

Mobile learning in a human geography field course

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ABSTRACT

This paper reports on reusable mobile digital learning resources designed to assist human geography undergraduate students in exploring the geographies of life in Dublin. Developing active learning that goes beyond data collection to encourage observation and thinking in the field is important. Achieving this in the context of large class sizes presents several challenges. Combining *in-situ* learning with spatially-accurate historical and contemporary multimedia, we developed a set of location-aware digital mobile tools or ‘mediascapes’. We explore how scaffolding can be achieved in such a context, focusing on the development of students’ observational, enquiry and thinking skills in the field.

KEYWORDS: mediascape; fieldwork; Dublin; pedagogy; mobile learning.

INTRODUCTION

Equating fieldwork with offering a ‘real world’ context to geographic education (e.g., Day, 2012) is at first glance intuitively persuasive with a value beyond question. Certainly, the value of the “geographer as voyeur” suggested by Zelinsky (2001) is unequivocal in more vintage commentaries on the importance of fieldwork (e.g., Wooldridge 1955; Stoddart 1986) that focus on what Driver (2000, 268) has described as a geographic “way of *seeing*” (our emphasis). However, being unequivocal in terms of the pedagogic value and effectiveness of fieldwork is more difficult. This matters given the financial context in which we teach, and it makes sense that we re-evaluate the pedagogic benefits of fieldwork (e.g., costly residential field courses) on an ongoing basis (McEwen 1996; Herrick 2010).

Surprisingly, the value of teaching in the field is contested. Gold et al. (1991) observed that we did not know if fieldwork was effective, suggesting that the main value could simply be as an opportunity for concentrated study. Consequently, the role and value of fieldwork in geography has been subject to some inquiry and discussion (e.g., McEwen 1996; Kent et al. 1997; Nairn 2005; Boyle et al. 2007; Hope 2009). Scott et al. (2006) suggested that whilst fieldwork has a role, it is in fact not central to geography. In contrast, Kent et al. (1997, 328) concluded that “fieldwork is vital to geography teaching”, and Hovorka and Wolf (2009, 99) referred to fieldwork as “geography’s signature pedagogy”. In human geography where “ways of *being*” (Driver, 2000, 268, our emphasis) intrude, the role is perhaps most contested (Nairn 2005; Hope 2009). Notwithstanding, the benefits for students gaining active experience of methods in context has been noted (e.g., Healey et al. 2005; Scheyvens et al. 2008). In fact, as others such as Herrick (2010) have illustrated,

training in the class and subsequent fieldwork can go hand-in-hand to produce a much deeper learning experience. Perhaps at the very least, the clear value of fieldwork lies firmly in the affective domain as revealed by Boyle et al. (2007).

One classification of student fieldwork is the two dimensional independent vs. dependent and observation vs. participation framework employed by Herrick (2010) and Panelli and Welch (2005), originally derived from Kent et al. (1997). Although this framework was devised as two continua, four categories are frequently identified (e.g., in Panelli and Welch 2005) with more passive guided tour and independent individual *observation* tasks opposed against the more (inter)active *participation* tasks in a fieldwork setting.

The observation-participation dimension is reminiscent of the (individual-based) *acquisition* and (collective-based) *participation* metaphors for learning described by Sfard (1998), which have since been referred to as *monological* and *dialogical* learning respectively (e.g., Paavola and Hakkarainen 2005). As noted by McGuiness (2005) the acquisition metaphor is perhaps epitomised as ‘learning-as-receiving-information’, and participation metaphor as ‘learning-as-participating-in-communities-of-practice’ or other forms of activity. Sfard (1998) argued for the importance of both metaphors for teaching and learning. Similarly, both have important roles to play in student fieldwork. However, we argue that Kent’s classification – and in particular the versions in Panelli and Welch (2005) and Herrick (2010) – needs reflection to incorporate the role of mobile technology. For example, participation in a fieldwork context is often associated with the task of data gathering (e.g., Panelli and Welch 2005; Herrick 2010). Although important, Saunders (2011, 185) warns of

“... the need to collect ‘data’ eclipsing the other dimensions of learner engagement, enquiry and thinking in the field”. As we discuss below, use of mobile technology clearly enables other forms of activity/participation that do not involve the task of data gathering, for example making use of Web 2.0 social media and communications tools, which represent a frequent student use of such technology for learning (e.g., Woodcock et al. 2012). The context of this paper lies squarely with the role of mobile technology in the form of personal electronic devices for mobile learning in a field context.

