

# Pathways to a Better World: Assessing Mobile Learning Policy against UNESCO Guidelines in a New Zealand Case Study

David Parsons

Massey University, Auckland, New Zealand  
D.P.Parsons@massey.ac.nz

**Abstract.** The UNESCO policy guidelines for mobile learning are intended to guide governments, educational institutions and other relevant organisations in the integration of mobile learning into education policy. Their main goal is to support and enable teaching and learning through the safe, affordable and sustainable use of mobile technologies. Like all policy guidelines, they are open to interpretation in practice, to be adapted to local contexts and conditions. Whilst they are primarily designed to assist developing nations without mature policy implementations, it is useful to benchmark them against possible exemplars in developed nations. This can help to reveal deeper issues in policy formulation that can assist policymakers in other contexts. It can also enable those nations with policies already in place to compare them with global best practice. This paper reports on a study based on a series of in-depth interviews with policy formulators and implementers in New Zealand. Interviewees were asked to reflect on the UNESCO guidelines in the light of the New Zealand experience of pioneering mobile learning policies. The results of this study reinforce many of the assumptions of the UNESCO guidelines, but also provide some insights into detailed aspects of mobile learning policy that are not explicit in the guidelines, yet may be of value to policymakers in other international contexts.

**Keywords:** UNESCO, Mobile learning policy, New Zealand, case study, interview data.

## 1 Introduction

Policy formulation works on many levels. It can range from the minutiae of internal organisational regulation, which at its worst reduces flexibility and innovation, and stifles creativity, to the visionary plans that embody our ideals for the future, and provide us with pathways to a better world. This article deals with the latter.

The UNESCO M-Learning Policy Guidelines Project was established to guide governments, educational institutions and other organizations in the integration of mobile learning into education policy. The main goal of the project was to support and enable educational delivery through the safe, affordable and sustainable use of mobile technologies. The “UNESCO policy guidelines for mobile learning” document that emerged from the project was authored by Mark West and Steven Vosloo of

UNESCO, but contributors to the policy guidelines came from more than twenty countries [1]. The guidelines themselves are intended to be broadly applicable to all levels of educational delivery and all nations, but of course the expectation is that the guidelines will be tailored to local contexts when being used to formulate policy. They are intended in particular to assist the implementation of policy in developing countries. However it may be helpful to examine current policy in developed countries as a way of evaluating how the policy guidelines relate to current practice. The guidelines are still in the process of gaining widespread visibility, but are likely to be increasingly used by policy makers across the world, so empirical investigation into the relationship between the policy guidelines and local policy implementation can provide us with valuable insights into their utility. This paper looks at mobile learning policy in New Zealand as a case study, interprets each of the UNESCO policy guidelines in the light of the local context, and explores to what extent the guidelines are currently embedded in national and local policy.

## 2 Research Methodology

The case study discussed in this paper addresses how mobile learning policy in New Zealand reflects the UNESCO guidelines. Since these guidelines address policy at both national and local level, and are intended for a range of different institutional types, the study investigates policy in the national government, local government, educational institution and commercial organisational contexts. A purposeful sample of policy makers and other relevant stakeholders (partly selected via snowball sampling) was chosen from a range of stakeholder institutions, and each of these representatives was interviewed using a semi-structured interview. Each of these interviews took approximately one hour, and was conducted face to face at the interviewee's place of work, where possible (6 interviews.) Where the interviewees could not be met face to face due to location, they were interviewed either by video call (2) or by telephone (1). Table 1 shows the interview subjects who kindly contributed to this study. Where direct quotes appear in the text, they are referenced by the name of the sector they represent.

The investigation process took a naturalistic, positivist approach, in that the emphasis of the questions was on the social realities of policy, primarily addressing 'what'-type questions with a fixed set of enquiries. A standard iterative analysis was applied to the data, beginning with data reduction (the interviews were recorded, transcribed and coded in NVivo) then seeking meaning through data display (supported by NVivo tools), and finally drawing some conclusions from the data [2].

