Chapter 4
Use of Web 2.0 Tools in Science Education: Designing Multimedia Learning Environments With the ADDIE Model

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ABSTRACT

This study aims to develop guided course materials by utilizing Web 2.0 tools within the scope of the acids-based subject for the 8th-grade science course in primary school. To achieve this objective, multimedia learning environments have been developed at the primary education level focusing on the topic of acids and bases. In the instructional design process, the ADDIE model of instructional design, which is one of the widely preferred instructional design models today, was used in instructional design. Multimedia learning environments were designed using Web 2.0 tools by the steps of the ADDIE instructional design model. As a result of the study, the challenges encountered during the design processes of multimedia learning environments were addressed. Therefore, this study endeavours to enhance learning success and contribute to educational outcomes by developing multimedia learning environments consisting of animations, virtual laboratories, and experiments within

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the framework of the ADDIE model.

INTRODUCTION

In the 21st century world, technology has become an indispensable part of our lives. Technology has changed the characteristics of the time we are in by carrying the characteristics of a revolution, making it the age of technology. With the help of technology, information can be processed and transferred easily (Raja & Nagasubramani, 2018). With the rapid interaction of technological changes that have been going on for years, new technological tools are emerging every day. As technological changes affect all areas of life, educational activities are inevitably affected by these changes (Meriçelli & Uluyol, 2016). It is stated in many studies that technology has a great role in the realization of meaningful learning in schools and educational environments as a requirement of age (Şenol et al., 2023). Classroom environments where technological tools are present and actively used allow the use of different interesting materials as technology appeals to multiple sensory organs (Öztürk, 2023).

The integration of technology into science education dates back to the 20th century (Demirci et al., 2018). In the 2000s, with the increasing prominence of student-centered and teacher-facilitated approaches, the use of technology in education gained momentum (Bybee et al., 2006). Technology in education offers several advantages, such as:

- Actively engaging students in the learning process,
- Allowing lessons to be revisited and repeated as needed,
- Saving time through faster learning opportunities,
- Moving away from traditional tools like blackboards and textbooks, and
- Making lessons more enjoyable and engaging (Akçay et al., 2005).

Science is a subject that involves abstract concepts and complex topics, but when it comes to concrete experiences, it is intertwined with daily life. Being an interdisciplinary course may seem to make the science course difficult. For this reason, students can come to science classes by examining the topics beforehand (Öztürk, 2023). Since many topics, achievements, tests and activities are included, the topics should be taught to students in a meaningful and coherent way. Simulations, concept maps and analogies can be used to teach abstract concepts in the course content (Karyağdı & Aydın, 2023). Supporting science lessons with technology is necessary in explaining events related to nature, that is, in situations that require a lot of use of abstract concepts. The use of technology in learning simplifies the