In this paper we augment the work reported in Jarvis et al. (2013) where the focus was on constructive alignment and assessment in an example of reusable mobile learning resources designed to assist undergraduate students in exploring the economic, cultural and social geographies of life in Dublin as part of a residential field course module. Here, our objective is the identification of specific aspects of geographical learning in the field facilitated by mobile technology. First, we consider the definition of mobile technology and the nature and affordances of mobile learning before focusing on a specific example of mobile technology that we use in a geography field course setting: mediascapes employed on a handheld mobile device. To provide some pedagogic context, we then outline the aims and design of the field course. Using data collected from students on the field course, we focus on two elements: (1) the use of mobile technology to develop students’ observational skills and (2) to assist in deepening linkage with urban theory. Last, we reflect on this evidence and attempt to make some general recommendations for the role of such technology in geography field-course learning.

MOBILE LEARNING AND TECHNOLOGIES

The technology used in geographical fieldwork covers a wide spectrum from bespoke field measurement equipment (e.g., data loggers), to more generic communication and information technology (Fletcher et al. 2007) which can take on a range of uses. Here, we restrict our attention to a subset of communication and information technology which we describe as ‘mobile technology’ as represented by a handheld mobile device such as a smartphone. Such technology can be employed in a variety of information contexts ranging from Geographic Information Science and Technology (Unwin et al. 2012) to Location Based Services, which are defined as “the delivery of data and information services where the content of those services is tailored to the current or some projected location and context of a mobile user” (Brimicombe and Li 2009, 2). Our main focus in this paper is upon the learning about geography enabled by the mobile technology, not learning about the technology *per se*, following Sui’s (1995) distinction between learning *about* and learning *with* GIS.

There is an increasing literature on the nature and value of mobile learning enabled by mobile technology. Mountain (2012) has reviewed the arguments for location-based mobile learning. He describes the concept of ‘ambient intelligence’ (Kukulska-Hulme et al. 2009) created when additional information is associated to things in the real world. He suggests a key facet of mobile learning is that it enables ‘situated learning’ (Naismith et al. 2004) whereby “learning materials can be linked to real locations” (Mountain 2012, 337) that effectively offers an “*untethering* of education, promoting learning in places and at time of the learners choosing, breaking out from traditional teaching environments” (op.cit., 340). Martin and Erzberger (2013) have defined what they describe as *here and now mobile*

learning, as learning with mobile technology anywhere, anytime via authentic activities. Significantly, the use of mobile technology for learning in this context “provide[s] scaffolding *WHEN* and *WHERE* the students need it” (op.cit., 78). Sharples et al. (2006, 225) have suggested a definition of mobile learning as “the process of coming to know through conversations across multiple contexts among people and personal interactive technologies”. In what they describe as ‘a theory of learning for the Mobile Age’, students learn by “exploring their world, in continual communication with and through technology” (op. cit., 244).

Patten et al. (2006) identified three application categories for mobile technology: data collection, location aware and collaborative. These are echoed in the elements of mobile technology considered most useful for situated learning by Martin and Erzberger (2013), namely: geospatial technologies, mobile search, image capture and social networking. Many of these elements such as photography, videography and geotagging are already recognizable in geography fieldwork. We suggest that smartphones effectively enable all the technological elements described above, across the three defined application categories. Although there has been less reported smartphone use (Murthy 2008), there is evidence that their use is on the rise (Welsh and France 2012) and they have significant potential for adoption in fieldwork (Welsh et al. 2013). This is particularly so in human geography where Büscher and Urry (2009, 103) have argued that the dynamic nature of urban geography needs to be reflected in the development of mobile research methods. Such approaches resonate with the challenge of aiding students to appreciate the relational geographies of urban space.

We explore the use of mediascapes on a smartphone. Here, we define mediascapes as location-aware multimedia experiences that are viewed *in situ* to their geographical context, on a mobile device (Stenton et al. 2007). Loveless et al. (2008) describe this as a ‘digital canvas’ – for example a map – onto which sounds, images and video have been geotagged. These are subsequently activated through the use of a GNSS-enabled (GPS) mobile device. The general concepts of mediascapes are illustrated in Figure 1. Students, armed with a location-aware mobile device navigate through a predetermined fieldwork area (Figure 1A). Several zones – invisible to the students – have been associated with a variety of multimedia, which is triggered and displayed on the mobile device when the student navigates into a zone (Figure 1B). Figure 1C shows the background map viewable by the students.