In the interviews, the stakeholders were asked to comment on each of the main aspects of the UNESCO mobile learning policy guidelines. In each case, a statement was provided, based on summarising elements of the guidelines, and the interviewees were asked to comment on these statements in terms of (a) whether or not they agreed with the statements and (b) how they felt these statements were, or were not, reflected in their own experiences or professional opinions of mobile learning policy. The statements were:

1. That governments should create or update policies related to mobile learning within existing ICT in education policies. These policies should avoid blanket prohibitions of mobile devices.
2. That teachers are trained to incorporate mobile technologies into pedagogical practice.
3. That curriculum, educational resources and lesson plans are available to teachers via mobile devices.
4. That incentives are created for developers to build learning content specifically for mobile devices, including for local groups and languages
5. That gender equality is ensured for mobile students by encouraging women and girls as well as men and boys to leverage mobile technology for learning.
6. That connectivity options are expanded and improved while ensuring equity.
7. That strategies are developed to provide equal access for all, involving BYOD or central provision.
8. That safe, responsible and healthy use of mobile technologies are promoted, including digital citizenship and management of potential health risks.
9. That mobile technology is used to improve communication and education management, including the collection of educational information following a conflict or disaster.
10. That awareness of mobile learning is raised through advocacy, leadership and dialogue

In cases where the interviewees requested more detail on the statements, relevant extracts from the policy guidelines were referred to.

**Table 1.** Interviewees who contributed to the study

<b>Sector</b>	<b>Representative</b>
National government (Ministry of Education)	Howard Baldwin (Manager, Sector Engagement)
School (Orewa College)	Kate Shevland (Principal) Mark Quigley (Deputy Principal)
Commercial service provider (Isometric Solutions)	Conrad Stewart (Managing Director)
Educational trust (Manaiakalani Trust)	Dorothy Burt (Professional Learning Programme Leader)
Educational researcher (University of Waikato)	Noeline Wright (Senior Research Officer)
Crown agency (Network 4 Learning)	John Hanna (CEO)
Industry organization (NZTech)	Candace Kinser (CEO)
Local government organization (Auckland Tourism Events and Economic Development)	Brett O'Riley (CEO)

### Research Model

Figure 1 shows a research model derived from aspects of policy that appear in the literature. Policy guidelines may come from a number of sources. In this paper we focus specifically on the UNESCO guidelines, but there have been other examples [e.g. 3]. “The impact of mobile learning...has both shaped and been formed by national and [regional] policy” [4 p.14], thus existing practices and policies influence future policy formulation. Variations in context may also shape policy, for example in the United States ‘Education leaders, perhaps sensing limited public or policy support, have not yet developed a strategy on how mobile learning should be deployed, or even if it should be used at all.’ [5 p.5]. The research model was used to guide the coding process that was used to analyse the interview data, identifying how guidelines, policies/practices and contexts have informed, influenced and shaped policy formulation, and how policies, driven by that process, are enacted in practice.

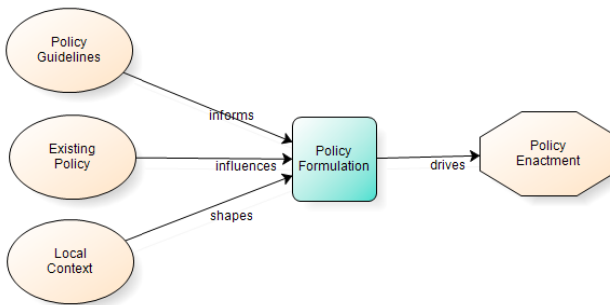


Fig. 1. Research model of mobile learning policy

### 3 Analysis

In this section, each of the main interview questions are addressed in turn, with related analysis themes explored in detail and illustrated with the voices of the interview subjects. However it is interesting to begin by reflecting on the result of a word frequency analysis of the interview data, which is shown in Figure 2. Whilst this is just an impressionistic view of the data, it nevertheless emphasises that policy is, in the end, all about people, and that thinking about schooling, and what we hope to achieve through it for our future citizens, is how policy is ultimately formed.



