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Investigation of the Relationship Between Computational Thinking and Design Thinking Skills of Science Teacher Candidates

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ABSTRACT

Objective: Today's problems, which affect society and the environment, require individuals to have comprehensive skills. In this regard, it is substantial to possess Computational Thinking (CT) and Design Thinking (DT) due to encompassing many dimensions and facilitating the learning process. Since DT processes are production-oriented, they can concretize computational processes that seem abstract to students. Therefore, using DT and CT together can lead to better development of both skills. However, it is seen that there needs to be a gap in investigating the relationship between CT and the DT skills of science teacher candidates. Therefore, the aim of the current research was to investigate the relationship between CT and DT skills among 94 science teacher candidates in the first and fourth years of their education and whether their skills differed based on grade level. **Method:** For this objective, a relational research model from quantitative research methodologies was utilized to understand whether variables interacted and gain valuable insights. **Results:** The results showed a positive relationship between the CT and DT skills of science teacher candidates. Moreover, their skills differed according to grade level. **Novelty**: In this respect, this research contributes to the literature by stating that it could be beneficial to incorporate CT and DT skills in courses designed to acquire these two skills.

INTRODUCTION

In the context of education, it is essential for educators to critically examine various concepts and their interactions with one another, including Computational Thinking (CT) and Design Thinking (DT) skills. While CT and DT skills are often considered separate, they can be used interchangeably in similar situations. Hence, it might be beneficial to consider CT and DT skills together instead of independently. In fact, this intersection might align well with 21st-century skills because today's society and the environment require individuals to have more comprehensive skills, which emphasizes the importance of a holistic skill set required to address the challenges encountered in the new century (Chalkiadaki, 2018). As stated by Fadel (2008), 21st-century skills that conform to current circumstances and demands can be divided into three major categories. The first category includes life and career skills, such as adaptability, accountability, and social interaction. The second category is learning and innovation skills, which encompass critical thinking, collaboration, and problem-solving. The third category is information, media, and technology skills, including information communication technology, media, and information literacy. Today's students are able to access information and communicate with each other by using countless technology-based tools at any time. Therefore, information, media, and technology skills are becoming increasingly important. Some scientists declared these skills that 21st-century individuals should have with different terms using different perspectives. One of them is CT, which includes learning and innovative thinking skills and information, media,

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