of each university was used to determine the number of students selected. Therefore, the percentage and share of each university were determined by dividing the number of students in each university by the total number of students (2943). Then, the sample size of students (340) was multiplied by the percentage obtained by each university separately and the number of selected students at Tehran, Bu Ali Sina, Hormozgan, and Torbat Heydariyeh universities was 168, 76, 53, and 43, respectively.

Instrument

To collect the related data, a questionnaire was used based on the 6 levels of Misra and Dhingra model. The first section consists of the factors affecting the acceptance of e-learning including 11 structures and 68 items scored on a 5-point Likert scale. The second section focuses on assessing the maturity of e-learning based on the Misra and Dingra models including 6 levels and 29 items scored on a 5-point Likert scale. The third section aims to evaluate the quality

of e-learning based on the Scorem model, which consists of open-ended questions rated on a 6-point Likert scale (Strongly disagree=1, disagree=2, no opinion=3, agree=4 and strongly agree=5). The fourth section included the personal characteristics of the respondents including 11 questions covering age, gender, job, degree, grade, skills, the level of computer use to do homework, as well as the use of the Internet for homework, and the rate of using e-mail.

The questionnaire was given to 10 experts in the related field to evaluate face and content validity. The inclusion criterion was being a faculty member in the fields of education and information technology, and the related specialties included educational technology, adult education, educational sciences, information technology, agricultural development, and agricultural education in Bu Ali Sina and Tehran universities. After distributing the initial questionnaire and applying the experts' opinions, the questionnaires were redistributed and the opinions of the professors, along with consultations from the supervisor and advisors, led to the preparation of the final questionnaire. The collected data were validated based on the scientific articles on e-learning in the field of maturity of educational organizations and the views of respondents.

Regarding ethical considerations, the expert opinions were kept in confidence and placed in the category of "observance of ethics in research". It took about 30 to 45 minutes to complete each questionnaire. There were two ways of distributing and collecting questionnaires among the faculty members. Some professors requested that the respondents be present when completing the questionnaire, while the other group set a time to complete the questionnaire and the respondents received the questionnaires from the professors at the specified time.

Data Analysis

The data were analyzed using Artificial Neural Network (ANN). The neural network was used to assess the level of e-learning maturity. Neural Networks are considered as the electronic models of the neural structure of the human brain. The learning mechanism of the brain is essentially based on experience. Electronic models of natural neural networks are also based on this model and the method of dealing with such models is different from the computational methods routinely used by computer systems. Artificial neural networks are new computing systems and techniques for machine learning, knowledge representation, and, finally, the application of the gained knowledge in order to predict outbound responses to complex systems (26, 27). This field of computational knowledge does not utilize traditional programming methods, while it benefits from the large networks which are arranged in parallel. An artificial neural network is modeled on the idea of information processing, which is inspired by the biological nervous system. This idea serves as a basis for a new structure of information processing system (28). This system includes a great number of high-precision processing elements which work together to solve problems.

Procedure

Reversible neural network algorithm (BP) is used for retrieving the coded neural network for data analysis. In this paper, it was represented by several techniques used for determining the levels of higher agricultural education. The simulation process indicates that the proposed algorithms have higher coherency rates than the standard BP algorithm.

Different laws can be applied for neural network maturity. Further, back propagation law (BP), which is applied in Multilayer Perceptron Networks (MLPs), can be used for training multicast neural networks. In other words, the topology of the MLP networks is complemented by retrospective error learning law, which is an approximation of Nicky's e-learning maturity algorithm and falls within the framework of functional learning. The post-propagation process consists of forward and backward maths. In this analysis process,

the initial presence and institutionalization are categorized in low-stimulating factors of e-learning maturity, while optimization, limited, preliminary, and realization are included in high-stimulating factors. In this process, an educational model is applied in the network and its effects spread through the intermediate layers, and ultimately, actual output MLP is obtained. In this path, the network parameters (weight matrices and vectors) are considered as constant and unchanged.