Fig. 2. Most frequent words from the interview data

### 3.1 Creating or Updating Mobile Learning Policy

The first interview question related to whether governments should create or update policies related to mobile learning, and if these policies should avoid blanket prohibitions of mobile devices. The main themes that emerged from this question were differing philosophical viewpoints, with both global and local forces acting on policy.

Although there was general consensus that governments should create or update mobile learning policies, the assertion that they should avoid blanket prohibitions of mobile devices raised some debate from different philosophical viewpoints. There is an argument, based on freedom of choice, that neither prohibition nor compulsion of mobile devices is appropriate.

*“Should they mandate the use or mandate the ban? I don't think either position is healthy.” – Crown Agency*

Some schools in New Zealand have had explicit bans in the past [6], though it is not clear how many (if any) schools still have complete prohibition. On the other hand, there was also recognition that blanket bans are in some contexts a means of repression.

*“If the government say you can't have a mobile device for the Internet, because then you'll know what's going on in the country, that's an issue” - School*

There was also recognition that there were global changes that might impact local policy, but also an increasing emphasis on local, rather than national, action as the driver of policy change.

*“That's all been taken out of the hands of government. People are just using things and so I think it's not a government policy ... a local policy, perhaps” - School*

Nevertheless, local policies that have been enacted are often derived from common templates provided by relevant organizations. In New Zealand, NetSafe [7] has developed a set of policy templates that schools can adapt to their own needs. These policy templates cover cyber safety policy and use agreements for staff and students at different school levels (primary, intermediate and secondary.)

*“A lot of schools start their policies off a NetSafe one because they can generate one quite quickly ... very generic but it's New Zealand generated.” – Commercial Service Provider*

### 3.2 Teacher Training with Mobile Technologies

The analysis of the policy guideline that teachers should be trained to incorporate mobile technologies into pedagogical practice focused mostly on digital skills requirements and their impact on teacher training institutions. This aspect of policy was seen as particularly important by many of the interviewees, though the term ‘teacher education’ was felt to be more appropriate than ‘teacher training’ by our educational

researcher. A point that was made by more than one interviewee was that common assumptions about young people having good digital skills due to being ‘digital natives’ are incorrect, and that, in fact, new student teachers are likely to enter (and possibly leave) their professional education with traditional, conservative views of teaching, and poorly developed digital skills, despite their familiarity with social media.

*“You get the new grads who come in and, because they're on Facebook all the time, think they know all there is to know” - Educational Trust.*

*“[the students] seriously speak out now about how frustrating it is to have a teacher come in front of them in February and not know how to run a digital learning environment for them” – Educational Trust*

*“[new teachers are] good at the social media, games that sort of thing, as are all young people that we employ probably, but actually using it in a more constructive way needs training”- School*

A number of solutions to this problem, some of which are already being piloted, were proposed to address this problem.

*“One of the programs that we run is for ordinary teachers in our schools...2 day intensive blocks in the holidays, we learn after school, we support them in their classes” – Educational Trust*

*“We didn't get funding from the ministry but Google gave us a significant amount of money ... we've taken 10 beginning teachers ... they are going through a digital immersion programme” - Educational Trust*

*“Selecting out master teachers...if you want to be a teacher you actually get apprenticed to one of them...it changes the whole nature of how we train teachers” - School*

*“The new Masters of Teaching for instance, that this university's just begun as a pilot, one of the underpinning things is about digital literacy” - Educational Researcher*

From these concepts a theme of institutional change emerged to balance the rapid evolution of digital skills requirements in the teaching profession. In particular, it can be seen that new concepts in teacher education are being developed.

