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Design and validation a model for reinforcing critical thinking skills in online learning environments

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Introduction

Regarding the prouision of an online learning environments, it is expected that such environments facilitate teaching and learning processes and increase higher-order thinking skills, especially critical thinking skills. However, evidence suggests that many of online learning courses are designed in ways that do not carry the required capacity to enhance higher order thinking skills such as t critical thinking skills. The purpose of this study is to design and validate a model for reinforcing students' critical thinking skills in an online learning environment.

Method

The present study uses a mixed-method research approach including content analysis and survey. The content analysis focused on a corpus of all research articles indexed in the database. We used a targeted sampling method for inclusion. For a survey research we used a convenient sampling method to select among the body of experts in the field of instructional technology. The sample size included 20 participants. The instrument used for the survey was developed by the researcher and was validated using an expert panel of seven experts in the field of instructional technology. The reliability of the tool was ensured using a test-retest method. The correlation coefficient (0.94) between the two tests was significant at the level of $p = 0.01$.

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Results

The findings of the research indicated that the elements of the proposed model for reinforcement the students' critical thinking skills in the online learning environment include the presentation of the problem and the stimulating events, the exploration and careful examination of the nature of the problem, the discussion and argumentation about the proposed problem, the presentation of the solution and cognitive and social presence. Guided by the observed themes, we also arrived at the proposed design model. Finally, the themes were cross validated in consultation with a subgroup of 20 experts in the field of educational technology.

Discussion

Based on the results of the present study, the presentation of the problem or stimulating events should happen in the early phase of the instructional design model. In the next stage, the learning environment should provide an opportunity for students to explore the nature of the problem. This stage should be followed by an opportunity for learners to discuss different sides of the problem and ultimately present their solutions and reasoning that come with it. Both social and teaching presence are elements that are present throughout the steps and processes of reinforcement critical thinking skills in online learning environments. The two aspects are important in design of learning environment because they create not only an affective bond for students but also balance and systematize the process of learning activities.

The results of the present study indicate that online learning environments, if designed systematically and follow sound design principles as shown in the present study, have the very potential to enhance critical thinking skills.

Keywords: Online Learning Environment, Higher-order thinking, Critical Thinking Skills, Design model and elements.

- **Author Contributions:** Author 1 planned the scheme, initiated the project and suggested the design; Author 2 determining research model elements, conducted the qualitative content analysis and analyzed the results; Author 3 Defined, categorized, and coded model components for qualitative content analysis; Author 4 developed the model components and examined the model validation. The manuscript was written through the contribution of all authors. All authors discussed the results, reviewed and approved the final version of the manuscript.
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