

Chapter 32

Introducing iPads into Primary Mathematics Classrooms: Teachers' Experiences and Pedagogies

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ABSTRACT

The fast pace of technology has meant that new technologies are often being introduced into classrooms without knowledge of how they can be used to enhance teaching and learning in mathematics. This chapter explores how a small group of teachers used a new technology, the iPad, to teach mathematics within the first six months of their implementation and without the support of professional development. Findings from two separate studies are presented to support the argument that care should be taken when introducing any new technology to teach mathematics in primary classrooms and appropriate professional development that addresses the combination of mathematical content, pedagogy and technology is critical for all teachers, regardless of teaching experience.

INTRODUCTION

The increased popularity of mobile technologies has resulted in schools within Australia and internationally investing significant funds in mobile devices such as tablet computers in the hope that learning and teaching practices will evolve to better suit the needs of contemporary learners, resulting in deeper engagement and improved learning outcomes. Although not originally intended for use within educational contexts, since its introduction in 2010 the iPad has fast become the 'must have' device in Australian and international classrooms. Although some claim the iPad has the potential to revolutionise teaching and learning (Banister, 2010; Ireland & Woollerton, 2010), others advise caution in relation to its educational value and warn it should not be viewed as a panacea, able to address all of the challenges of contemporary education (Gardner & Davis, 2013; Rowsell, Saudelli, Scott, & Bishop, 2013).

Although mathematics curriculum documents in Australia explicitly promote the use of technology (Australian Curriculum and Reporting Authority, 2012; Board of Studies New South Wales, 2012),

DOI: 10.4018/978-1-5225-1624-8.ch032

the rapid development of mobile devices and their vast range of affordances has resulted in a lack of direction for teachers who are expected to use the devices effectively in their classrooms. While many schools are buying into the hype of iPads and similar devices, they are not investing in professional development that addresses pedagogical approaches rather than technical aspects and this may be due to the newness of the devices and the time lag between research being conducted and disseminated into the profession. Although research concerning iPads in schools is beginning to emerge, there is little that documents their role in primary mathematics classrooms in relation to pedagogical approaches that incorporate their use and whether they serve to improve student learning outcomes and engagement. However, there has been recent research focussed on specific mathematical applications (Highfield & Goodwin, 2013; Larkin, 2013) and the affordances of using iPads (Melhuish & Fallon, 2010), but little published research exploring the issues relating to the implementation of the devices and ways in which to use them to enhance mathematics teaching and learning (Attard, 2013; Attard & Curry, 2012). This lack of direction provides a deep challenge for teachers who need to reconceptualise their practices to accommodate the new devices (Niess et al., 2009).

The goal of this chapter is to explore how a small group of primary teachers used iPads in mathematics lessons within the first six months of implementation. I will argue that care should be taken when making the decision to purchase and use iPads or indeed any new technology to teach mathematics in primary classrooms and appropriate professional development that addresses the combination of mathematical content, pedagogy and technology is critical for all teachers. The ease of use associated with iPads may lead schools to assume their implementation is easy, but teachers' levels of expertise and experience in terms of pedagogy and content knowledge must also be taken into consideration.

Findings from two studies conducted in Australian primary classrooms (Attard, 2013; Attard & Curry, 2012) will be used to support the argument above. Data will be explored in relation to the TPACK framework (Koehler & Mishra, 2009) after a brief description of the methodologies employed. From this data, the importance of teachers' development of pedagogical content knowledge (an assumption within the TPACK framework) prior to the use of iPads for teaching and learning will be explored along with a discussion of the observed roles of the devices within mathematics lessons (Goos, Galbraith, Renshaw, & Geiger, 2000). The practices of the teachers including the issues and challenges they experienced and examples of their teaching with iPads will be presented against a backdrop of the SAMR model (substitution, modification, augmentation and substitution) (Puentedura, 2006) and used in conjunction with TPACK to organise, present and analyse the observed uses of iPads. The chapter will conclude with a small sample of mathematics tasks that incorporate iPad use in primary classrooms.

A brief overview of literature pertaining to the integration of ICT with mathematics teaching and learning and student engagement is now presented to provide some context for the two studies. This will include a discussion of the perceived benefits and affordances of using iPads in comparison to the more traditional technologies of laptops and desktop computers.

BACKGROUND

iPads and the Mathematics Classroom

The introduction of iPads as teaching and learning tools provides the opportunity to remove some of the traditional barriers to successful ICT integration such as a lack of teacher confidence and competence,

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