### **3.3 Educational Resources Available through Mobile Devices**

This aspect of the policy guidelines states that curriculum, educational resources and lesson plans should be made available to teachers via mobile devices. A number of perspectives on this guideline emerged from the interviews. While it was generally acknowledged that resources should be made available through mobile devices, a number of subjects felt that this was in most cases just an extension of materials being available in digital formats, regardless of whether a mobile device was used to access the material.

*“The curriculum in New Zealand and educational resources are available already online so that makes them available via mobile devices” - Educational Researcher*

The issue of local context was important in this particular question, since it was felt that making specific curricular material available was more relevant in countries with fixed materials for a national curriculum, and not in countries where teaching content is more locally managed.

*“In some other countries there's much more central provision of curriculum resources” – School*

There was also some scepticism of the value of making lesson plans available.

*“A lesson plan is only as good as the teacher teaching it and the class you're teaching it with, so a lesson plan is never a Silver Bullet.” – Educational Researcher*

The issue of creative commons was also raised. This was seen as important by a number of interviewees to ensure that the correct copyright status was conferred on shared material.

### **3.4 Incentives to Develop Learning Content**

The analysis related to the guideline that incentives are created for developers to build learning content specifically for mobile devices, including for local groups and languages, centred mainly on the conflicting pressures of cost and quality. In New Zealand, the issue of local language is perhaps more important than in many other countries, due to the status of the indigenous Māori language, Te Reo, and the support of Māori language learning is of strategic importance to education in New Zealand [8]. Fishman stresses the role of technology in sustaining indigenous languages [9], and significant efforts have been made to develop mobile learning tools for the Maori language [10].

In their responses, the interviewees highlighted the issues of cost versus quality (including local relevance.) There are clearly a number of forces at play in this area which make for complex decision making. On the one hand, the move towards everyone publishing themselves using social media and Web 2.0 tools has led to a common perception that content should be free.

*“People have the mind-set that you can get everything for nothing and why would I pay? ... it's not that people can't afford it but we become accustomed to thinking it's like air, why would you pay for it?” – School*

However, a problem with free resources is that they often lack the quality control processes that would be put in place by a professional publishing house.

*“If you look back at the current model of producing resources...what comes out the other end is something that's suitable for lots of people. When you've got an individual producing something ... those checks and balances are not in there any more.” – School*

Perhaps as a result of the competition between free and purchased content, and the pressures on traditional publishers to compete by migrating their content to digital formats, new online forms of content delivery have become relatively more expensive:

*“The school has a \$10,000 spend a year, say, on textbooks, where we get five years of use. The model the publishers are talking about at the moment is ‘we’ll give you access to our textbook for one year and then it disappears’, which adds up to a lot more than \$10,000, much more expensive.”* – School

Thus there are competing pressures in the area of content generation, and it is clear that market forces alone may not deliver all that is required. This is particularly true where minority culture and languages need to be sustained and promoted.

*“We need to ensure that the unique elements of New Zealand’s culture are reflected in content.”* – Ministry of Education

This may mean that targeted incentives will be required to support digital content in minority languages, if market forces will not deliver these resources.

*“If the cash is predominantly English or Mandarin the developers and content producers will go where the cash is. From an equity perspective...maybe there needs to be some incentives for content developers and producers to deliver in as many languages as the world thinks is appropriate.”* – Crown Agency

### **3.5 Gender Equality**

The guidelines recommend that gender equality is ensured for mobile students by ensuring women and girls as well as men and boys can leverage mobile technology for learning. Although all respondents supported the concept of gender equality in principle, there were some views on specific contexts and aspects that were highlighted. A number of the interviewees noted that the introduction of BYOD into schools has addressed some aspects of the digital divide through access to ICTs. This theme was certainly picked up by some of the interviewees, for example regarding the effect in the classroom of each child having their own device, removing any digital access divide that might have previously existed.