Linear regression was used in Weka software for each level of the parameter. The packet-level analysis in the maturity of e-learning has six parameters including a part called hidden layer in the neural network with the linear regression and coefficients of accuracy, precision, and error in the Weka software. Based on the results, the fourth parameter "it is not possible for the faculty to use the information technology" shows an increasing stimulus in the neural network, which can affect the use of IT in college.

In this study, after the regression, the effects of maturity were assessed among the 200 postgraduate agricultural students in Iran. It can be decided which factors are more effective than other parameters at different levels of the packet. As shown in the post-analysis in the Weka software, the fourth parameter included blue color with proper learning and productivity rates which is appropriate for the maturity of e-learning and obtained the appropriate score of 98.

Then, the factors among the statistical population should be presented by proposing an algorithm for applying in the neural network in the maturity of e-learning for six levels of factors. The data were clustered into the Excel software and unused data were deleted. Afterwards the cleaning, limited, preliminary, initial presence, implementation, institutionalization, and optimization levels were presented in the form of a neural network in the following form in the Weka software.

A Neural Network Designed for E-learning Maturity

In this section, the neural network of e-learning maturity of the Misra and Dhingra models is presented. Based on neural network models, a reinforced neural network processing table is constructed and analyzed. In this paper, we use the input factors of the Multilayer Perceptron Network (Figure 1).

Multilayer Perceptron Network Based on Misra and Dhingra Model and Its Role in Maturity of E-learning

In the provided system, MLP with a triple layer for neural network levels in neural network training was used for estimating the duration of a neural network.

Improving the Standard Back-Propagation Algorithm (SBP) by Implementing it in the Maturity of E-learning

BP Algorithm of Batch Type (BBP)

The standard BP algorithm is based on the template form so that the network parameters can provide a clear understanding of the implementation plan for e-learning in developing an integrated system at the Faculty of Agriculture. These parameters adjust acceptable facilities for exchanging information, after presenting each of the learning patterns which are generally randomly selected, while the network parameters are set after applying all inputs in the BBP algorithm. Batch processing makes local gradients closer to real local gradients.

Finally, the BP algorithm is closer to the most descending algorithm, leading to an increase in the convergence of the BP algorithm. As shown in Figure 2, the problem of XOR (maturity) is implemented by using the BP algorithm

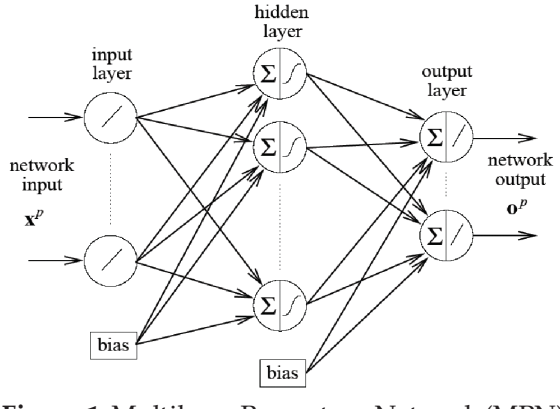

Figure 1. Multilayer Perceptron Network (MPN)