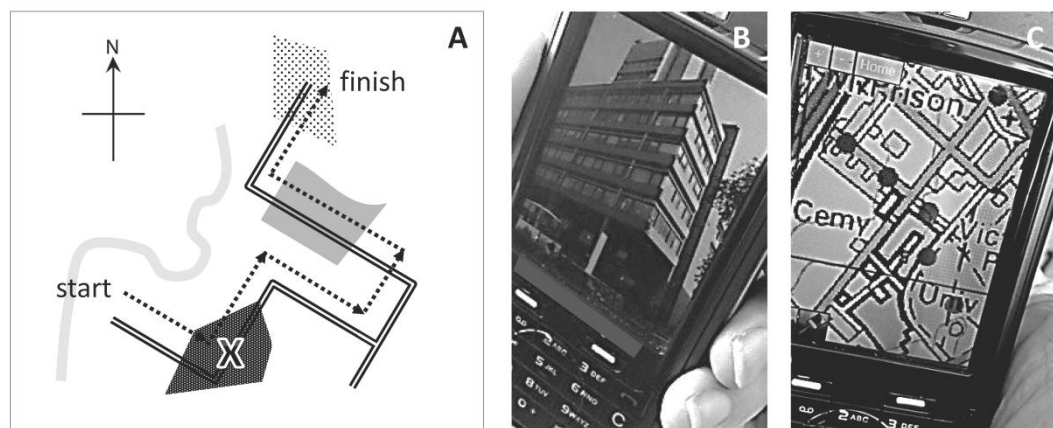


Figure 1: The concept of the mediascape: (A) map with geotagged zones, (B) example multimedia delivered at location ‘X’, (C) Basemap (© Crown copyright/database right 2014.

An Ordnance Survey/EDINA provided service) within mscape™ interface (© Hewlett Packard®).

METHOD AND FIELD COURSE DESIGN

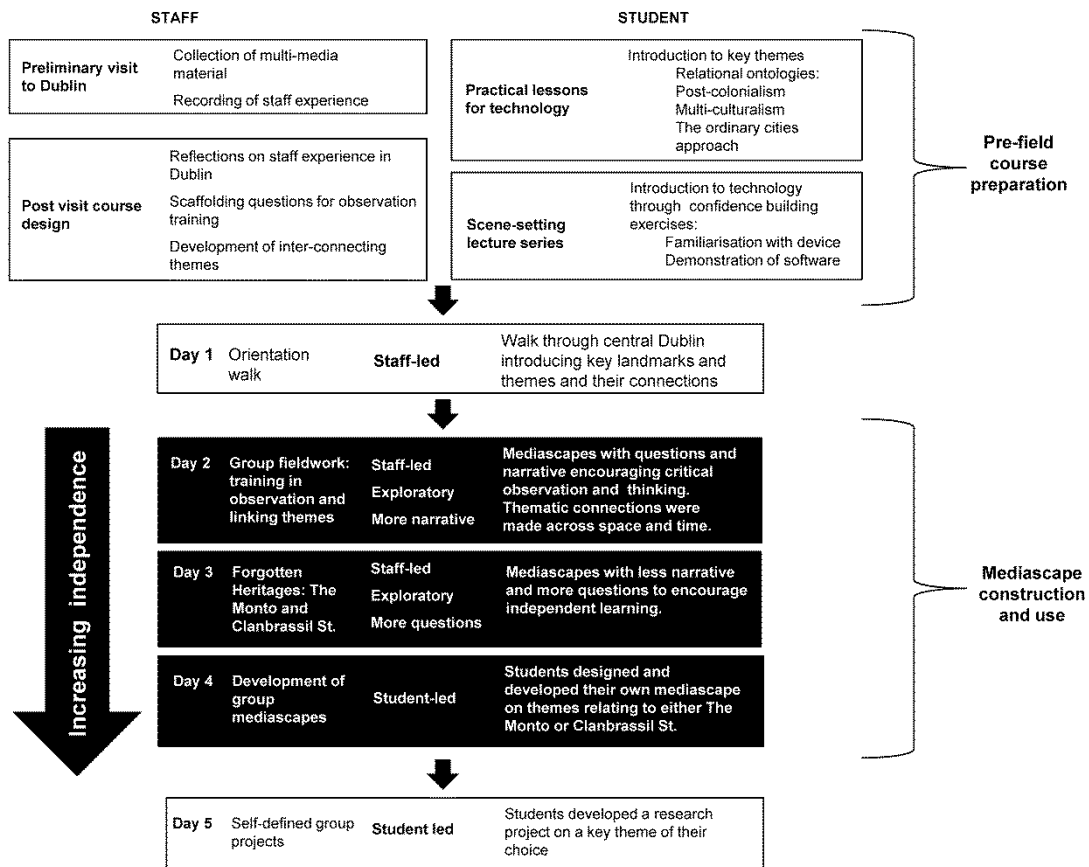


Figure 2: Design of the Dublin field course with emphasis on mediascape scaffolding.