*“All the girls having digital device...being in charge”* – Local Government Organization

Device access is not, of course, the only digital divide. Possession of ICT is “not only a matter of material resources but also of the attractiveness of this technology and the necessary skills to use it among people of different age and gender” [11 p.319]. The potential attractiveness and new affordances of mobile technology, specifically to female students, compared to older industrial images of technology, was noted in some of our interviews.



*“It is different with something like mobile technology which is I guess ‘cleaner’ and maybe lends itself to more visual thinking” - School*

A common response from the interviewees was that in New Zealand schools, gender inequality was not a distinct challenge, at least when compared to socio-economic inequalities, which were generally seen as more pressing. Indeed it is recognised from previous research that gender inequality in information technology in education varies from country to country. For example Reinen and Plomp [12] noted that the United States and Bulgaria were, for different reasons, much more gender equal in ICT education than many other nations. New Zealand was not included in their data but would likely follow the United States’ model (e.g. in terms of home access to computers and female role models) and be more gender equal than many other nations.

If gender imbalance was seen to be being addressed in a positive way for female students, there was also a potential down side. One interviewee commented that girls seemed to be increasingly doing better than boys in some schools.

*“It seems to be the boys who’ve got more barriers at co-ed schools” – Educational Trust*

This idea has certainly gained a lot of traction in recent years in a number of countries. In the UK, for example, there is concern at the underachievement of boys in national assessments [13]. Evidence from the OECD suggests that this is certainly the case in some subjects. However the picture is different when we focus on engineering and science, or higher degrees; “Efforts to increase mathematics and science performance among girls...can promote gender equality even further in education. Meanwhile, initiatives to break down gender stereotypes in fields of study and progressive corporate policies can increase women’s employment opportunities.” [14 p.4].

In fact the issue of gender inequality once female students leave school and enter the workforce was raised as more significant by some of the interviewees.

*“At a senior management level, the fortune 100 technology companies, less than 12 or 13 CEOs are female, 10% roughly, whereas I know at that level there’s got the be women in industry who are capable.” – Industry Organization*

This issue is of course not confined to the boardroom; “The lack of women in leadership positions is only a reflection of the low numbers of women in the sector overall” [15]. Recent international studies in the literature regarding women in the IT workforce are limited but there are many country specific studies that are illuminating. For example a study of ICT training in the UK suggested that education alone will not address the masculine norms of the IT industry, and will thus not remove barriers to participation [16].

*“The digital divide between genders tends to be around computer science and programming [we need] to make things more open for women to get involved in coding and application software development.” – Ministry of Education*

### 3.6 Connectivity and Equity

The UNESCO guidelines recommend that connectivity options are expanded and improved while ensuring equity. In New Zealand, currently, a large scale government initiative to roll out broadband access to all schools is already well under way, such that it is possible to state that:

*“No matter where you are you going to get fibre, you going to get your network upgraded, you are going to have a wireless overlay, and the next bit of the puzzle is Network for Learning”* – Ministry of Education

This resonates with a common view that access to ICTs is becoming as much of a basic human right as many other aspects of modern societies.

*“Technology should be a right that we are able to extend access to much in the same way as health care and education”* – Industry Organization

It was, however, noted by more than one interviewee that a number of initiatives that have taken, or are taking, place rely on some kind of short term investment funding.

*“Subsidies are unsustainable over the long run”* – Local Government Organization

*“Hopefully [the teacher training initiative] will backfill into the teacher training system because certainly what they're doing is not a sustainable, affordable program”* – School

The analysis for this theme suggests that equitable access to mobile learning asks serious questions about socio-economic inequalities in wider society, and whether equality of access can not only be provided but be sustained over the longer term.

