Original Article

IEEPJ Vol. 4, No. 4, 2022, 252-259

http://ieepj.hormozgan.ac.ir/

Iranian Evolutionary and Educational Psychology Journal

IEEPJ

Examining a Professional Competency Model for Teachers in the E-Learning Environment

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Abstract: The current study aimed to provide a model of professional competency of teachers in the e-learning environment. The research method was correlational, and the data was analyzed using structural equation modeling. The statistical population included all male and female elementary school teachers in Qom city that 375 of whom were selected by stratified random sampling method. Data were collected using a researcher-made questionnaire. The validity and reliability of the questionnaire was evaluated at a satisfactory level. Results of confirmatory factor analysis indicated that seven dimensions of professional competency of teachers in the e-learning environment were confirmed. According to the results, these dimensions include educational (pedagogical), social, evaluation, technological, organizational, ethical and individual dimensions. Also, the model fit indices showed that the research model benefited from a good fit. Correspondingly, the model of professional competence of teachers in the electronic learning environment includes seven dimensions and 16 components. The findings can be used in the design of plans to improve the professional competence of teachers in e-learning environments.

Keywords: Professional competence model, e-learning environments, elementary school, teachers

Introduction

As a result of the global pandemic caused by COVID-19 and the closure of face-to-face education in schools, the face-to-face education based on traditional principles (teacher, classroom, etc.) was abandoned and teachers were widely involved in virtual education using online technologies, and this issue caused a big change in the education system of the countries (Hoernke et al., 2020; Torres Martín et al., 2021). The methods used in the traditional classroom often lost their application in the virtual learning environment, and teachers needed to acquire a set of competencies and skills to be able to move the teaching process in the right direction (Mok et al., 2021). Competency approach is one of the most recent and important approaches that was proposed as an effective way of thinking to face these changes (Egan & Akdere, 2005). Since the teachers of e-learning systems have a special role in the success of these systems, strengthening their professional ability is of particular importance.

According to past studies, the competencies and effective actions of teachers are the main factor in the quality of e-learning (Subaih et al., 2021; Winter et al., 2021). The competence and capability of the teacher in the electronic environment facilitates the relationship between the learner and the teacher (Guasch et al., 2010; Karuović et al., 2021), as a result, a competent teacher in electronic education is considered the key to success in the implementation of electronic learning, and he must have the necessary skills and experiences to effectively implement this type of education.

Article information: Received: 2022/07/24 | Accepted: 2022/10/6 | Published: 2022/12/1. https://doi.org/10.52547/ieepj.4.4.252

[Downloaded from ieepj.hormozgan.ac.ir on 2026-11-08]

[DOR: 20.1001.1.25884395.2022.4.4.23.9]

[DOI: 10.52547/ieepj.4.4.252]

In a general definition, e-learning is the use of network technology, for example, the Internet, in order to design and implement lessons with aim to realize the continuity of learning (Elfaki et al., 2019). E-learning can be both an individual activity and a group activity. Also, it can be simultaneously and non-simultaneously, that is, by using previously prepared educational CDs or through educational materials that have already been called from the Internet (Moh'd Al-Assaf, 2021).

Today, conventional and current education alone is not enough to establish social growth and the flourishing of talents and ultimately the expansion of education. Therefore, it is very necessary to pay attention to new methods of education and implementation of programs such as part-time education, open education, distance education and virtual education to achieve development goals (Alqahtani et al., 2021; Chamorro-Atalaya et al., 2021). Research has shown that e-learning creates a potential force for combining different interactive methods, which enables better collaboration in problem solving and critical thinking (Yustina et al., 2020). E-learning has helped to create a new paradigm in teaching and learning and is rapidly changing the efficiency of higher education (Hermanto & Srimulyani, 2021).

In various researches, the competencies of teachers in electronic education have been examined. For instance, Ramezanpour et al. (2021), in a research entitled "Providing a Meta-Synthesis Model of Competencies of E-Learning Courses Instructors", have come to the conclusion that the e-learning course instructor must know technology and its capabilities and limitations and have sufficient digital and media literacy. Be interested in technology, accept it and understand its value and position, they gain the skill of using technology, multimedia tools, and the ability to match technology with education. During the process of analysis and composition and according to the concepts emphasized in the selected articles, the competencies model of e-learning courses instructors by extracting 118 concepts, 26 categories and 9 dimensions (technological competency, specialty competency, pedagogy competency, guidance competency, social competency, individual competency, moral competency, managerial competency and self-development competency were approved. In another research, khademi and sattari (2021) in a research titled evaluation and prioritization of types of interaction and participation in e-learning environment using hierarchical analysis process (AHP), showed the contribution of teacher-student interaction variables with 32%, student-content with 23% and teacher-content with 16% has the highest impact on the level of learning and students' satisfaction with interaction and participation in the learning process., respectively.

