Identifying the Competency Components of Instructors in E-learning Environment Based on a Constructivist Approach

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Abstract

Current study used exploratory mixed method designs to identify the competencies of e-instructors based on the constructivism approach. A qualitative and quantitative methods were applied in this research. The qualitative method was thematic synthesis and the quantitative method was a survey method. The statistical population of the study included all works published in this field from 1992 to 2019 in 6 valid databases. The study sample included 30 documents. In the quantitative section, due to the researcher's access and utilizing Krejcie and Morgan table, the statistical sample consisted of 135 e-instructors in the field of educational sciences and psychology who were selected from Payame Noor University. At this stage, a 41-item questionnaire was designed based on the components obtained in the qualitative section and for the purpose of validation. The results obtained by data collection were analyzed after adjustment and summarization using statistical tests including first and second order confirmatory factor analysis using applying LISREL 8.8 and SPSS 22 software. Experts were used to confirm the content validity of the research instrument, and confirmatory factor analysis was used to determine the construct validity of the measurement instrument. Also, the reliability of the tool was confirmed by Cronbach's alpha coefficient. According to the findings of synthesis research, the components of constructivist competencies of instructors in e-learning environment as the main theme include four themes of constructivist guide, constructivist instructor, constructivist designer and constructivist collaborator. The dimension of constructivist guide consisted of three components: modeling, improving critical thinking skills and upgrading problem solving skills. The dimension of constructivismm instructor consisted of three dimensions of cognitive instructor, feedback, and motivational. The dimension of constructivism designer included three dimensions of content design skills, organizing and the use of interactive and participatory tools in designing. The dimension of constructivist colleague included four

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dimensions of class dynamics, knowledge sharing skill and social negotiation skill and group formation skill. Fit indices of first-order confirmatory factor analysis of the inclusive themes showed the alignment of items with the theoretical structure and confirmation of factor analysis. Also, the second-order confirmatory factor analysis of organizing themes showed that the mentioned components played a role in explaining the variance of the main structure. The research findings can be used in the design of e-learning environments based on the constructivist approach and also to improve the instructors' career development programs.

Keywords: Competence, Constructivism, Instructor, E-learning.

Introduction

In today's fast-paced world, where technological advancements are on the rise, there is an increasing need for alternative methods of learning that can facilitate the development of skills required in the 21st century. E-learning programs have been proposed as a promising solution to meet this demand (Whitaker, 2015). Educational institutions are therefore seeking innovative approaches that can help them keep up with these rapid developments (Moghaddam & Sarkarani, 2003). The constructivist psychological approach is one such approach that holds great significance in the field of education and psychology, particularly for e-learning. This approach emphasizes the role of teachers in guiding learners to construct their own knowledge and become self-directed learners (Martin, 2006).

As technology continues to advance and learning needs change, e-learning programs are becoming increasingly popular as a model for developing learners' skills in the 21st century (Whitaker, 2015). However, e-instructors often lack the necessary skills and knowledge to create engaging and learner-centered online learning environments (Barbour, Siko, Gross & Waddell, 2013). To address this issue, it is essential to develop competencies for e-instructors in an e-learning environment based on constructivist principles. The concept of competence was first introduced by McClelland in 1973 as a significant predictor of employee performance and success. In the early 1900s, competency models for e-instructors in the e-learning environment were developed to improve the effectiveness of e-instructors. However, these models were primarily based on traditional teaching methods and pedagogical approaches, rather than the potential for implementing constructivist theory in the e-learning environment.

The model of designing constructivist learning environments by Jonassen is widely employed in the development and design of computer-based learning environments, among several other constructivist educational design models

(Li & Irby, 2018). Jonassen posits that knowledge is constructed through the collaboration of the instructor and the online learning community in a constructivist learning environment. Examination of Jonassen's (1999) model reveals that it includes the essential components necessary to create constructivist environments, wherein learners learn through problem-solving and tools are provided to aid in their understanding and resolution of problems. In this model, the instructor assumes a pivotal and effective role in designing the constructivist environment by constructing and designing the problem, utilizing information tools, accessing various resources (such as search engines and Web 2.0 features), using cognitive tools to make learning meaningful, and emphasizing and supporting group learning and tools for discussion and collaboration.