### 3.7 Equal Access Strategies

The UNESCO guidelines suggest that strategies are developed to provide equal access for all, which may involve various strategies for putting mobile devices into the hands of learners, whether that is based on a Bring Your Own Device (BYOD) approach, a leasing model, or some kind of centralized provision. The type of provision of mobile devices will have an effect on the nature of the activities that can be undertaken using them [17]. Thus decisions need to be made about the purpose of a BYOD programme when deciding on what types of device should be allowed, recommended or mandated. Having an open policy may potentially lead to difficulties in effectively delivering the curriculum.

*“You may paint yourself into a corner if you’ve not got a good enough device. Does that mean that the teaching has to go to the lowest common denominator?”* – Commercial Service Provider

However the main issue of BYOD is an economic one, so schools may feel the need to allow a mix of devices for financial reasons.

*“BYOD has got a bad name .... the schools call it ‘device for learning’ just because it seems to have got negative connotations...parents have to pay for a device” - Commercial Service Provider*

While BYOD approaches come with their own challenges, alternative models, where devices are controlled and managed by the school, may result in a lack of flexibility, and excessive management demands on the school’s ICT support infrastructure.

*“You buy the computer from the school, it’s a specific model, it gets attached to the domain. That’s not BYOD any more, that’s a domain computer and it’s controlled by the school” - Commercial Service Provider*

One positive development as schools group together into larger clusters to negotiate procurement is that some economies of scale or even marketing power may become evident.

*“We purchase more devices per year than [large individual schools] do and we have gone from being the amusement to having Apple come to us saying can we loan you 2 classes of iPads because you’re not using our devices” – Educational Trust*

The analysis of this theme reveals that there are a number of different access models, and that cost issues may impact on parents, students and teachers in different ways, with no single model providing all the answers.

### **3.8 Safe, Responsible and Healthy Use of Mobile Technologies**

The guidelines recommend that safe, responsible and healthy use of mobile technologies be promoted, including digital citizenship and management of potential health risks. This recommendation therefore covers both social and physical concepts of safety. A number of issues were raised by the interviewees around cyber safety. One of the more interesting comments was that the whole concept of ‘safety’ did not resonate with school students, and that other approaches had to be taken.

*“We don’t like to use ‘safe’ because no child feels unsafe about anything; sex, drugs, the internet...kids just can’t conceptualize any reason to be unsafe so we talk about being ‘smart’” – Educational Trust*

Further, digital citizenship was defined as being much broader than just issues of on-line safety.

*“Digital citizenship is more than just safe and responsible use. It’s actually being deeply critical and aware of what’s out there and how other people use these things” - Educational Researcher*

In addressing potential health risks, there were frequent references to relying on expert advice on the safety or otherwise of technologies such as Wi-Fi networks. The issue of personal choice was also raised in this context, in that any parent who wished to send their child to a school where they were not exposed to electromagnetic radiation should be free to do so. In one New Zealand school, parents have campaigned successfully to have Wi-Fi removed due to fears about possible cancer risks [18]. However, a number of interviewees raised the inescapable issue of background levels of electromagnetic radiation that would be beyond the control of schools even if they did not install their own wireless networks. These may occur both at home and in the general environment, even in schools where there is no on-site wireless network.

*“Parents have far more dangerous devices going on in their homes than is happening in the schools” - Educational Trust*

*“At [...] school there is something which affects their wireless and it’s just this massive band of frequency ... so even if that school had no wireless network, students are still getting it. There’s not a lot that they can do.” – Commercial Service Provider*

### **3.9 Mobile Communication and Management**

The guidelines recommend that mobile technology is used to improve communication and education management, including the collection of educational information following a conflict or disaster. Not surprisingly, this particular aspect of the policy guidelines resonated strongly with New Zealand stakeholders as a result of the Christchurch earthquake in 2011. In the aftermath of the disaster, all schools were temporarily closed, and all the students from nine of the city’s 163 schools had to be relocated to other local schools because their own schools were too badly damaged to reopen [19]. In addition, over 1,000 school students became ‘refugees’ in the neighboring region of Otago, with others dispersed to even more distant areas of the country [20].