In Alipour et al. (2021) study, using content analysis, 29 subcategories were identified and the components of e-learning environment that were extracted using content analysis in 7 dimensions include: the learner, the teacher, curriculum approaches, the teaching-learning process, the teaching content, the physics of e-learning environment and evaluation. To assess the validity and reliability of the coding, the trust feature was used. it includes four criteria, namely reliability (the degree of belief in research findings), confirmability (the ability to identify the place from which the data of a particular study has come) and verifiability (the findings are practically based on the data) and transferability (the results of a qualitative study can be transferred to a different environment).

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Also, Nasrollahi (2016) in a research identified and prioritized the effective factors affecting public schools teachers' tendency to employ e-learning. The study population are 667 elementary school teachers teaching in public schools. The result showed that environment and infrastructure (3.11), educational media (2.43), individual characteristics of the learner (2.39) and educational content (2.08), were ranked one to four. The components of each factor were also ranked, among which computer literacy and experience and web knowledge were (8.52) at the highest level and appropriateness of educational content with occupational needs (2.38) were at the lowest level. The study findings exhibited that teachers prefer electronic in-service education to other modes of teaching and learning because it is less time-consuming and cheaper.

Martin and Bolliger (2018) showed in research that learner-to-instructor engagement strategies seemed to be most valued among the three categories. Icebreaker/introduction discussions and working collaboratively using online communication tools was rated the most beneficial engagement strategy in the learner-to-learner category, whereas sending regular statements or e-mail reminders and providing grading titles for all assignments was rated the most beneficial in learner to instructor category. In the student-content category, students mentioned working on real world projects and having discussions with structured or guiding questions were the most beneficial. This study also analyzed age, gender, and online learning years of experience differences on their perception of engagement strategies. The results of the study have implications for online instructors, instructional designers, and administrators who wish to enhance engagement in the online courses.

Rochefort and Richmond (2011) identified the disconnect between workplace demands and university teaching. It highlights the importance of providing faculty development related to connected teaching and the role of the instructional designer to assist faculty with the integration of social media tools in their courses in a pedagogically appropriate way. Examples from practice include connected learning using social media within online higher education courses and programs. Using the theory of connectivism, and the idea of connected learning, the article outlines possibilities to engage and support adjunct and distance faculty to embrace social media and networks.

Therefore, e-learning is very different from face-to-face classes. The transformation of the lecturer from information provider to facilitator, guide or supervisor is one of these differences. Therefore, following the expansion and use of e-learning to achieve educational goals, some competencies are needed for the teacher in the e-learning environment. Based on this, the present research has been conducted with the aim of identifying the appropriate model for the professional competence of teachers in the e-learning environment and its dimensions and components, and checking the validity of the identified model.

Material and Methods

The research method is correlation, which used structural equation modeling to examine the model. The statistical population of the quantitative part of the research included all the primary teachers of Qom city (5270 people), of which 357 people (according to Cochran's formula) were selected by stratified random sampling method. The questionnaires were provided to the participants online. Before

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[DOI: 10.52547/ieepj.4.4.252]

answering the questionnaires, the participants completed an informed consent form. In order to collect data and examine the teacher's professional competence model, a researcher-made questionnaire was developed. This questionnaire has 74 items that measure seven dimensions of teacher competence in the e-learning environment. The response scale of this questionnaire is a five-point Likert, which ranges from completely agree (5) to completely disagree (1). Based on this, the range of scores is from 71 to 355, and a higher score indicates that the respondent is more qualified to teach in an e-learning environment. The number of questions, dimensions and components are presented in Table 1. In the present study, the validity of this questionnaire was checked by confirmatory factor analysis and its reliability using Cronbach's alpha obtained as 0.85. Statistical analysis was done with SPSS-24 and AMOS-21 software.

Table 1. number of questions, dimensions and components of questionnaire

Dimensions	Components	N of Items	Dimensions	Components	N of Items
Social dimension	Student support	**3**	Technology dimension	Technology expert	**6**
	Social facilitation	**4**		technical support	**3**
	Creating a group learning environment	**3**		Total	**9**
	Total	**10**	educational dimension (pedagogical)	Designer of content tasks	**4**
Moral dimension	Conflict management	**2**		Use of theories	**3**
	work commitment	**3**		planning	**3**
	Total	**5**		motivating	**4**
Organizational dimension	Understanding the organizational framework	**2**		Content Facilitator	**6**
	Course management	**4**		Learning strategies	**7**
	Career development measures	**3**		Total	**30**
	Total	**9**	Supervisory dimension	Course evaluation	**2**
Individual dimension	Personality characteristics	**6**		Student evaluation	**3**
	Total	**6**		Total	**5**

Results

In the current research, the model of professional competencies of teachers in the electronic learning environment has been investigated. Based on this, the validity of the identified components for the model of teachers' professional competence in the electronic learning environment of primary schools in Qom city has been investigated. In order to measure the validity of the components and dimensions of the proposed model, confirmatory factor analysis was used. The fit indices of the model are presented in Table 2.

