Chapter 83
Students' Kinaesthetic Interactions with a Touch–Enabled Virtual Mapping Tool

Theodosia Prodromou
University of New England, Australia

Maria Meletiou-Mavrotheris
European University Cyprus

Andreas O. Kyriakides
European University Cyprus

ABSTRACT

Recent technology advances have substantially changed the way we teach and learn mathematics providing educators with opportunities for creating novel inquiry-based learning environments by increasing the range and sophistication of possible classroom activities. The affordances provided by mobile technologies can motivate students to engage in authentic problem solving activities that can promote their mathematical learning, and the attainment of important competencies essential in modern society. This chapter reports on the main experiences gained from a study that exploited affordances of tablet devices used by young students (11-year old). Findings from the study indicate that general purpose apps such as Recce that was employed in the current study can scaffold learning of the mathematics curriculum in educationally powerful ways that engage students and promote their mathematical growth.

INTRODUCTION

Mathematical literacy is a core literacy that serves as one of the foundational areas of knowledge that drives scientific and technological advancement in knowledge-based economies (European Commission, 2004). Cross-national studies of student achievement (e.g. Trends in International Mathematics and Science Study (TIMSS), Programme for International Student Assessment (PISA)) indicate lack of mathematical and scientific competence for a considerable proportion of the student population worldwide. There is also well-documented evidence of declining interest in key

mathematics topics, and in science careers (e.g. Adleman, 2004; European Commission, 2007; Jenkins & Nelson 2005; OECD, 2006; Sjøberg & Schreiner, 2006). The methods of instruction have been identified as contributing to students' low achievement and falling interest in the sciences (Van Langen, 2005). The teaching of mathematics is often viewed as unappealing to the majority of students, as outdated and unconnected with their interests and experiences (Goodrum, Hackling & Rennie, 2001). Ideas are presented in an overly theoretical and abstract manner, without sufficient opportunities for students to engage in problem-solving and experimentation.

One pervasive challenge in mathematics education at the school level is the identification and use of authentic contexts to motivate student inquiry. Recent technology advances have provided the opportunity to create entirely new, inquiry-based learning environments in mathematics by significantly increasing the range and sophistication of possible classroom activities. Access to technology provides teachers and children with tools which, when constructively used, can create opportunities for hands-on and engaging mathematics learning environments. One promising approach lately explored is the potential of hand-held tablet PC like the Apple iPads and Android tablets and of other handheld devices (e.g. smartphones, game consoles, etc.) that have become an integral part of modern society and are routinely used in daily life, as tools for enhancing mathematics teaching and learning. The existing literature indicates strongly the significant potential of tablet devices as ubiquitous tools that can radically transform and enrich mathematics education (Clark & Luckin, 2013; Henderson & Yeow, 2012; Melhuish & Falloon, 2010). It suggests that the affordances offered by tablets and other mobile devices can be used as the machinery for students to engage in authentic problem solving activities that can help raise their

intrinsic interest in mathematics, and promote the attainment of important competencies essential in modern society.

The current article contributes to the emerging literature on mobile mathematics learning. It reports on the main experiences gained from a study which exploited the affordance of tablet devices in an effort to spark young students' (11-year old) interest in mathematics and to make mathematical concepts more accessible and attractive for all children.

BACKGROUND

Since the introduction of the iPad in 2010, there has been a rapid adoption of tablet devices in educational institutions worldwide. The hegemony and dominance of fixed personal computers is diminishing quickly, making way for a variety of flexible, ubiquitous alternatives that have enormous implications for learning, within both formal and informal settings. We are in the midst of the time frame where tablets and smartphones are becoming standard learning tools, and adopting mobile devices in the classroom is becoming a must (Johnson et al., 2013).

Although research on mobile mathematics learning is still at an early stage given the novelty of mobile technologies, conducted studies do overwhelmingly point towards numerous positive attributes that have the potential to enhance both formal and informal learning of mathematics (e.g. McKenna, 2012; Clark & Luckin, 2013). The existing literature indicates strongly the significant potential of mobile devices as ubiquitous tools that can radically transform and enrich mathematics teaching and learning. It suggests that the adoption and use of personalized devices within and beyond the classroom can provide an educationally rich and dynamic environment that increases learners' autonomy, allowing them to augment and enhance

20 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/chapter/students-kinaesthetic-interactions-with-a-touch-enabled-virtual-mapping-tool/139114

Related Content

A Collaborative Model for Green Factory Through Green Unit Processes
Amber Batwara, Vikarm Sharmaand Mohit Makkar (2024). *Human-Centered Approaches in Industry 5.0: Human-Machine Interaction, Virtual Reality Training, and Customer Sentiment Analysis (pp. 74-95).*
www.irma-international.org/chapter/a-collaborative-model-for-green-factory-through-green-unit-processes/337098

Change Detection in Water Body Areas Through Optimization Algorithm Using High- and Low-Resolution Satellite Images
A. Sivasankari, S. Jayalakshmiand B. Booba (2023). *Recent Developments in Machine and Human Intelligence (pp. 138-152).*
www.irma-international.org/chapter/change-detection-in-water-body-areas-through-optimization-algorithm-using-high--and-low-resolution-satellite-images/330325

Exploring the Impact of Digital Detoxification on Higher Education Students' Learning
Anshul Garg, Amrik Singhand Jia Yanan (2024). *Business Drivers in Promoting Digital Detoxification (pp. 111-126).*
www.irma-international.org/chapter/exploring-the-impact-of-digital-detoxification-on-higher-education-students-learning/336745

Computer-Assisted Indian Matrimonial Services
Robert Leslie Fisher (2019). *Advanced Methodologies and Technologies in Artificial Intelligence, Computer Simulation, and Human-Computer Interaction (pp. 450-460).*
www.irma-international.org/chapter/computer-assisted-indian-matrimonial-services/213150

From Digital Distraction to Digital Motivation: Utopia or Reality
María A. Pérez-Juárez, Javier M. Aguiar-Pérez, Javier Del-Pozo-Velázquez, Miguel Alonso-Felipe, Saúl Rozada-Ranerosand Mikel Barrio Conde (2022). *Digital Distractions in the College Classroom (pp. 205-222).*
www.irma-international.org/chapter/from-digital-distraction-to-digital-motivation/296133