Optimizing Teachers' Digital Pedagogies through University-School Projects

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Abstract: This paper reports on a multi-case study exploring the impact of three recent international university-school partnership projects that aimed to develop school teachers' and teacher educators' digital pedagogies with mobile devices. It draws on interview and survey data from a component of the study that focuses on participants' perceived value of the projects' underpinning socio-cultural digital pedagogical framework. Findings suggest that participants' engagement with the framework through project activities supported development of their attitudes towards technology-enhanced learning and diversified their digital teaching practices with an emphasis on learner autonomy and peer learning. Implications and further research directions are shared for optimizing the effectiveness of these increasingly important digital innovation projects that align with the

strategic goals and priorities of organizations such as the European Commission (EU) in a post pandemic world.

Keywords: digital pedagogies, partnership projects, digital innovation, teacher education

Introduction

In 2020, at the height of the COVID-19 pandemic, politicians across Europe reiterated their support and determination to harness digital technologies for a 'fairer and more sustainable Europe' and to help raise the 'quality and inclusiveness of education' whilst also driving forward the European Green Deal objectives to reach climate neutrality by 2050 (European Commission, 2020). Digital education and transformation lie at the heart of these political ambitions and their Digital Education Action Plan 2021-27 is the latest EU strategic initiative that seeks to encourage transnational collaboration and partnership between schools and universities. It builds upon the success and reach of the Erasmus+ programme, started in 2014, which has fostered numerous strategic 'digital innovation' partnership projects between schools and universities across and beyond Europe.

We report on a work-in-progress study interrogating the impact of three such projects. The study aims to embellish the literature base examining the broad value and contributions of digital innovation projects. It is important to critically evaluate such projects to increase the likelihood of quality outcomes, including enhanced student learning (Alexander, 1999). Our three projects were underpinned by a digital pedagogical framework developed by the authors (Kearney, Schuck, Burden & Aubusson, 2012; Kearney, Burden & Schuck, 2020), called the iPAC framework. (This socio-cultural theoretical framework is detailed in the Literature Review below). The projects, led

by the first author, aimed to address a recurring paradox associated with the relatively recent introduction into education of mobile digital technologies such as laptops, tablets and smartphones. Previous research undertaken by the authors (Burden & Kearney, 2017; Kearney, Burden & Rai, 2015) revealed that despite the prevalence of personal mobile devices in schools and universities (often as high as 90%), educators lacked the confidence and skills to use these technologies effectively in different learning contexts. This resulted in the use of mobile devices for teaching (mobile pedagogies) in more traditional ways that replicated existing practices, often adding little extra value to students' learning. This study explores how teacher and teacher educator participants' engagement in our three recent digital innovation projects has helped to address this problem. In particular, we focus in this paper on their views of the projects' underpinning iPAC framework, and its utility for informing their digital pedagogical development through project activities.

The Three Projects

The *Mobilising and Transforming Teacher Educator's Pedagogies project (MTTEP)* was completed in 2018. It developed a pedagogical toolkit for supporting teachers and teacher educators in building knowledge and skills around more diverse digital pedagogical approaches. The toolkit (www.mobilelearningtoolkit.com) includes validated survey tools for teachers' professional learning, and teaching resources to enable educators to apply mobile pedagogies in their practice. The second project, called *Designing and Evaluating Innovative Mobile Pedagogies (DEIMP)* finished in 2022 (see www.deimpeu.com). It initially captured principles of digital pedagogical innovation to guide the development of mobile learning (ie. learning mediated by the use of mobile devices). These principles emerged from a robust systematic literature review (Burden, Kearney, Schuck & Hall, 2019) that subsequently informed activities and resource development, including a professional learning app and an online course. The third (current) project, *Environmental Learning through Mobile Learning* (ELMO), aims to assist teachers and teacher educators to develop a mobile learning toolbox to help them become more competent in

exploiting digital learning for environmental purposes (see sites.google.com/view/elmo-erasmus/about).

As well as the underpinning theoretical framework, other common features of the three Erasmus+ projects in this collective case were active transnational partnerships between universities and schools, and the wide adoption of action learning activities that involved participants in the co-production of knowledge to expedite the implementation of outcomes.

Study Design

In this paper, we examine the three previously described projects as a multi-case study (Stake, 2006), addressing the following question: *How do teachers perceive the value of a socio-cultural theoretical framework that underpins their participation in digital innovation projects?* The participant sample consists of teachers and teacher educators who were members of these university-school partnership projects from Germany, Norway, Cyprus, Belgium, Netherlands, Ireland, Spain, Australia and the United Kingdom (U.K.). The sample also includes teachers and teacher educators who engaged in associated project activities and dissemination events.