Table 2. The fit indices of the model

Indec	**Stimate**
Goodness of fit index (GFI)	0.94
Adjusted Goodness of Fit Index (AGFI)	0.95
Root mean square errors of approximation (RMSEA)	0.04
X^2	93.43
DF	93

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According to Table 2, the goodness of fit indices indicates the validity of the dimensions of the proposed model. In other words, the model designed by the researcher about the professional competence of teachers in the e-learning environment was approved. In Table 3, the components of model and factor loadings are presented.

Table 3. components of model and factor loadings

Dimensions	Factor loading
Social dimension	0.713
Moral dimension	0.661
Organizational dimension	0.668
Individual dimension	0.643
The technology dimension	0.674
Educational dimension	0.723
Supervisory dimension	0.690

According to Table 3, the educational dimension with factor load (0.72) has the most important role in defining and measuring competence, followed by social dimension (0.71), evaluation (0.69), technology (0.67), organizational (0.66), moral (0.66) and individual (0.64) played a role in the competence model. This means that the educational factor plays the greatest role in the professional competence of teachers and individual factors play the least role.

Discussion

The purpose of this research was to investigate the professional competence model of teachers in electronic education. The findings of confirmatory factor analysis confirmed 7 educational (pedagogical), social, supervisory, technological, organizational, individual, and moral dimensions. Also, the model fit indices showed that the research model has a good fit, and finally, the final model was obtained about the professional competence of teachers in the electronic learning environment of primary schools in Qom city. Based on the study model, the professional competence of teachers in the electronic learning environment of primary schools in Qom city includes 7 dimensions and 16 components. The obtained findings are consistent with the findings of past studies (Alipour et al., 2021; khademi & sattari, 2021; Nasrollahi, 2016; Ramezanpour et al., 2021; Winter et al., 2021).

The first dimension is the educational dimension, which mainly includes the teacher's educational activities in the electronic learning environment. In the research, the educational dimension is mentioned as one of the dimensions of teachers' competence in the electronic learning environment. Being in sync with the theories, approaches and models of learning and teaching, familiarity with teaching strategies and the effective implementation of active and student-centered learning by teachers in the virtual classroom, presenting content in various ways such as (example, text, diagrams, sound, images) and providing different types of assignments according to the needs of learners are some of the most important of these activities.

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The second dimension is the social dimension, which refers to the social relationships between the teacher and the learners in the electronic learning environment. In the research, the social dimension has been confirmed as one of the dimensions of teachers' competence in the e-learning environment. In the social dimension, activities such as having the necessary skills to create a learning community and implement group mechanisms, expressing opinions, thoughts and feelings by the teacher during communication in the virtual environment, supporting students are some of the most important activities.
The third dimension of teacher competence in the e-learning environment is the technology dimension. The teacher's ability to use the technologies that are needed in the learning management system and in the course of e-learning is one of the important activities of the technology dimension. Helping the teacher to the learner in using relevant technologies and facilities of synchronous and asynchronous communication programs is another activity that increases the technological competence of the teacher in the electronic learning environment.
The supervisory and organizational dimensions are the teacher's competencies in the electronic learning environment, which include mainly guided online classroom, management of communication channels and shared files and identifying the unique challenges and problems of the course. The use of various types of activities for the purpose of student evaluation (for example, tests, essays, participation projects in class activities) and the teacher's action towards his professional development in order to increase the quality of e-learning courses are relevant activities as well.
In the individual dimension and the moral dimension, activities such as having a work commitment in teaching and communicating with students in the e-learning environment and speaking skills are activities that can increase the competence of teachers in the e-learning environment. Personality traits, academic evaluation skills, planning skills, and motivational skills in students are among other things that are related to individual and moral dimensions of competence.
In general, the results of this research can be used as a basis for strategic planning, selection and formulation of professional development programs and activities, and evaluation of the performance of e-learning course instructors; Therefore, by considering these qualifications in the conditions of employment, lecturers who have these qualifications can be prioritized for selection. It is also possible to design and implement appropriate courses and mechanisms for their professional development by evaluating the level of these competencies in e-learning course instructors. Conducting a study on teachers in Qom and using self-report questionnaires has been the most important limitations of the present study, which should be taken into account in the generalization of the findings.

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[DOI: 10.52547/ieepj.4.4.252]

Conflict of interest: The authors state no conflict of interest in the study.

Financial sponsor: The authors acknowledge that they have not received any financial support for all stages of the study, writing and publication of the paper.

Acknowledgements: The researchers wish to thank all the individuals who participated in the study.

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