Research paper

Exploring the effectiveness of new technologies: Improving literacy and engaging learners at risk of social exclusion in the UK

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HIGHLIGHTS

- Web 2.0 technologies contributed to improved literacy and engagement of students at risk of social exclusion.
- Affordances of Web 2.0 technologies resulted in more flexible, collaborative and creative learning.
- Professional development evidenced new pedagogy which encouraged transformation of capabilities.
- Findings indicate improved progression and engagement in learning.

ARTICLE INFO

ABSTRACT

This paper explores the effectiveness of new technologies in developing literacy within subject disciplines of secondary school students at risk of social exclusion. The research was undertaken as a collaborative project across five schools, including qualified and pre-service teachers in the United Kingdom. This paper provides an overview of the study and presents key findings related to impact on student progression and engagement and impact on teachers. The research indicates the affordances of the software supported more flexible, collaborative and creative learning opportunities, improved literacy and engagement with learning.

1. Introduction

Engaging students who have low literacy levels,[1] are learning in a second language, or those disengaged with their learning, is challenging for many teachers (Byrd-Blake & Hundley, 2012; Trigwell, Rodriguez, & Han, 2012) and requires teachers to rethink their practice (Vescio, Ross, & Adams, 2008). This paper reports an intervention using Web 2.0 technologies in secondary schools in the United Kingdom (UK). The purpose was to identify its potential to raise literacy levels in subject disciplines for students with low levels of literacy, English as a second language, disability or those identified by their school as disengaged in learning. Five secondary schools (11–18 years) led by a university research team, took part in this year long research project which was part funded by the UK's Training Agency[2] (TA).

The UK has undergone a significant revision of curriculum in secondary schools over the last three years with literacy now embedded within all subject disciplines. Research into improving literacy has identified that interventions for students with low literacy levels is essential (Brooks, 2007) with collaborative learning identified as particularly supportive (Slavin & Lake, 2008).

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[1] For the purposes of this research the definition of literacy is 'literacy includes the key skills of reading, writing and communication that enables pupils to access different areas of the curriculum' (Office for Standards in Education, 2014, p. 18).

[2] The Training Agency is the national agency responsible for the training and development of the school workforce.

Increased use of Web 2.0 technologies in schools globally has resulted in a developing body of research on how to successfully integrate these into the classroom (Angeli & Valanides, 2009; Bennett, Bishop, Dalgarno, Waycott, & Kennedy, 2012; Bingimlas, 2009; Byrd-Blake & Hundley, 2012; Luckin et al., 2012; MacArthur, Ferretti, Okolo, & Cavalier, 2001; Molebash & Fisher, 2003; Niess, 2005; Webb & Cox, 2004). However, the affordance of new technologies' contribution to the development of literacy in subject areas and engaging disaffected students is under-researched; this paper makes a contribution to knowledge in this area.

Reported research indicates integrating technologies in classrooms in the UK is still in need of development (Hutchison, 2012; Lawless & Pellegrino, 2007) with many teachers restricting their use of technologies to 'presentation software, learner-friendly Web sites and management tools' (Harris, Mishra, & Koehler, 2009, p. 393). There is criticism in the literature relating to the use of technologies in the classroom and whether they can be transformational, engage learners and impact on student progression (Angeli & Valanides, 2009; Higgins, Xiao, & Katsipataki, 2012; Kirkwood & Price, 2013). Indeed, Harris et al. (2009) argue that current use of technologies tends to focus on skills required by teachers to integrate them into their classroom, rather than students' learning needs. Other researchers such as Ertmer (2005) acknowledge student-centred learning is important to the successful integration of technology in education.

For the introduction of new technologies to be successful in classrooms professional development is viewed by many as essential (Avalos, 2011; Harris et al., 2009; Vescio et al., 2008). Various theories relating to the development and use of technologies in the classroom are reported, some of which evidence the impact on professional development (Chism & Szabo, 1997; Guskey, 2002; Guskey & Yoon, 2009; Rienties, Brouwer, & Lygo-Baker, 2013). However, few evidence the impact of professional development on the progression of students (Flecknoe, 2002).