The aims of our field course module were; 1) to develop students' field thinking and observation skills; and 2) to develop new ways of making links with advanced theoretical concepts from urban geography. Achieving these aims in the context of large class sizes and lower teacher-student ratios is problematic, especially when trying to maximise the degree of student engagement. This led to the development and adoption of a mobile technology solution on a smartphone that would allow students to explore Dublin independently in small groups, allowing for more focused teacher intervention. The overall design of the field

course module is summarised in Figure 2. Evaluation issues are considered in a later section of the paper.

Field course Preparation

In Laurillard's (2002) terms, teachers' 'conceptualisations' can form the basis of teachers' 'constructions' designed to support student learning. Therefore, as teachers we visited Dublin before the students to record our own 'ways of seeing' and to see how as teachers we conceptualised the processes of observation and broader thematic linkage in the field. Subsequently, digital photographs, audio recordings highlighting our thought/observation processes, questions for students or *in-situ* sounds and GPS tracks were combined with other media (e.g. songs, poetry, historical photographs of Dublin) to form specific 'teacher-led' mediascapes (described below). Pre-field course student preparation included lectures on key themes of the module such as relational ontologies, postcolonialism (after McEwan and Blunt, 2002), multi-culturalism and the 'ordinary cities' approach. Students were also exposed to mobile technologies including specific mediascape software via a number of confidence-building exercises held across the university campus (Figure 1).

Mediascape Construction and Use

In a reflection on mediascapes designed for secondary school students, Loveless et al. (2008) noted an important distinction to be made in the role of the learner was between 'authoring' verses 'audiencing'. We adopt the terms 'teacher-led' to identify those mediascapes where the students took on a role more as an audience, and 'student-led' where the students themselves were authoring the mediascapes. A set of 'teacher-led' mediascapes

were designed such that specific audio and visual material would be highlighted when the student passed into the geographical regions to which the materials were assigned. We made use of the Hewlett Packard® product ‘mscape™’, a Windows® based design tool for collating audio-visual materials into the form of a location-aware mediascape (Stenton et al. 2007). Students used Windows® Mobile smartphones to host the mscape™ software and interact with the mediascapes while in the field in Dublin. Our desire was for students not to be constrained into a linear, pre-set narrative by the tool; no systematized route was suggested and students could wander freely within a prescribed area. Both the design environment and mobile device emulator are shown in Figure 3.

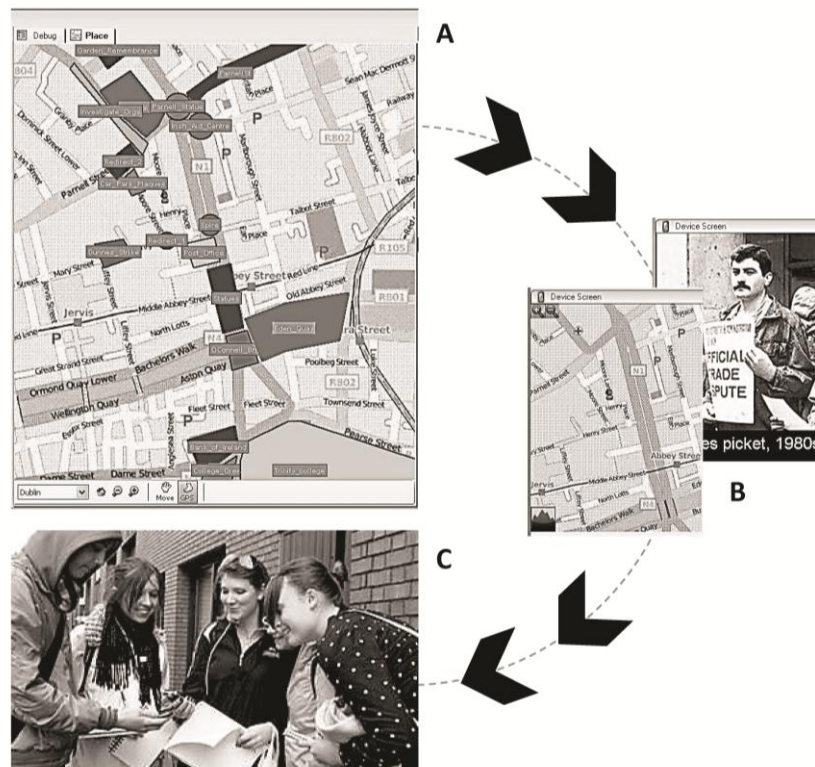


Figure 3: Mediascape for part of Dublin: (A) the mscape™ design screen (© Hewlett Packard®), (B) example multimedia delivered to the mobile device, interface © Hewlett

Packard®, and (C) students interacting with technology in situ in Dublin. (basemap in A and C © OpenStreepMap Contributors).

