

A model for the implementation of digital examinations: New Zealand's vision for digital assessment

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Abstract

In New Zealand, as in many other countries, technology has permeated all facets of life and the New Zealand education sector is also realising the benefits of a connected world. Practices such as Bring Your Own Device (BYOD), the flipped classroom, blended learning, and other technological changes are becoming commonplace in New Zealand schools, and these are impacting on pedagogical practice. Changing practices in teaching and learning are creating the stimulus to change national assessments to better reflect what is happening in schools and classrooms.

The New Zealand Qualifications Authority (NZQA) manages assessment for the national senior secondary school qualification in New Zealand, the National Certificate of Educational Achievement (NCEA). The structure of the NCEA and the context in which it operates, present some unique challenges for NZQA as it looks to develop and implement a digital assessment model.

NZQA's vision is to have an assessment system that can be accessed by any learner, anywhere, anytime, online and on demand. This will present some interesting challenges for NZQA, for the secondary education sector in New Zealand and for the wider community.

In undertaking such a project, NZQA will be drawing on a wide range of research and the experience of various educational jurisdictions. This paper outlines the challenges and issues that NZQA faces as it embarks on its journey to change the face of national assessment in New Zealand.

Keywords: computer based examinations, standards based assessment, NCEA

Introduction

Innovation, creative use of resources, highly trained professional teachers and a wide and balanced curriculum are features of the New Zealand education system. These elements, combined with a revolutionary secondary school assessment system, have contributed to an education system that is ready for the challenges of the 21st century. The increasing use of technology in schools has opened up new opportunities for student learning and innovative teaching practice. It is within this context that the New Zealand Qualifications Authority (NZQA) has begun the process of moving from Paper Based Examinations (PBE) to Computer Based Examinations (CBE). The change to CBE is only the first step in a bold move to create an environment in which students will be able to undertake their external assessment anywhere, anytime, online and on demand.

Each year NZQA manages the end of year examinations, It is an intensive activity for the entire sector, which draws considerable media and political attention and has an adverse effect on teaching programmes. The ultimate aim for NZQA is to reach a point where candidates can undertake external assessment when they are ready, which will mean the end of year examinations will cease eventually, thereby removing the need for schools to constrain their programmes to a calendar year. Potentially, this action alone could revolutionise the way schools are structured and should enable more personalised learning. Removal of the end of year examinations will also remove the need for the hugely expensive and intensive examination exercise conducted each year.

This paper outlines the challenges and issues that NZQA faces as it embarks on this journey.

The Nature of the Context

Computer technology has already permeated New Zealand society to the extent that it is arguably now indispensable in the way individuals work, play, think and communicate. The tension this integration creates is clearly seen in the education sector as schools and teachers struggle to maintain their perspective of a quality teaching and learning environment in the face of massive technological change.

Many schools have introduced a BYOD programme and begun the process of introducing new pedagogical approaches based around the use of technology to enhance student learning. However, many secondary schools in New Zealand are reluctant to move to new technology on a wholesale basis for various reasons, including the fact that NCEA examinations are paper-based.

One school can be used as an example of the issues schools are confronting in this context. This school is based in a very low socio-economic area in Auckland (New Zealand's largest city) and has been making extensive use of technology in their teaching and learning programmes for over three years. Students make wide-ranging use of blogs, google docs and e-portfolios within the context of a student driven learning programme and they rarely, if ever, use pen and paper. The problem for the school is that they have to train their students in the use of pen and paper in order for them to undertake the NCEA examinations that occur at the end of a calendar year.

In moving to a fully digital examination environment, the context for implementation needs careful consideration. Firstly, the New Zealand community places a high value on examinations and sees them as a critical component of the educational environment. The merits or otherwise of society's attitude towards external examinations is not the focus of this paper and can be debated elsewhere. It is sufficient to state that the examination process is considered a high status activity; it is highly visible and attracts significant media, political and public scrutiny.

The second contextual element requiring consideration is New Zealanders' attitudes towards technology. While, in general terms, New Zealanders tend to embrace new technology, many appear to have an inherent distrust of it. Incidents such as network crashes and issues relating to the implementation of large scale technology projects (especially in Government departments) have done little to assuage this general feeling of distrust.

New Zealand schools operate under a policy referred to as Tomorrow's Schools which was developed late last century. Under this policy schools became self-managing entities and many of the responsibilities for the running of schools were devolved away from a central agency.

New Zealand also has a National Curriculum that sets out the learning objectives in eight essential learning areas. A learning area is a grouping of subjects and all eight learning areas are compulsory through to Year 10.

Complicating the process for NZQA is the unique qualifications system that was implemented in 2002. New Zealand's national qualification is the National Certificate of Educational Achievement (NCEA), which is undertaken at three levels. Typically, candidates complete Level 1 in year 11 (15-16 years old), Level 2 in year 12 (16-17 years old) and Level 3 in year 13 (17-18 years old).