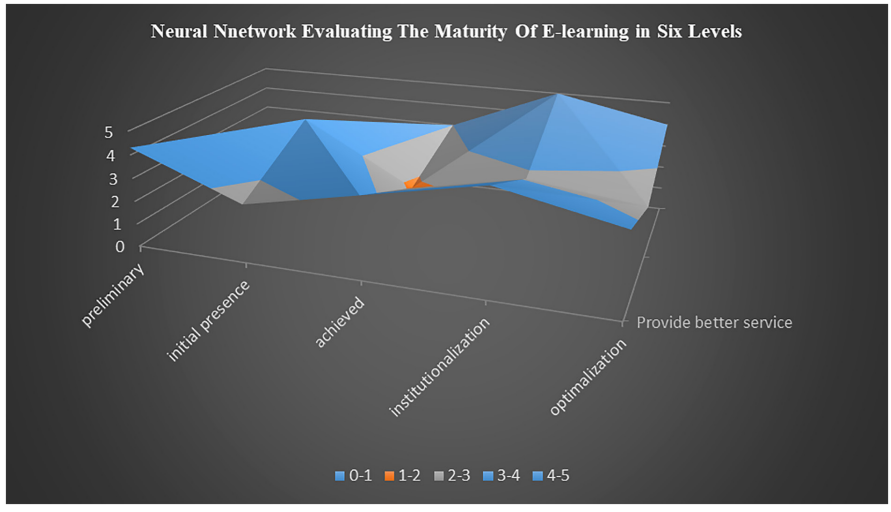

Figure 2. Assessment neural network for e-learning maturity

method to form a batch. In addition, the BBP algorithm has a higher convergence speed compared to SBP algorithm.

Back-propagation is used for learning the weight of a multi-layered network. In this method, we minimize the error square between network outputs and target function by using the gradient descent method in order to achieve an acceptable hypothesis by minimizing the error. However, there is no guarantee that this algorithm can reach the absolute minimum. After examining the uncertainties of the maturity of electronic learning in the neural network, which determines the error between the outputs, the output of the paper error (e-learning maturity) reached 7%, which determined the rational and stimulatory ratio. In the next section, the the error analysis in the neural network is examined.

Figure 2 displays the sensitivity of the network. The behavior of the network should be analyzed after creating the neural network and 6 level behaviors. Table 1 indicates the analysis of the network in Weka software.

Table 1. Network behavior with SBP algorithm

Agents	Maturity in e-learning
Limited	89%
Preliminary (access)	60%
Initial presence (planning)	58%
Realized (Understood)	79%
Institutionalization	90.1%
Optimization	90%

Table 1 shows factor analysis and level of communication in relation to the maturity of e-learning. Due to the sensitivity and behavior of the network, the institutionalizing factor is 90.1 % which is the best amount of reminder and error accuracy in creating the neural network educator layer.

Ethical Considerations

This study was approved by the Deputy Head of Research Committee at Bu Ali Sina University of Agricultural Education and Development. All participants were fully aware of the nature and confidentiality of the study and were told in advance that the information provided by them would remain confidential. Entering the study was made possible by signing the consent form.

Results

Based on the demographic information, 34.2 and 65.8% were faculty members and graduate students, respectively. The mean faculty member was 35.4 years. In addition, the mean graduate students were 33.5 years. Further, 55.6 % of graduate were male and 44.4% were female, while 65.5 % of faculty member were male and 34.5% were female. Further, 97.2% of faculty member were in the field of agriculture and 2.8% of were in the field of natural resources. Additionally, 93.2 and 6.8% of graduate students were in the field of agriculture and natural resources, respectively. Of these, most of the faculty

members studied irrigation and drainage major (11.9%) and 1.1 % were in the field of rangeland and watershed management. Additionally, most graduate students studied gardening (8.5%) and the rest held major in rangeland and watershed management (3.2%). In addition, 51.1% held master, 14.7% PhD and the rest were post-doctoral (34.2%). Further, 52.4% of students stated that they used computer between 1 to 10 hours for doing homework, while 28.8 % used computer between 11 to 20 hours and 18.8% used it for 21 to 30 hours. Finally, 50.9% of the students used internet between 1-10 hours, 32.1% for 11-20 hours, and 17% for 21-30 hours in a week.

After performing the analyzes, enhancing, stimulating, and learning the BP algorithms, the following results were derived from the Post-Publication Learning error (BP) law for teaching multi-layered neural networks as follows.

- Limited equals (23%)
- Preliminary equals (29.5%)
- Primary presence (planning) equals (58%)
- Realized (perceived) equals (82.37%)
- Institutionalization equals (40.25%)
- Optimization equals (35.26%)

Generally, new algorithms are proposed for improving the BP algorithm. Some of these methods are based on the adaptive learning rate. In this way, the learning rate changes during the training process to improve performance in the standard BP algorithm. The comparative learning rate can increase the learning rate to the extent that it is possible and the system is unstable. Another algorithm is presented to improve the convergence speed of the BP algorithm. The proposed algorithm acts as a controller. Further, Figure 3 displays the analysis and stability analysis of the proposed algorithm.