Within Figure 3A, the design/authoring environment of the software for central Dublin is shown with the user hypothetically present in Moore Lane, Dublin. Note that while in the design environment regions of interest can clearly be seen, in the user version of this screen they are hidden. Shown on the screen of the mobile device (Figure 3B) is a map of the local area, together with the location of the user. As the user moves with the mobile device into the region marked up as ‘Dunnes Strike’ (Dunnes is a department store) on the design board, the mobile device changes to show material associated with this location, in this case visual imagery and an audio commentary regarding the strike over the handling of South African goods during the apartheid era. In Figure 3C we show students engaging with mscapeTM in the field. At the boundaries of the areas or regions of interest (Figure 3A) we placed sensory ‘edges’ within the mediascapes in the form of audio tracks, and encouraged free roaming exploration within these areas. The tools were thus not ‘guided tours’ in any conventional sense. Similar results could be achieved with other software such as AppFurnaceTM that runs on iPhone and Android devices.

In designing the field course, we were aware of the need for learning to be systematised such that students received varied levels of support to build their learning. Scaffolding, is considered an important element of effective instruction (Bruner 1983; Greenfield 1984). If careful scaffolding is not in place, students can find it difficult to apply knowledge gained in the field to other aspects of their prior (and future) learning, or to other locations. However, relatively little has been written regarding the scaffolding of mobile

learning (Chen 2003; Yin et al. 2013). Commonly the process of scaffolding involves the teasing out of answers and understandings from students through skilful questioning, but clearly this is difficult to achieve using a mobile device alone. In the process of designing the ‘teacher-led’ mediascapes, we were clear that a proportion of the audio files and other media clips could be used to pose critical questions to the students to promote their active learning, and present challenges that would develop and enhance their own observational skills and techniques. We therefore designed several ‘teacher-led’ mediascapes that transitioned from being strongly to loosely ‘teacher-led’, and finally to ‘student-led’ (Figure 2). In Loveless et al.’s (2008) terminology, the students go from being ‘audience’ to ‘author’ in a linear fashion.

The two mediascapes employed earliest in the field course were designed to be ‘teacher-led’ (e.g., Figure 3A). Typical early teacher interventions asked students to ‘look up to the plaque on the wall’ and asked related factual and theoretical questions such as ‘who is depicted in the statue/what does the statue represent?’, ‘when did the event marked on the pavement occur and what was the political context?’ Previously hidden links to other periods and places were revealed on entrance to a pre-coded zone of interest (Figure 1) using a series of interleaved audio and visual imagery. For example, links were highlighted using audio and visual materials between the famine memorials in Dublin and those in New York, Boston and Liverpool, thus revealing key nodal points in the Irish diaspora. We intended that this innovation would help better illustrate the relational networks and flows between people and places that have shaped the specific post-colonial geographies of Dublin. Students were learning through the concrete experience of being *in situ*, observing the situation around

them, but in a strongly scaffolded way. Students would anticipate that their position related to regions of interest that might trigger media where appropriate before the technology alerted them to it. If the mediascape caught students unawares when presenting material then it would be pointing out mistakes by omission and supporting them in a scaffolded manner (Yin et al. 2013).

A further two 'teacher-led' mediascapes (Figure 2) were developed with a greater emphasis on critical questions and hints rather than facts or narrative of our own observations. A degree of scaffolding was provided through peer-to-peer group discussion and by lecturer facilitation on visits to the field groups. Here, the use of mobile technology allowed for smaller more intimate groups of students to interact than teacher-student ratios would otherwise have allowed. By leading with the 'teacher-led' tools and then drawing back support to those mediascapes that required more 'student-led' observation and thinking, we hoped to apply fading to the support process at a more meta-level as the students' own conceptualisations developed.

Finally, students constructed their own 'student-led' mediascapes during and immediately after the field course. Papert (1993 cited in Patten et al. 2006) has noted the value of learning when students are involved in the direct construction of something for an audience. Patten et al. (2006) identify this as an example of constructionist learning. In negotiating this element, students were encouraged to incorporate critical reflections on this work, which contextualised and justified their choice of materials included in the mediascape.

Assessment

The field course was designed to be assessed as a mix of traditional (field notebook, essay, research project) and non-traditional ('student-led' mediascape) components. The latter were constructed as part of the group-assessed field exercises carried out on (and immediately after) the field course. The 'student-led' mediascapes were assessed by a teacher after the field course by simulating a "walk through" of the area using a GPS emulator on a personal computer. While building a mediascape for use in the field requires trialling it in the field, the observational and theoretical aspects of the 'student-led' mediascapes could be assessed by a teacher familiar with the territory concerned. 'Student-led' mediascapes that were developed based on project multi-media allowed a much more direct appreciation of the degree to which students observed the environments they were within, providing a more nuanced assessment than that possible using a written report alone (Jarvis et al. 2013).

