Chapter 5
The Development of a Digital Educational Game Design Training in Teacher Education:
A Design-Based Research

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ABSTRACT

This design-based research study aimed to develop and refine a digital educational game development training framework for pre-service teachers. Following established instructional design models, the curriculum was designed to equip pre-service teachers with key competencies in pedagogy, scenario, game design, and technical skills. In the first iteration, challenges related to the delayed introduction of technical training were identified, particularly for participants with limited technical skills. This was addressed in the second iteration by integrating blog-based programming language training earlier in the process, allowing pre-service teachers to create more advanced game prototypes. The results demonstrated significant improvement in pre-service teachers' digital educational game development self-efficacy scores, as shown by higher mean scores in the second iteration. Participants expressed positive feedback on the revised course structure, noting that the earlier integration of tech-

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nical skills enhanced their ability to design and develop digital educational games.

1. INTRODUCTION

Digital educational games and game-based pedagogy have attracted researchers' interest due to their impact on enhancing students' motivation, engagement in lessons, enjoyment, and peer interaction in various subjects (Bulut et al., 2022; Hartt et al., 2020; Hooshyar et al., 2018). However, digital educational games must be developed within the framework of certain standards to achieve learning outcomes. This issue highlights the demand for designing and developing high-quality and need-oriented digital educational games (Hooshyar et al., 2018), uncovering skilled human resources and their training needs to bridge these gaps.

Both the development and integration of digital educational games into education reveal the necessity of new knowledge areas in teachers' competencies. Teacher education programs should offer new competency areas to complement today's pedagogical needs regarding game-based pedagogy (Nousiainen et al., 2018). Thus, the importance of digital educational games increases. As some terms related to digital games in education may sound new to teacher educators, the slow update of teacher education programs causes a lack of knowledge of these techno-pedagogical skills for both pre-service and in-service teachers. Therefore, this study emphasizes the need for digital educational game development courses in various aspects within the scope of pre-service teachers as instructional designers.

This study builds upon previous research conducted by Kelleci and Kulaksız (2018a). The initial course framework proposed by Kelleci and Kulaksız (2018a) for pre-service teachers' digital educational game development and was tested by Kelleci and Kulaksız (2018b). The results showed that the applied curriculum within a semester increased pre-service teachers' digital game development skills based on performance scores and opinions. This paper aims to present an instructional design framework for digital educational game development training using a design-based research approach. It focuses on how in-service teachers and pre-service teachers, who are constantly instructional designers of their lessons, should be trained to create digital educational games. The results of this study will contribute to the literature by presenting a framework and program that covers the technical and pedagogical skills needed for developing digital educational games. We believe that this study can create an important structure for increasing the competencies of pre- and in-service teachers instructional design skills to be able to select, modify, produce, and qualify digital educational games.