Thus, the results are as follows.

- Realization (perceived) with 82.37% accuracy and precision in the first level
- Initial presence (planning) with 58% accuracy and precision in the second level
- Institutionalization with 40.25% accuracy and precision at the third level
- Optimization with 35.26% accuracy and precision on the fourth level
- Introductory 29.5% accuracy and precision at the fifth level
- Limited with 23% accuracy and precision at the sixth level

Figure 4 shows the final results of improving the maturity of e-learning at different levels after examining the neural network.

Sustainability analysis is related to the circumstances in which the learning parameters should apply with the exchange of information and e-learning content between e-learning and the practical algorithm so that the algorithm remains stable. Finally, algorithms are presented, among which

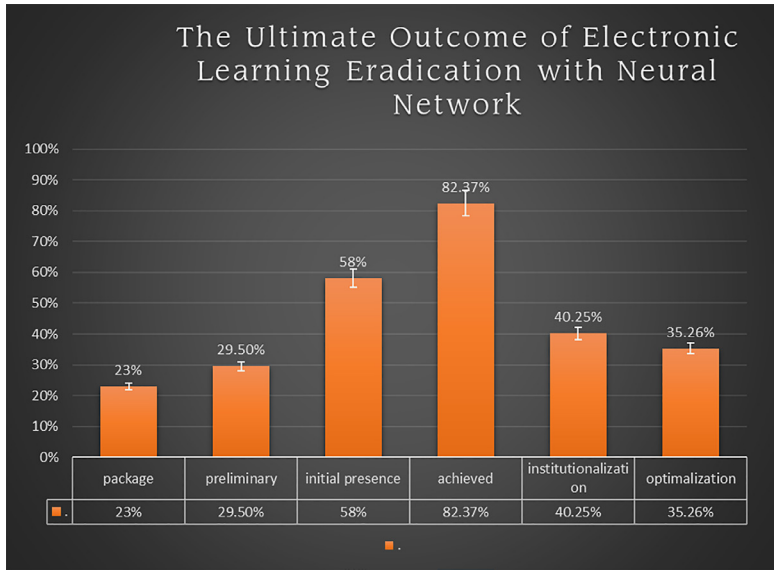

Figure 3. Maturity levels of e-learning after the reinforcement of algorithms

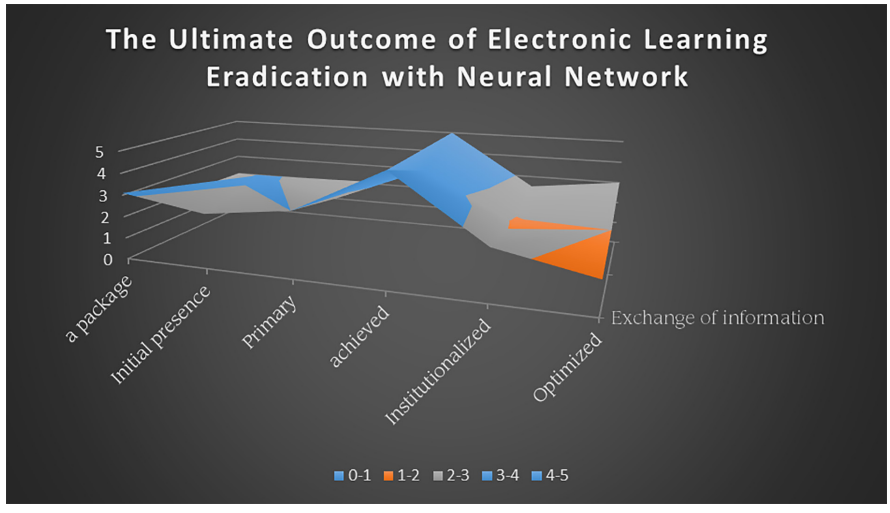

Figure 4. Final results of improving the maturity of e-learning at different levels

RPROP Back-Up Error-Optimization algorithm can be mentioned. In this algorithm, only the derivative of the propagation function relative to the network parameters is used to set the network parameters. In addition, the derivative size of the excitation function has no effect on the setting of the network parameters.