RESULTS AND EVALUATION

To assess how the students responded to the use of mediascapes both in terms of the knowledge and skills they acquired as well as the less obvious pedagogic benefits the mobile equipment offered, we evaluated the field course using:

- observations of student interactions with teacher mediascapes in the field,
- informal interviews with students during the field course,
- a short feedback questionnaire completed by all students enrolled in the field course (n=23),

- a focus group with a small sample of students conducted after all coursework submission (n=6),
- qualitative analysis of the student mediascapes and their reflective essays about the field course.

A systematic manual approach was deployed to transcribe the recorded focus group and interview data into analytic notes for coding. Thematic analysis (Braun and Clarke 2006) was used to analyse the qualitative data. Our focus here is on (a) observational skills and (b) ability to make links between materials and theories to enhance their methodological understandings.

Observational skills

We were particularly interested in how the students' use of the mediascapes changed over time, both in terms of their observational skills and in the way they interpreted the themes of the field course. Our analysis of the evaluation material suggested that the students were unanimous in their view that the mediascapes were instrumental in improving their observational skills, particularly where objects of importance were less obvious. The students were encouraged to look beyond their eye-level, particularly up and down, as well as being directed to specific objects of interest. The students grasped this form of observational training with ease and were very quickly implementing their new skills during their exploration of Dublin. Typical commentary regarding this phase of learning coming out of the analysis of the focus groups is exemplified as follows:

“when the mediascape asked you to look for something in particular it prompted me to consider something which I may otherwise have overlooked. I felt this was a particular strength of the mediascape and really helped me in terms of focusing my observational skills.”

“the mediascape was very useful in helping utilise observational skills in the field, by pointing out some aspects it gave a clue and flavour for what to look for and allowed for the expansion of our own exploration.”

Overall, student opinion on the quantity and quality of information contained in the ‘teacher-led’ mediascapes on day 2 (Figure 2) was positive. After the initial familiarization stage, many students reported that they started to pre-empt the commentary, walking to areas or objects that they felt were significant and discussing the possible relevance within the group.

“We began to pre-empt the mediascape, and relied less heavily upon it, relying more on our own instincts. This was good in that we became more independent”

“As we got more used to using the mediascape and knowing what to expect from them, more group conversations developed debating reasons for particular images sounds and information.”

The initial prompts provided by the mediascapes demonstrated to the students the types of observations they should be making, building confidence while also reassuring them when they did activate a response. We suggest that this reflects independent thinking, reducing reliance on the mediascape for the more obvious observations. By providing a new, teacher-free support resource, the students were able to debate their ideas freely and more confidently with their peers. This compares markedly with more passive teacher guided tour orientation walks where students may feel more inhibited. In addition, anecdotal evidence and our own observations of the groups showed that the students experienced a sense of achievement when they did correctly pre-empt the mediascape, engaging with the task in a game-like manner. One student described the mediascapes as bringing “a fun side to the trip” and perhaps this was a contributory factor to the students’ high levels of motivation and engagement during the field course.

We believe that this application played an important role in the general acceptance of mobile technology as a learning tool. By demonstrating its usefulness from the onset, the students became more open to further pedagogic interactions and affordances the technology may bring. The general acceptance of the technology was further evidenced by the ‘student-led’ mediascapes. Having been given the freedom to create a mediascape with whatever content they felt was appropriate, the students chose to mirror the aspects of the ‘teacher-led’ mediascapes they thought were most helpful to the participant; they approached their choices in a considered and critical manner. Questions featured heavily in these ‘student-led’ mediascapes.

Despite the entire student cohort recognizing that the mediascapes helped them develop their initial observational skills, some students counter-argued that on some occasions, particularly when they were having technical difficulties, their focus was on the technology rather than on the environment around them:

“We were often so caught up in making the mediascape work (more so on the first day) that the attention paid on our surroundings, and environments, was reduced.”

There was also some concern that despite our intention to facilitate independent exploration of the city, the mediascape in fact ‘led’ some students to a greater degree than we had planned, subconsciously changing the focus of their task to be finding the next mediascape narrative rather than observing the urban landscape:

“Sites that we did find that were not on the mediascape, we did not explore as fully as we could have done, perhaps because thinking that it was not so important.”

For a few students, depending on the routes they took through the selected field areas and hence the amount of material they received from the mediascape, the early more ‘factual’, confidence-building mediascape phase was too long:

“This may have hindered our own observation skills as the mediascape seemed to be throwing facts at us constantly; it meant we became lazy and relied too heavily on the technology, waiting for it to point out things to us rather than noticing them for ourselves.”