In light of the growing prevalence of teaching and learning in e-learning environments, there has been a lack of research on the integrated components of instructors' competence based on a constructivist approach. Therefore, the researcher aims to establish a relationship between the competencies required by instructors and the constructivism approach, utilizing Jonassen's (1999) theory and conducting an in-depth review of existing research in this field. The objective is to identify and present the competencies of instructors integrated into the e-learning environment based on this approach. To achieve this goal, the researcher poses the following research questions:

1. What are the competencies of constructivist instructors in the e-learning environment?
2. To what extent are the identified components valid?

Research Methods

This study employed an exploratory mixed-methods design, utilizing the classification formulation model of the exploratory design. In the qualitative stage, the thematic synthesis research method was used to present the research findings on the constructivism competencies of instructors in the electronic environment from 1992 to 2019. The synthesis research involved four stages: Stage 1: Determining objectives and research questions. Stage 2: Determining the geography of the research (identifying relevant research findings). Stage 3: Systematic critique of selected documents (screening). Stage 4: Synthesis; creating something new from separate elements.

In the quantitative section, a descriptive survey method was used to validate and confirm the findings from the qualitative stage. The statistical population comprised 256 electronic instructors in the field of educational sciences and psychology at Payame Noor University, and the sample size was 135 instructors based on the Krejcie and Morgan table. The data collection tool was a researcher-made questionnaire on the constructivist competency

components of e-instructors, developed using the research literature and the results obtained from the qualitative study. The collected data was analyzed using statistical tests, including first-order confirmatory factor analysis and second-order confirmatory factor analysis, after adjustment and summarization.

Results

The competencies of constructivist instructors in the e-learning environment were analyzed using first-order factor analysis (inclusive themes) and second-order factor analysis (organizing themes). The estimates related to this model include general fit indices and main parameters (factor loads), as presented in Table (1).

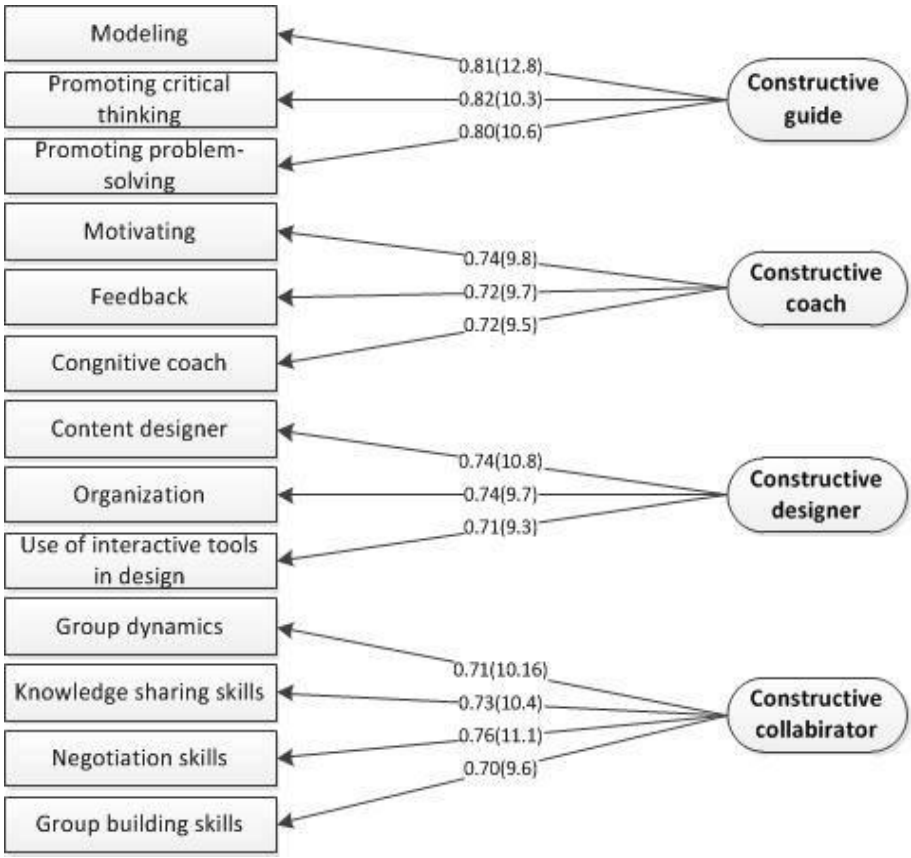
Table 1: First-order factor structure matrix (inclusive themes)