Regarding the the current status of higher agricultural education institutions in Iran in the field of electronic education maturity, the results indicated that e-learning maturity level is realized at higher education agriculture. Based on this level, the necessary facilities and conditions for e-learning were met, along with the minimum necessities, but the conditions are not completely stabilized and there is a possibility of returning to the previous levels. In other words, at this level, an integrated system is implemented based on the plans, upon which all internal processes of the organization are conducted by computer and the information exchange occurs between all units performs in an integrated way. In addition to providing services to its employees effectively, the organization starts to provide services for foreign customers at this stage. Based on the analysis, the achieved level was related to institutionalization level, upon which educational centers have established their real status by focusing on the removal of the gaps between what is in the program and what is happening based on the definition suggested by the Misra and Dhingra models at this level. However, by conducting more accurate analysis, it was found that realization level reached in higher agricultural education.

Regarding the suitable model of e-learning maturity in higher agricultural education institutions in Iran, there are many models for e-government and e-commerce maturity, but Misra and Dhingra model is considered as the only model which examines corporate maturity, which evaluates the electronic maturity of different educational organizations and was used in this study due to its comprehensiveness, reliability, and proportionality with the topic and title of research.

As for the effective factors in reaching the desired level of maturity of e-learning in higher agricultural education institutions in Iran, Several factors can affect the satisfactory level of electronic maturity in higher agricultural education such as quantitative and qualitative development of technical and telecommunication infrastructure, attracting, employing and educating efficient and expert human resources in the field of information and communication technology, policy-making and appropriate planning of managers and responsible officials for the development of e-learning in universities, the existence of determination, intention, and belief in senior managers for the development of e-government and e-learning in higher education, adequate investment

in the infrastructure and support part, the availability of sufficient technical knowledge and electronic literacy among managers and planners, a comprehensive look at macro policymakers in implementing e-government, design, procurement and setting up a comprehensive e-learning roadmap in the country, allocating a part of the budget of each university to the quantitative and qualitative development of e-learning based on a specific timetable, and the like.

Regarding the problems and institutional barriers affecting the optimal level of maturity and providing a good model, we can refer to the lack of confidence among policymakers and managers in e-learning and its achievements, lack of material and spiritual support of officials and senior executives of these types of training, lack of acceptance of faculty members from the institutionalization of this type of education due to the deterioration of their position in relation to in-person and traditional education, lack of electronic literacy among students and faculty members of universities and institutes of higher education, weakness of technical and telecommunication infrastructure, lack of expert and skilled personnel, lack of comprehensive e-learning map in higher education of the country, and the like, leading to the electronic education in higher agricultural education of Iran in order not to reach to the level of absolute electronic maturation.

As for the executive strategies for achieving the desired level of e-learning in higher agricultural education institutes in Iran, it seems that there are executive strategies in order to achieve a desirable level of e-learning in educational higher education institutions in Iran as follows.

First, in-house executive strategies which focus more on the educational activities and actions of officials, faculty members, staff and students at universities and higher education institutions, and how they are welcomed by this method of education. Certainly, the necessary and competent efforts should be made by university authorities to introduce and institutionalize e-learning for better success of this system in different universities.

Second, external executive strategies which are at the macro level performed by policy makers and planners of higher education sector in Iran should be adopted. Undoubtedly, having a comprehensive, sophisticated, and systemic approach by these managers will help to develop and improve e-learning at higher education levels. The findings of this study indicated that e-learning maturity level is realized at higher education agriculture.