However, the response to the ‘shift’ to an increased level of questioning, as opposed to the narrative approach, when it did occur was particularly positive:

“we found this to be an effective way to develop the observations of the participants rather than merely ‘spoon feeding’ everything that can be observed. I believe that this led to a more independent style of research that, while providing information, also encouraged individual exploration and interpretation of the things that we could see.”

“The questions that the mediascape audio clips asked us meant that we had to think more carefully and outside the box, as the answers to these questions were not so obvious. The questions resulted in us considering the area in more detail and from different perspectives”

In pedagogic terms this questioning, conversational approach allowed the students to construct their own learning; they enjoyed being challenged intellectually but also used the questions to keep focused on the task at hand. The questions were used to guide the students but gave them the freedom to develop their own ideas and achieve a deeper level of thinking. Overall, while we achieved our goal of developing confident student observers, we tapered the ‘teacher-led’ material a little too late and would include a wider range of questions in all mediascapes in future use. Tapering could be operated more subtly if students followed a designated tour route, but our preference remains strongly to encourage free but bounded exploration.

Theoretical linkage

We questioned whether the mediascapes could also support the students to think more deeply (Dummer et al. 2008), and to see theoretical links and relational connections as well as isolated observations *in situ*. Spronken-Smith (Harland et al. 2006, 98) writes in favour of this element of fieldwork: “By working closely with lecturers and peers, students can begin to understand how a geographer ... thinks. They can find out the sort of questions we ask and the methods we use to gather evidence. This modelling of good practice and the induction of students into the discipline, and often into the research culture, is an experience that could not possibly be captured in a lecture theatre”.

Many students commented that, by providing them with some background information on the more mundane, but often key aspects of Dublin, it helped them untangle some of the more complicated social and cultural themes of the field course. When we were constructing the ‘teacher-led’ mediascapes we were concerned that they perhaps contained too much information. However, the majority of students found this to be an effective way of interpreting a new city and used it as “a base of knowledge which we could then take and re-apply to other areas of the city”. Typical focus group feedback concerning the way in which the mediascapes promoted seeing links between ideas included the following points:

“The content of the mediascape reminded you of what you were looking for, allowing you to connect what you were seeing with what we had previously learnt from overview lectures, and putting it into context. The combination of the two worked well together, allowing your own interpretations, but also within the scope of the themes to relate it back to.”

“I think this encouragement to think about the observations whilst in the field meant that more insightful analysis was possible as the longer you spend looking for answers, the more likely you are to come up with theories and ideas.”

MOBILE LEARNING IN THE GEOGRAPHY FIELD COURSE

Before we consider what mobile technology and the use of mediascapes can contribute to learning in the field, it is important to note some of the limitations of the work we have described. Our evaluation and reflections are based on a single example of this field course, and therefore the evidence that we draw from is limited. While there is no doubt that repeating the field course a number of times, perhaps alongside versions of the field course run in a ‘lower tech’ form, would provide further evidence and deepen the statistical confidence/reliability in our observations, we feel able to make some indicative comments and recommendations based on our results.

Mobile technology applied in the form of the mediascape, heightened some aspects of student observation yet lessened others. More active participation with mediascapes appeared superior to more passive teacher guided tours in which students may feel more inhibited. The manner in which students picked up the teacher’s observational style, developed and built upon this in their own mediascapes, suggested that deeper learning took place. Students’ responses were strongly of the opinion that the mediascapes had helped draw their attention to urban features that they might well have missed on their own. Furthermore, while the development phase of building and refining the mediascapes required intense effort, this was offset in knowing that we were building a learning resource for years to come, that

offered students via mobile technology a small group tutorial effect. However, a potential drawback of using mediascapes was that the interface located students on the map, requiring less situated way-finding skills to be deployed, and hence potentially dulling the wider observational experience.

It is interesting to reflect on Dando and Chadwick's (2014) findings that the making of film, be this in the form of YouTube video or podcast, assisted the bridging of links between geographic theory and real world. Martin and Erzberger (2013, 78) suggested that "students doing fieldwork can acquire variety of information from the location they are visiting and reinforce the connection between the accessed information (theoretical knowledge) to the environment (situated knowledge)". Our findings support this assertion. Students are consumers of media, but are provoked by questions as to what, how, whom, where, when and why the processes they observe emerge. They also construct multi-media themselves through the assessment process of this field course, covered in more detail in Jarvis et al. (2013). It is difficult in this case to attribute this making of theoretical links specifically to either the consumption or making of multi-media. Similarly, it is difficult to disentangle the role of digital media generally to that of the location aware mobile technology used, but given that observations and associated questions are inherently place based the latter forms an appropriate vehicle for modelling the process of observing, especially in situations where the ratio of students to teaching staff is high (Leydon and Turner 2013).

