Chapter 11
Students' Use of Digital Storytelling in University Mathematics Education: A Case Study

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ABSTRACT

Storytelling has long been recognized for its cognitive and affective benefits and its digital counterpart (DST) is increasingly valued as an educational technology. However, its use in university mathematics education remains underexplored. This chapter presents a case study of undergraduate mathematics students who created DST videos to illustrate concepts such as function, limit, derivative and integral. Drawing on interviews with students who produced seven videos, the study examined (1) how students designed, implemented and reflected on their projects; (2) the emotional responses elicited during production; and (3) how these experiences shaped their views on DST's pedagogical utility. Findings indicate that students engaged in structured planning, integrated personal experiences and employed creative approaches. The process generated various emotions—ranging from anxiety to excitement and pride—while fostering mathematical understanding and reflection. All participants expressed intent to use DST in future teaching, underscoring its potential to humanize mathematics learning.

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INTRODUCTION

Storytelling has long served as a vehicle for communication and knowledge sharing. In education, its digital adaptation—digital storytelling (DST)—has been used to combine text, images, audio, and video into multimodal narratives (Meadows, 2003). By integrating these elements, DST can present concepts, experiences, and ideas in ways that are both engaging and accessible (Lowenthal, 2008; Psomos & Kordaki, 2011).

A growing body of research highlights the pedagogical potential of DST. Studies have shown that it can foster engagement with disciplinary content (Sherwood & Makar, 2022), encourage active participation in learning (Niemi et al., 2019), and increase motivation, particularly in mathematics (Hernandez-Martinez & Keane, 2024). DST has also been linked to deeper conceptual understanding (Bryant, 2023; Hernandez-Martinez & Keane, 2024), creativity and collaboration (Nordmark & Milrad, 2012), reflective practices (Moseley et al., 2013; Walters et al., 2011), and improved academic achievement (Tsou et al., 2006; Yang & Wu, 2012). Furthermore, it has been associated with student-centered approaches such as project-based learning and with strengthening teacher presence in collaborative learning environments (Sadik, 2008; Robin, 2008; Hung et al., 2012; Lowenthal & Dunlap, 2010; Stacey & Hardy, 2011).

Despite these findings, research on DST in university education remains limited, especially in mathematics. Prior studies have largely focused on outcomes, whereas the processes of designing and producing DST videos, along with the emotions involved, have received little attention (Islim et al., 2018; Hernandez-Martinez & Keane, 2024). While some evidence exists regarding the emotional impact of DST on audiences (Harding, 2018), less is known about the affective experiences of students during production. Similarly, research on students' views of DST as a future teaching aid is scarce and often based on participants without teaching experience (Islim et al., 2018).

This study addresses these gaps by investigating the experiences of undergraduate mathematics students who created DST videos as part of their coursework. Through interviews, we examine how students approached the design and production process, what emotions they experienced, and how these experiences shaped their views on the educational use of DST. Specifically, the study explores:

1. In what ways did students design, implement, and reflect on their DST videos?
2. What students' emotional responses emerged during their DST production process?
3. How did producing a DST video influence students' views regarding the pedagogical utility of DST videos?