In order to gauge the broad impact of project activities, including use of the resources created by the respective projects, we designed and implemented a quantitative online survey. The survey has 9 Likert-style items, and was completed by 509 participants across 74 different countries. We also sought to explore details and precise mechanisms through which any impact was perceived to have been achieved through a series of interviews with school teacher and teacher educator participants, the collection and analysis of artefacts generated by each of the projects, and various project reports. All data were aggregated to identify common themes across the three projects. For the purpose of brevity, we report on the survey and interview data that pertain to this

paper's research question. To give an authentic context for the findings, we include a brief illustration based on data collected from a partner school in the current ELMO project.

Literature Review

A key feature of all three projects was the adoption of the iPAC framework (Kearney et al., 2020) as an underpinning theoretical perspective. This framework highlights three distinctive mobile digital pedagogies: personalisation, authenticity and collaboration (or 'PAC', see www.ipacmobilepedagogy.com). Informed by sociocultural theory (Wertsch, 1991), the iPAC theoretical framework brings a pedagogical perspective to an area previously dominated by techno-centric considerations. How learners experience these three approaches is influenced by their use of 'time-space' (or context), as depicted in Figure 1.

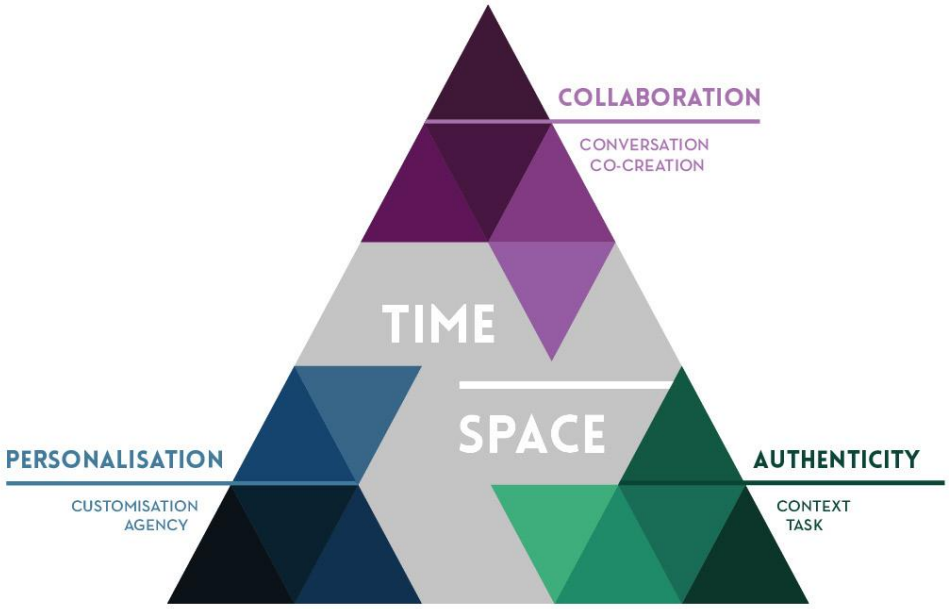

Figure 1. Representation of our socio-cultural *Digital Pedagogical Framework* (iPAC) comprising three distinctive features of mobile learning experiences. (From Kearney, Burke & Schuck, 2019, p.754).

The *Personalisation* construct consists of the sub-constructs of Agency and Customisation. It points to the potential for learners to enjoy an enhanced degree of agency (Pachler, Bachmair & Cook, 2009) and flexibility to tailor both tools and activities. These experiences are linked to a strong sense of ownership of both the device and the learning process. The *Authenticity* construct links with opportunities for in-situ, participatory learning (Radinsky, Bouillion, Lento & Gomez, 2001). The sub-constructs of Task and Context focus on learners' experiences of rich, relevant tasks, making use of tools in a realistic way, and driven by real-life practices and processes. The *Collaboration* construct points to the well-discussed conversational, networked features of mobile learning (Sharples, Taylor & Vavoula, 2007). It consists of Conversation and Co-creation sub-constructs, focusing on learners' engagement in socially negotiated meaning-making, forging connections with peers, experts and the environment (Wang & Shen, 2012). The iPAC framework provides a useful lens to explore how use of mobile technologies can leverage potentially

transformational pedagogies in a range of formal and informal learning settings. Hence, it was used to provide the foundational theoretical underpinning of the three digital innovation projects discussed in this paper.

