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Enhancing Fieldwork Learning Using Mobile Technologies

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Preface

Recent advancements in hardware, software, battery life and durability of portable devices have led to the development of tablet computers and other associated mobile technologies. Tablet technology only became available to the mass market since 2010, and this has forced us to think afresh about how we educate and get the best from our students. Indeed, how we can support students to use affordances, in the sense that a pencil and paper are affordances, to get the best from themselves. We believe that 'tablets' such as Apple iPads, Samsung Galaxies, Xperia tablets, etc., can be viewed as transforming devices at all levels within education and especially within fieldwork education. We would even say that they are a 'disruptive innovation' within education as they create a new market and eventually displace existing technology, thereby creating new educational possibilities.

Fieldwork is a core element of many Bioscience, Geography, Geology, Earth and Environmental Science degree courses. Fieldwork can provide opportunities for experiential learning and research-led teaching in a 'real-world' setting. Teaching and learning during fieldwork can be enhanced through the use of digital technologies; tablets provide opportunities to develop novel approaches to fieldwork pedagogy that neither students nor tutors envisaged possible through traditional means.

The aim of this book is to help you as a tutor to develop novel pedagogic approaches that make the most of these new digital technologies to enhance fieldwork teaching and learning. There is a supporting website that continues to be updated as new technologies and pedagogic ideas emerge: http://www.enhancingfieldwork.org.uk.

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The above project has been a catalyst for practitioners to contribute and share good practice case studies of Technology-Enhanced Learning in the field. We would like to thank all those practitioners for sharing their practice, the students who participated in the research projects, all those students and colleagues who responded to surveys and workshop participants for their enthusiasm and input into the project.

The authors and publisher would also like to thank the following practitioners for their good practice case studies:

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These practitioners contributed 29 case studies to this book and we describe over 130 mobile apps with suggestions on their usage in enhancing fieldwork learning. This book is not intended to be an exhaustive list of mobile apps applicable to fieldwork, but used to illustrate the diverse range available and their educational potential within a fieldwork setting.

Contents

Abbreviations

3G/4G	Third or fourth generation mobile network
App	Mobile application—software designed to run on mobile devices and smartphone
AR	Augmented reality
BT	Bluetooth—wireless technology for exchanging data over short distances
BYOD/T	Bring Your Own Device/Technology
CSV	Comma separated values
EFL	The Enhancing Fieldwork Learning project
ERA	Enabling Remote Activity
FNS	Field Network System
FSC	Field Studies Council
GA	Graduate Attribute
GEES	Geography, Earth and Environmental Sciences
GLE	Group Learning Environment
GPS	Global Positioning System
HE	Higher Education
HEA	Higher Education Academy
ICT	Information and Communications Technology
KML	Keyhole Markup Language
LiDAR	Light Detection and Ranging
MDMD	Mobile Data Mini Directories
MO	Media Object
OER	Open Educational Resource
OU	Open University
PDA	Personal Digital Assistant Computer
PDF	Portable Document Format—a file format that can be used to save documents that look the same in any operating system
PLE	Personal Learning Environment
PSP	PlayStation Portable

RLO	Re-usable learning object
SETT	SETT Framework—Student, Environment, Task, Tools
TEL	Technology Enhanced Learning
USB	Universal Serial Bus—used for connection between computers and other devices
VFG	Virtual Field Guide
VGA	Video Graphics Array—PC connector for a projector
VR	Virtual Reality
VTF	Virtual Field Trip
XML	Extensible Markup Language

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Chapter 1
Introduction

Abstract This Chapter introduces the concept of fieldwork and the literature promoting the value of integrating mobile technologies into fieldwork practice. We discuss the pedagogic reasons for incorporating technology into fieldwork and promote the concept of Personal Learning Environments (PLEs) for students as a framework for education, with the "tablet" computer (loaded with appropriate apps) enhancing the student's personal learning experience.

Keywords Fieldwork · Mobile device · Personal learning environment · Pedagogy · Technology-enhanced learning

1.1 Fieldwork and Experiential Learning

Fieldwork can often be thought of as working in extreme environments for long periods, we prefer the broad definition of any 'out of classroom/lecture theatre educational experience'. Fieldwork can enhance students' experience of whatever they are studying (France and Ribchester 2004; Hovorka and Wolf 2009; Scott et al. 2012; Welsh et al. 2013; Wheeler et al. 2011) and provide ample opportunities for experiential learning or learning from experience (Keeton and Tate 1978; Kolb 1984). We believe that experiential learning is at the heart of the best fieldwork practices (Healey and Jenkins 2000).

Fieldwork can offer students a novel learning environment (Rickinson et al. 2004; Cotton and Cotton 2009), a valuable learning experience (Fuller et al. 2006) and provide opportunities for experiential learning which can motivate (Parr and Trexler 2011) and benefit students that find other teaching methods less rewarding (Kern and Carpenter 1984, 1986). Recent studies have provided evidence of enhancement of learning during fieldwork (Prokop et al. 2007; Easton and Gilburn 2012; Scott et al. 2012) and much of this enhancement has been attributed to the fact that most students enjoy and value fieldwork (Gamarra et al. 2010; Goulder et al. 2012).

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Students have the opportunity to develop discipline-specific practical skills during fieldwork in addition to enhancing their wider, employability skills such as team working, the development of interpersonal skills, self-management and lifelong learning skills (Andrews et al. 2003). There is even the prospect to provide a new stage for skills development (France and Ribchester 2004). Personal development is especially evident when away on residential fieldtrips (Stokes and Boyle 2009).

Fieldwork is undertaken in a wide range of subject disciplines and with a pedagogic remit, but in general we want to show students how to observe the natural world, to interpret it, to collect data and samples, to analyse data and compare trends and results. It is all about giving the students a chance to immerse themselves in the environment and to make their learning active (Swansborough et al. 2007).

In order to improve and enhance fieldwork learning there is always the potential to innovate. The underlying rationale for introducing any educational device or technique needs to be pedagogy. This can be exemplified if you are innovating in order to find ways to:

- Deliver a better learning experience for your students
- Do something you can't do now, or want to do it better
- Improve the group learning dynamic on fieldwork

In this book we present a wide variety of ways to use tablets and mobile devices. However, it is for you, the tutor, to think of how best to use them in your own educational situations. Section 1.3 is given to a basic pedagogic consideration of using technology for effective educational practice. However, fieldwork design and planning is just as important as where it is carried out and how long it takes. Further guidance on planning fieldwork can be found for the Biosciences in Peacock et al. (2011) and for Geography Earth and Environmental Sciences (GEES) in Maskall and Stokes (2008).

1.2 Integration of Technology and Mobile Devices into Everyday Life

Technology is now integrated into everyday life and study. Weiser (1991) in his article on the 21st Century Computer described this as 'ubiquitous computing' where "the most profound technologies are those that disappear—they weave themselves into the fabric of everyday life until they are indistinguishable from it" (Weiser 1991).

As we are now in the age of pervasive or ubiquitous computing (Caudill 2010; Traxler and Wishart 2011; Mehigan and Pitt 2010) the public's expectancy is for researchers and educators to keep up with the pace of mobile technology advancement (Traxler and Wishart 2011). Indeed, students have access to handheld or mobile technologies that are more powerful and better connected than most conventional desktop computers (Guy 2010).