Discussion

The results of this study indicated that the level of institutionalization was obtained at first based on the artificial neural network, where the level of maturity of e-learning in higher agricultural education in Iran was adjusted to the level of realization after enhancement, stimulation, and learning of the algorithms. Regarding the results of the research and the definitions related to the levels of e-maturation, the level of institutionalization implies that the necessary conditions and infrastructures for e-learning have been created and the necessary situation in this area has been consolidated and internalized. In other words, attendance at this level indicates that e-learning has been deployed in higher education and becomes a part of its organizational culture, while it was adjusted to fourth stage or "realization" in the secondary analysis which was conducted after reinforcement and learning the level of e-maturity. According to the Misra and Dhingra model, based on the implemented programs, an integrated system is implemented at this level, upon which all of the internal processes of the organization are conducted by computer, and the information completely exchanges among all units. In addition to providing effective services to its employees, the organization also begins to provide services for foreign customers at this stage.

Therefore, the level of achievement in higher agricultural education was realized based on the theory of Misra and Dhingra. The

results of this study showed that e-learning in higher agricultural education of Iran occurs in the realization (perceived) level with 82.37% accuracy and integrity. In addition, faculty members and students stated that the current situation of Iran's agricultural centers is at the planned level. In fact, a systematic approach is used at this stage, where training centers have specific goals for e-learning. Furthermore, paying attention to the different models for the maturity of e-learning were studied in agricultural training centers. According to students and faculty members, the 6-level model of Misra and Dhingra e-learning maturity is considered as a suitable model due to its high level of compatibility with Iranian agricultural education.

The present study aimed to to identify the effective factors in achieving the desired level of e-learning maturity in agricultural education. The results showed that policy-making and macro-planning for increasing the maturity of e-learning require cooperation and coordination between educational centers and e-learning authorities.

In addition, the institutional problems and barriers affecting the development of e-learning maturity were identified. According to students and faculty members, the lack of coordination between sectorial and extra-sectorial decision-making institutions, reduced budget for the development of technical infrastructure, insufficient provision for the development of e-learning, and lack of belief in this kind of training are considered as the most important problems.

Finally, coordination between sectorial and extra-sectorial decision-making institutions, increasing funding for the development of technical infrastructure, and providing skills courses in this field can be adapted to the conditions of e-learning maturity.

The findings also indicated that e-government in education in Ahwaz is in the second stage of the UN model as the evolutionary phase, and this organization and its four regions have passed from the first stage, but they have not yet gone beyond the second stage since both studies indicated the evolutionary and electronic maturity. Some studies in this area, while confirming the early stages of e-government in many institutions, emphasized that the establishment of e-government in Iran does not follow a linear pattern (29, 30). In other words, despite the fact that the features of the early stages have not yet fully realized, some of the characteristics of the final stages are observed in the operating systems. The results are consistent with those of this study since some of the features of the initial levels of the model are not fully realized despite the achievement of the fourth level or the level of realization by e-learning in higher agricultural education in Iran. In fact, the creation and development of e-learning do not follow a linear pattern. Zhou (30) evaluated the capacity and maturity of institutions and organizations with e-learning based on e-learning areas. However, only the level of maturity even with higher education in other disciplines and sciences was not compared in this study and the researcher only aimed to examine the existing conditions for planning and implementing e-learning. This factor was considered as a process which could be implemented in stages. The results are in line with those of the present study on the regular and continuous maturity of educational organizations. Generally, Iranian agricultural education has passed the first level and the second level of e-learning, while it failed to exceed the third level (planning stage) and this stage was not fully implemented in agricultural education. In other words, e-learning has entered the path of maturity and development in the agricultural sector and has gone through only half of the path, which is growing according to the e-maturity model of Misra and Dhingra. However, this study was limited to the lack of cooperation of universities, familiarity of universities with e-learning and difficulty in accessing the required data.

Ethical Considerations

This study was extracted from the Doctoral dissertation presented by the researchers at

Bu Ali-Sina University. The proposal, the questionnaire, and the participant consent form were submitted to the Deputy of Research Committee at Bu Ali Sina University of Agricultural Education and Development. All participants were fully aware of the nature and confidentiality of the study and were told in advance that the information provided by them would remain confidential. Entering the study was made possible for each participant by signing the consent form.

Authors' Contributions

K.M: Study design and data analysis.

M.S: Designing of the manuscript.

K.M and M.S: Critical revision and final approval of the manuscript.

Conflict of Interest

The authors declare no conflict of interest in this study.

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