Results

Preliminary data suggest that teachers' engagement with the iPAC framework through participation in project activities, challenged and, in some cases, altered their beliefs and practices about teaching and learning. Sixty-seven percent of survey participants reported a more positive attitude about using mobile technologies in their teaching, and over 85% of respondents reported feeling more confident about how to use mobile technologies in their teaching practice. A teacher from Barranquilla, Colombia mentioned: "*Learning about the iPAC framework has made a great impact in my teaching practice. Now I feel more confident using technology in my classes."* While a teacher from the DEIMP project noticed an improvement in her risk-taking attitude towards technology: *"I also became more courageous in experimentation with apps: Padlet, VoiceThread and other Google apps."*

Sixty percent of survey participants claimed they had changed the way they design learning tasks for their students. The Personalisation construct from the iPAC framework was often mentioned, with an emphasis on enhanced student autonomy. One teacher from the MTTEP project described changes to his teaching in an interview: "*My lessons are more project oriented with a lot more self-regulated learning scenarios where students have to keep doing something for themselves. Using collaborative apps like Padlet changed my teaching totally. Students have far more agency now."* Another teacher participant in the DEIMP project talked in her interview about benefits from her engagement with the project, also emphasizing technology-mediated student autonomy: *"I could see the shift in my lesson design and approach. It was evident to me how the implementation of mobile technology allowed students to take autonomy in their learning and how*

the lessons were no longer content driven." A colleague from the same secondary school who was also a project participant observed that the project had been *"a very transformational learning experience"*. The use of mobile technologies to support authentic and collaborative learning approaches was also mentioned. For instance, one teacher from the ELMO project said:

> *"I'm trying to exploit more the authentic material that the students can bring from their real life. For example, through videos that they can produce about their daily life, about their hobbies, their family etc., and to boost the collaboration among them via Messenger, Viber, and Instagram."*

A teacher education leader in two of the projects, said that the iPAC framework now constitutes a core element for their curriculum on digital pedagogy. In his interview, he discussed the influence on his institution's practices in initial teacher education emerging from his project participation: "*The iPAC framework crucially has helped to inform how we prepare our student teachers to make the most of the potential of mobile learning...and is directly changing and augmenting classroom practices in the use of mobile technologies in schools."* The projects have also informed their preparation of teachers to better understand and design mobile learning during the recent COVID-19 pandemic. He stated that the iPAC model "*has come front-and-centre in our thinking about education during COVID-19, and the redesign of learning and teaching in our teacher education programs."* Another teacher educator claimed in his interview that his use of the iPAC framework during the MTTEP project has had a significant impact on his practices: "*When I do training with teachers I have to explain [justify] why I am using mobile devices...but when I show iPAC, then immediately the teachers realize there is a method behind this….and it is deeper than just gaming or playing with apps.*"

The following short illustration is derived from data collected in a partner school in the current ELMO project. Interviews were held with the school principal and six teachers. As part of the project, the principal recently asked staff to evaluate one of their recently implemented lessons

using a validated professional learning survey tool (Kearney et al., 2019) informed by the iPAC framework (www.ipacmobilepedagogy.com/teachers-specific-task-survey). The teachers were asked to upload and share their survey feedback chart into an online collaborative platform (Padlet) for later professional discussions with colleagues at a school staff meeting. This exercise facilitated effective staff conversations about pedagogical weaknesses and strengths signalled in their survey feedback charts, and helped to *"consolidate positive results and try to improve the parts with lower results"* (principal). Potential improvements to teaching mentioned by two teachers targeted learner agency (Personalisation construct) and peer interactions (Collaboration construct): *"I plan to give the students more agency by having them choose what they want to learn"* and *"We will have more focus on interactions in relation to collaboration."*

Discussion

The preliminary findings indicate that participants' engagement with the iPAC framework through the projects' activities influenced the development of their digital teaching practices. The frequent mention of the framework in participants' survey and interview responses indicated its strong influence on outcomes. As well as attitudinal benefits (e.g. more confidence, increased risk-taking), the data so far points to a positive influence on teachers' beliefs about teaching and learning, resulting in new emphases on socio-cultural approaches supporting student autonomy and peer learning. Such shifts in pedagogical beliefs are known to be pivotal in changing teaching approaches with technologies (Ertmer, Ottenbreit-Leftwich, Sadik, Sendurur & Sendurur, 2012).

The study illuminates ways forward for designing and implementing future digital innovation university-school projects that aim to improve educators' digital pedagogies. In this way, the study adds to the scarce but important body of literature focusing on the effectiveness of such projects. The findings speak to the rich potential for deepening and broadening the impact of these projects, showing the value of an underpinning validated socio-cultural framework. Our

further research explores more nuanced aspects of the projects' activities that may have also contributed to changes in participants' practices, such as the previously mentioned action learning approaches. Further research also explores the rich inter-cultural exchanges between partners in these types of transnational university-school partnership initiatives, and how they might contribute to more widely advancing educators' digital pedagogies and sustaining outcomes beyond the lifetime of the projects.

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