*“The problem of schools having all of their material on site, and those sites then becoming inaccessible for periods of time” – Ministry of Education*

*“The continuity of education in Christchurch showed good role models on how some schools managed really well because they did have their work out there on the web, in the cloud, and others didn’t” - School*

ICT can contribute positively in post-earthquake recovery by enabling civic participation [21]. The same effect is observable in educational participation.

*“Even if the school itself wasn’t functional the teacher was functioning” – Local Government Organization*

It was also felt that some broader education was needed around public use of communication resources during a disaster:

*“Maybe some policy around citizens’ behaviour, mobile device behaviour, in the event of a disaster, to ensure that the network’s going to support the communications needs associated with a disaster.”* - Crown Agency

### **3.10 Advocacy, Leadership and Dialogue**

The need for awareness of mobile learning to be raised through advocacy, leadership and dialogue was acknowledged by all of the interviewees. Indeed, many of them saw a major part of their role as addressing this aspect of policy. Perhaps the most important aspect of dialogue highlighted during the interviews was that which takes place between schools and parents.

*“You have to involve parents really early, have to talk to them and meet them and discuss, because all of those questions about policies come up. How are you going to filter the Internet? How are you going to deal with broken devices or stolen devices?”*  
– Commercial Service Provider

One of the most interesting responses that emerged around advocacy and leadership was the way that it is often the students, rather than the staff, who demonstrate this in the classroom:

*“They start sharing with each other, they start helping each other, those different experts arise in the classroom”* – Educational Researcher

## **4 Conclusions**

This paper has reported on the results of an interview-based study designed to benchmark mobile learning policy in a developed, innovative nation against the UNESCO mobile learning policy guidelines. The intent of this study was to gain new insights into how generic policy guidelines may be implemented in practice, and to reveal subthemes in the guidelines that will inform policymakers wishing to promote mobile learning in different national and cultural contexts. The study reaffirms some core recommendations, such as the need to introduce the use of mobile devices into teacher education and the importance of maintaining equity. However the study also reveals that, in some cases, the promotion of mobile learning may have to be balanced with opposing principles such as user choice. The conflicting demands of cost and quality have also emerged in more than one context, including the provision of mobile devices and the sourcing of digital educational resources. It is therefore one role of policy to ensure that market forces alone do not dictate practice, for example by ensuring that indigenous language learning resources are provided. Further, some positive aims of the policy, for example promoting gender equality, may prove to be highly complex in practice due to specific local conditions. Throughout the analysis, it is clear that in most cases, while the recommendations are seen as positive and worthy in their

intents, the detail of policy on the ground will need to deal with conflicting demands, philosophies and constraints. It is hoped that the New Zealand experience will be informative for other policy makers around the world and help prepare them for building pathways to a better world.

**Acknowledgments.** The author wishes to thank the interviewees who contributed their knowledge and experience to this article.