Reflecting on the manner in which we scaffolded the learning experience, we acknowledge that our approach was relatively unsubtle. In our desire to avoid linear narrative and control the overall geography of exploration, we unwittingly facilitated an unintended

degree of micro-geographical influence on some students. We had identified the issue of over-dependence as a possible drawback of using mediascapes during the developmental stages of this project. We realised that if this technology was to be a successful pedagogic addition to the field course, student learning must develop from a more passive role to one of independent thinking and active participation. While overall, at a meta-level, the scaffolding of our mediascapes had a linear structure and sequence (in keeping with the Vygotskian concept), at the micro-level our over-riding desire to construct pedagogic resources that provoked an active exploratory response from the students overrode traditional scaffolding practice.

While it was never our intention to restrict the students' experience, noting Nelson et al.'s (1977, 97) point that "the observer must learn to treat everything he sees as potentially important", we acknowledge that the novelty of the mediascapes could have led to over-dependence on them. By over-scaffolding, made complex in this location aware mobile learning context, we had inadvertently dampened the level of 'concrete experience' of Kolb's (1984) experiential learning model. There is a need to emphasise more strongly that the mediascapes are intended as an aid or resource to enhance, not control, student learning experiences.

There was a clear suggestion that an affective component (Boyle et al. 2007) was present in the use of mobile technology. The exploratory, fun, gaming aspect of using a mediascape may have been lessened in a simpler version of an application that, say, played sample media on an iPod or tablet based upon a prearranged spot location on the map navigated to by the student. However, the use of the location-aware device forced students to

go exploring in order to receive input. It engendered an active rather than passive response to media. In this sense, the field-based media rich learning of our approach can be decoupled from the use of the technology.

The location-aware technology allowed the learning experience to adjust automatically to the physical surroundings in which the students found themselves. Arguably this is a more sophisticated than the students navigating to set points in the landscape and then playing audio or video materials. This ‘situated learning’ (Naismith et al. 2004) allows the movement through physical space to be simultaneous with travel through information space (Mountain 2012). A more advanced conceptualisation of our field course could allow additional social context in the form of technology-mediated communication to those teaching, facilitating enquiry at sites not currently encoded as mediascape regions. In practice, while students were equipped with mobile phones, non-urgent queries waited for discussions at teacher visits to consolidate knowledge for reasons of cost.

Overall, we feel that the many advantages of learning in field with mobile technology, specifically using mediascapes, outweigh the disadvantages provided that the initial investment in equipment and learning resource design time can be achieved. Certainly, giving students experience with mobile location aware technologies in general provides an authentic experience in regard to the types of skills that employers are increasingly expecting, a benefit that goes beyond the particular learning goals of a specific geography module.

CONCLUSIONS

Methodologically, we have used mobile technology in the form of a mediascape on a smartphone to visualize and synthesize intellectually challenging theoretical concepts about urban space in new, easily accessible ways. The approach adopted here, working across locational and sensory domains and using material based upon multiple perspectives, exemplified non-linear connectivity between places and times in a user-friendly manner. We discuss elsewhere (Jarvis et al. 2013) the benefits of the mediascape as an aligned assessment tool. Looking beyond this particular example, the potential of the mediascape for developing and communicating representations of understandings in an accessible manner is high both in a teaching and learning setting and for use as a methodological research tool.

By using mobile technology, our students were given the opportunity to experience Dublin in a novel way. Combining *in-situ* learning with spatially-accurate historical and contemporary multimedia, we developed a new approach to develop the students' observational abilities in context. The practical and intellectual meeting of two very different teaching teams, in human geography and GIS, was highly significant as regards the transfer of prior knowledge and effective and efficient building of the digital resources. We do not argue that just by adding technology students' skills will improve. However, we suggest that the careful use of technology facilitates small group learning in a context where this would otherwise not be possible, and illustrate how it advances the learning of observational skills in a fieldwork setting.

Mediascapes also took our students on a journey through time and space to show interweaving stories between people and places in a way that would have been difficult to

achieve within the context of a classroom-based lecture series. The order and nature in which these stories unfolded was very much down to the students' geographical exploration of their environment. Reflection on their observations and testing them in new situations all played a part in this abstract conceptualization. Further work remains to explore how we might moderate the degree of scaffolded learning within non-linear digital geographic environments, and to build deeper links into methodological concepts and opportunities relating to augmented and mixed reality.

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