Factor4	Question	Factor3	Question	Factor2		Question	Factor1	Question
.711	Q22	.761	Q18	.802		Q11	.814	Q1
.701	Q23	.758	Q19	.800		Q12	.809	Q2
.681	Q24	.689	Q20	.699		Q13	.754	Q3
.673	Q25	.686	Q21	.689		Q14	.751	Q4
.701	Q26			.686		Q15	.748	Q5
.694	Q27			.685		Q16	.743	Q6
				.678		Q17	.729	Q7
							.802	Q8
							.800	Q9
							.794	Q10

The values estimated in the table indicate that the factor loads related to all organizing themes and inclusive themes are in a desirable condition (above 0.60).

Table 2: Second-order factor structure matrix (organizing themes)

Dimension 4	componen	Dimension 2	componen	Dimension 2	componen	Dimension 1	componen
.711	Group dynamics	.739	Content Designer	.738	Motivating	.814	Modeling
.729	Knowledge sharing.skills	.719	Organization	.723	Feedback	.819	Promoting critical thinking
.758	Negotiation skills	.710	Use of interactive tools in design	.721	Cognitive coach	.802	Promote problem-solving thinking
.698	Group building skills						



Total 1- Factor model of inclusive themes of competency of constructivist instructors in e-learning environment

Conclusion

According to the results of previous research and the qualitative analysis of themes and factor analysis, it is recommended that instructors consider the identified dimensions, components, and indicators when creating and designing a constructivist environment in the e-learning context. These components, based on Johnson's model, can serve as a basic model for instructors and facilitators to develop the required behaviors to deliver a high-quality electronic course. The research model was derived with four dimensions: 1) Constructivism guide, 2) Cognitive instructor, 3) Constructivism designer, and 4) Collaborator. The Constructivism guide dimension comprises three components: 1) Modeling, 2) Improving critical thinking skills, and 3) Upgrading problem-solving skills. In the Modeling

component, instructors plan to create opportunities for constructivist experiences and behaviors in the e-learning environment using solved examples and clues as well as providing practical opportunities. The other two components of this dimension focus on strengthening learners' critical thinking skills and problem-solving skills by presenting different perspectives and evaluating ideas.

The second dimension of the e-instructor competency model is the coaching dimension. In this role, e-instructors support, motivate, empower, and shape learners' ability to interpret and construct meaning based on their interactions and experiences.

In the context of e-learning, e-instructors must possess a range of competencies to effectively facilitate a constructivist learning environment. The third dimension of these competencies involves designing well-organized and poorly-organized problems that can develop problem-solving and critical thinking skills among learners. This, in turn, enhances the quality of the e-learning experience. To achieve this, e-instructors must possess the skill of designing problems that match the learners' understanding and knowledge level, as well as utilize interactive tools that can facilitate the learning process.

Moving on to the fourth dimension of e-instructors' competencies in the constructivist environment, collaboration plays a crucial role. E-instructors must create a participatory learning environment that fosters new social relationships and increases learner interaction in e-learning courses. This can involve encouraging and facilitating group activities, discussions, and assignments, and providing opportunities for learners to collaborate with one another to solve problems and complete tasks. By doing so, e-instructors can help create a supportive and engaging learning community that enhances the overall e-learning experience for learners.

Suggestions and Limitations

The findings of this research suggest that the competencies identified for e-instructors can be utilized to enhance the occupational development of instructors. Therefore, it is recommended that training courses be designed and conducted based on the results of this study to improve the knowledge and skills of e-instructors. Furthermore, the principals and planners of e-learning courses at universities should consider incorporating these competencies into their standards for recruitment and evaluation. It is important to note that this study has some limitations, including the collection of information solely from experts and professionals in the field. Future research may benefit from incorporating the perspectives and exp1eriences of a wider range of stakeholders, such as learners and administrators, to provide a more

comprehensive understanding of e-instructor competencies in the constructivist learning environment.

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