There are various frameworks presented for integrating technologies into the classroom. For example the Technology Pedagogy and Content Knowledge (TPACK) framework, developed by Mishra and Koehler (2006) from Shulman (1986) PCK model, identifying the importance of pedagogy, lesson content, knowledge of students, and confident use of technology by teachers to ensure appropriate use of technologies in classrooms (Niess, 2005). Mukama and Andersson (2007) present similar factors for the successful introduction of new technologies in Rwandan classrooms. Other researchers such as Kilbourne and Alvarez (2008) identify that teachers need time to become able to use Information Communication Technology (ICT) critically in their practice. Byrd-Blake and Hundley (2012) draw on Holloway (2006) factors which focus on teacher content knowledge and teaching skills, student learning goals, creating a supportive culture for a learning community, using student data to inform professional development planning and as part of the training itself, embedding training in the daily work of the teacher, sustaining training over time, allowing for feedback and coaching, providing opportunities for teachers to participate in planning their training and reflect on practice. Hodgkinson-Williams, Slay, and Sieborger (2008) and Meyer, Abrami, Wade, Aslan, and Deault (2010) evidence that local support when developing new technologies is essential for the successful integration of new technologies.

However, these frameworks do not offer a lens for measuring impact of professional development. This research therefore draws on that presented by Guskey (2002) who identified 5 levels for measuring the success of professional development focussing on impact in the classroom:

Teachers' reactions	Level 1
Participants' learning	Level 2
Organisations' support and change	Level 3
Participants' use of new knowledge and skills	Level 4
Student learning outcomes	Level 5

This framework, originally developed for business (Guskey, 1986), was adapted for teacher professional development (Guskey & Huberman, 1995). At the forefront of Guskey's framework is his view that 'for the vast majority of teachers, becoming a better teacher means enhancing student learning outcomes' (Guskey, 2002, p. 382). There are criticisms of Guskey's framework (c.f. Coldwell & Simkins, 2011) due to the levels not being presented consequentially, rather a set of conditions from one level to the next. Guskey's framework provided a structure for collecting data at different stages of the research, discussed later the Methods and Findings sections.

Vygotsky's (1978, 1981) theory of constructivism provided a theoretical framework for this research. Vygotsky proposed an alternative theory of learning to behaviourism which dominated teacher training in the UK during the late 20th Century, criticised as being too narrow and isolating (Liu & Matthews, 2005). Vygotsky (1978) identified that learning can take place by working individually or collaboratively through co-constructing knowledge, moving students from a zone of what is already known to a zone of proximal development, through the learner's construction of knowledge. The constructivist tradition has been further developed by others to recognise the role of the social environment in learning (Lave & Wenger, 1991; Wenger, 2009). While teachers now encourage collaborative and active learning in many countries, this research identified that Web 2.0 technologies can provide a vehicle for collaborative and co-construction of knowledge. This process of learning arguably enables learners to develop their knowledge and subject discipline literacy through participating in activities designed by teachers, delivered through the Web 2.0 technologies to create a student-led environment.

Barriers to the successful integration of technologies in the classroom have been identified in the literature, for example Boulton and Hramiak (2013) identified barriers including lack of senior management support, insufficient time for planning, lack of access to technologies and school firewalls. Murray, Nuttall, and Mitchell (2008) and Bingimlas (2009) identified barriers including lack of teacher confidence, resistance to change, negative attitudes, lack of time, accessibility, poor training and lack of technical support. Gaffney (2010) grouped barriers into specific areas of research and policy, school context, teacher skills attitudes and beliefs, student skills and knowledge and technology. Other studies also indicate access to technology in schools as a potential barrier (Hammond et al., 2009; Office for Standards in Education, 2009; Pelgrum & Doornekamp, 2009).

There is thus an increasing body of research relating to the introduction of new technologies into school classrooms which identify potentially successful models and also recognise some of the challenges faced by teachers. The aim of this research was to test the efficacy of Web 2.0 technologies in improving literacy in subject disciplines for specific groups of students with low literacy levels, special educational needs or disability (SEND) or disengaged with learning and identify training and support needs for teachers in core subject disciplines in integrating technologies leading to improved progression.