## References

1. UNESCO: Policy guidelines for mobile learning, <http://unesdoc.unesco.org/images/0021/002196/219641e.pdf>
2. Folkestad, B.: Analysing Interview Data: Possibilities and challenges. Eurosphere working paper series 13, [http://eurospheres.org/files/2010/08/Eurosphere\\_Working\\_Paper\\_13\\_Folkestad.pdf](http://eurospheres.org/files/2010/08/Eurosphere_Working_Paper_13_Folkestad.pdf)
3. Naismith, L., Lonsdale, P., Vavoula, G., Sharples, M.: Literature Review in Mobile Technologies and Learning, Futurelab Report 11, [http://telearn.archives-ouvertes.fr/docs/00/19/01/43/PDF/Naismith\\_2004.pdf](http://telearn.archives-ouvertes.fr/docs/00/19/01/43/PDF/Naismith_2004.pdf)
4. Kukulska-Hulme, A., Sharples, M., Milrad, M., Arnedillo-Sanchez, I., Vavoula, G.: Innovation in Mobile Learning: A European Perspective. *International Journal of Mobile and Blended Learning* 1(1), 13–35 (2009)
5. Shuler, C.: Pockets of Potential: Using Mobile Technologies to Promote Children’s Learning. The Joan Ganz Cooney Center (2009), [http://www.joanganzcooneycenter.org/wp-content/uploads/2010/03/pockets\\_of\\_potential\\_1\\_.pdf](http://www.joanganzcooneycenter.org/wp-content/uploads/2010/03/pockets_of_potential_1_.pdf)
6. Wright, N.: e-Learning and implications for New Zealand schools: A literature review. *Education Counts* (2010), <http://www.educationcounts.govt.nz/publications/ict/e-learning-and-implications-for-new-zealand-schools-a-literature-review/pedagogy-and-e-learning>
7. Netsafe: Policies and Use Agreements (2010), [http://www.netsafe.org.nz/keeping\\_safe.php?pageID=81&sectionID=education&menuID=81](http://www.netsafe.org.nz/keeping_safe.php?pageID=81&sectionID=education&menuID=81)
8. Māori Language Commission: Promoting Positive Attitudes to the Māori Language in the Classroom (2000), [http://www.tetaurawhiri.govt.nz/english/pub\\_e/classroom/booklet.shtml](http://www.tetaurawhiri.govt.nz/english/pub_e/classroom/booklet.shtml)
9. Fishman, J.: What do you lose when you lose your language? In: Cantoni, G. (ed.) *Stabilizing Indigenous Languages*. Northern Arizona University (2007)
10. McKenzie, T.: The Challenges and Opportunities of Using Mobile Devices to Attain Māori Language Proficiency. Victoria University of Wellington PhD Thesis, <http://researcharchive.vuw.ac.nz/xmlui/bitstream/handle/10063/3291/thesis.pdf>
11. van Dijk, J., Hacker, K.: The Digital Divide as a Complex and Dynamic Phenomenon. *The Information Society* 19, 315–326 (2003)

12. Reinen, I., Plomp, T.: Information Technology and Gender Equality: A Contradiction in Terminus? *Computers & Education* 28(2), 65–78 (1997)
13. Paton, G.: GCSE results 2013: Girls stretch to record lead over boys (2013), <http://www.telegraph.co.uk/education/educationnews/10260163/GCSE-results-2013-girls-stretch-to-record-lead-over-boys.html>
14. OECD. Education Indicators in Focus, <http://www.oecd.org/education/skills-beyond-school/49986459.pdf>
15. Henderson, J.: Is NZ hi-tech industry starting to address gender imbalance? *Techday* (2014), <http://techday.com/it-brief/news/is-nz-hi-tech-industry-starting-to-address-gender-imbalance/183082/>
16. Gillard, H., Mitev, N., Scott, S.: ICT Inclusion and Gender: Tensions in Narratives of Network Engineer Training. *The Information Society* 23, 19–37 (2007)
17. Wenmouth, D.: Thinking about BYOD, <http://blog.core-ed.org/derek/category/mobile-technologies>
18. National Business Review: Manawatu school removes wi-fi over cancer fear, <http://www.nbr.co.nz/article/manawatu-school-removes-wi-fi-over-cancer-fear-ck-150478>
19. Ham, V., Cathro, G., Winter, M., Winter, J.: Evaluative study of co-located schools established following the Christchurch earthquake. *Education Counts*, <http://www.educationcounts.govt.nz/publications/schooling/115174>
20. Lewis, J.: 1010 refugee pupils swell schools' rolls. *Otago Daily Times*, <http://www.odt.co.nz/regions/otago/150423/1010-refugee-pupils-swell-schools-rolls>
21. Mitomo, H., Otsuka, T., Jeon, S., Cheng, J.: The role of ICT and mass media in post-disaster restoration and recovery progress: A case of the Great East Japan Earthquake. In: 24th European Regional Conference of the International Telecommunication Society (2013)