A Roadmap Teaching Pure Mathematics Lessons in Higher Education in the Pandemic Process:
Teaching Abstract Algebra in the Flipped Cassroom

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EXECUTIVE SUMMARY

The aim of this study is to present an example roadmap, in the context of the integration of technology, which has become increasingly important with the COVID-19 pandemic, into teaching environments, for the integration of remote online environments into the Abstract Mathematics course, which is one of the basic courses in mathematics teacher training programs. This roadmap, which can inspire field experts and teacher candidates, has been prepared within the framework of flipped learning theory.

INTRODUCTION

To reduce the impact of the pandemic on pupils, many educational institutions have introduced "emergency remote teaching" (ERA) (Bozkurt & Sharma 2020). Emergency remote teaching is described as a quick transition in instructional delivery to an online medium as a result of a significant disaster (Hodges et al., 2020). ERA involves using available distance learning tools to deliver curriculum or training materials that would normally be delivered physically or as hybrid or blended courses. Once the disaster or

catastrophic conditions are gone, the educational presentation will revert to its original format. Given this situation, it is not difficult to interpret the relationship between the concepts of emergency remote teaching (ERT) and online learning. Although the idea of bringing teaching online provides flexibility to the learning-teaching process for students and educators, this transformation has taken place very quickly due to the pandemic.

BACKGROUND

COVID-19 and Its Effects on Education

Technologies used in Emergency Distance Education Applications

Covid 19 pandemic has had a positive impact on technology literacy on students, educators (Shenoy, Mahendra, & Vijay, 2020; Tejedor, et al., 2020). Although many educational institutions claim that the pandemic offers a revolutionary opportunity for the transition to distance education applications (COL, 2020; OECD, 2020), the technologies used in the emergency remote teaching are in a conflict about integrating them into the existing curriculum in this crisis that suddenly emerged, this situation has created difficulties for both faculty members and students (Bao, 2020; Dilmaç, 2020; Mohmmed et al., 2020; OECD, 2020).

In the 21st century, there are certain concepts and pedagogical approaches that stout in education in connection with technology. These can be counted as blended learning, game-based learning, flipped classrooms, social media, web 2.0, game-based learning, online learning management systems, and Industry 4.0. With the great development of the Web, which is the basic element of online learning, the sites that host Web 2.0 and Web 3.0 technologies have been used more frequently in the field of education in recent years, these sites have started to serve the social interaction of individuals greatly (Akgündüz, 2019). At this point, with the development of web technologies, online learning, which makes its importance felt during pandemic we are in, is actively used in higher education applications.

The Social Transformation of Mathematics Teaching

The factors, circumstances, demands, societal needs, scientific studies that affect mathematics teaching and learning are analyzed to determine the approaches to be used in mathematical education (Behr et al., 1984; Howson, 1988; Skovsmose, 2012; Wheeler et al., 1984; Wilson, 2020). Inglish & Foster (2018) emphasize that mathematics education should be taught by intertwining with many different fields such as geometry, calculators, computers and programming. Recently, non-traditional and out-of-school mathematics learning approaches such as using online learning platforms like Wolfram Math World, Demos (Henry, 2018; Johnson et al., 2008), using gamification (Cunha et al., 2018; Hamari et al., 2014), meetings like Zoom or Google Meet, workshops, mathematical environments (Kennedy & Smolinsky, 2016) have been recommended as an example of the applications might be used. However, these suggestions have not received the attention they deserve by experts working in the field of mathematics education. Undoubtedly, Schoenfeld's (2016) statements "What happens in schools and classrooms are closely linked to what happens in society in general" (p. 497) explains Lerhman's (2000) "social transformation" in mathematics education.