Assessment is standards based with a mixture of internal (school-based) and external assessment. A standard is a discrete statement derived from a specific learning objective in the New Zealand Curriculum. The statement establishes the skill or knowledge the candidate is expected to demonstrate in order to meet the standard.

The statement is supported by a series of explanatory notes that unpack the requirements of the standard within an assessment context. Each standard has a credit value associated with it and each level of NCEA is based on the aggregation of credits at that level or higher. Assessment activities are based upon a standard, or collection of standards, and each standard is assessed on a stand-alone basis. The standards at a level are not moderated against one another but are derived from the same curriculum level. A typical subject will have three externally assessed standards and up to six internally assessed standards at each level.

Student performance against a standard is judged qualitatively using three ascending achievement grades, the criteria of which are explained within the standard. A student can attain a standard with Achievement (A), Merit (M) or Excellence (E) or if they fail to meet the standard they are given the grade of Non-Achieved (N)

Schools are able to construct courses that are assessed using standards from a range of subjects.

External assessment is undertaken at the end of a calendar year and the most common modes are a written examination or portfolio submission. A small examination team for each subject and level is contracted by NZQA to develop an examination that assesses no more than three standards. Each standard that is assessed in an examination is usually marked by a separate marking panel.

Examination papers use constructed responses, extended paragraphs or essays through which the student can demonstrate what they know and can do. NCEA examination papers do not use multichoice questions.

For internal assessment, schools and teachers are free to use suitable assessment methods and contexts that they feel are most appropriate for their students. NZQA manages a national moderation system to ensure the internal assessments are at the national standard. In this process, schools send samples of student work for each subject, along with the assessment documents, to a moderator who completes a report back to the school and to NZQA. The

school is expected to act on any findings in the report that relate to their assessment practice or to the student work in relation to the national standard.

The NCEA is based on the fundamental premise that a student who can demonstrate a specified skill or aspect of knowledge to an appropriate standard should receive recognition for it. The recognition is granted regardless of how many other students can also demonstrate the same skill or knowledge, or how many students can demonstrate it better.

Implementation of the NCEA required a paradigm shift in both the education sector and the community. Even though the NCEA is over 10 years old there are still segments of the education sector and the community who have yet to realise how different the NCEA is from previous examination systems. NZQA is proposing to make changes to an examination system that the community hold to be very important, even though there might not be universal acceptance of how it functions. And these changes are going to use technology that segments of the community are sceptical about.

The Nature of the Client

There has been significant social comment and research around the nature of young people in the 21st century and their use of technology. Isabel Nisbet, when she retired as head of Ofqual, (The Office of Qualifications and Examinations Regulation, UK) called for a change away from the traditional pen and paper examinations. She described pen and paper examinations as “invalid” for digitally native students (Times Educational Supplement, 2011). Prensky (2001) refers to those who have grown up with the technology as “digital natives”. They can *parallel process multitask* and see the technology as a “friend”.

Don Tapscott (2012) maintains that

This is the first generation of people that work, play, think and learn differently than their parents.... They are the first generation not to be afraid of technology. It's like air to them.

Jerry Adler from Wired magazine discussed those born after 1993. He referred to them as the Nisei of cyberspace

...the first generation born into a world that has never not known digital life and so never had to adjust to it as the rest of us settlers have. Like all Nisei, they understand the new world in ways their parents never will and speak its language with far more fluency. If you want to understand the past two decades, they are perhaps the perfect subjects. The drumbeat of disruption and technological advance that has defined the past 20 years is their natural rhythm.

Manafy and Gautschi (2011) described digital natives as preferring to receive information quickly from multiple sources and from pictures, sounds and video before text. They preferred to interact in real-time, use hyperlinks and undertake learning that is instant, relevant and fun. Digital natives are also comfortable living their lives in a public space.

The evidence is very clear that the students of today (and of tomorrow) already make extensive use of technology in the way they interact with the world. Using technology is their preferred mode of working and communicating, and it is gradually being introduced into New Zealand schools and integrated into teaching and learning programmes.

Bennett (2002) argued that the inexorable use of technology will lead to significant changes to the management and content of assessment. He maintains that as technology is becoming pivotal to schooling and is the learning medium of choice for most students, using another medium for assessment is indefensible. Access to the internet will therefore be crucial for learning and for assessment.

The New Zealand Government has taken a similar view to Bennett and has demonstrated a commitment to the criticality of the internet to 21st century learning. It is funding the roll out of Ultra-Fast Broadband to all New Zealand schools and is committed to ensuring that this is complete by 2016. Through an organisation called Network for Learning, schools will be able access the internet without data download constraints.

Manafy and Gautschi also described digital immigrants (those that are drawn to digital technology) as preferring a controlled release of information from limited sources and they preferred this information released linearly, sequentially and logically. Digital immigrants often get their information from text and favoured a situation where they had more personal and private space for introspection.

Stephen Atherton from Apple spoke at the 2009 International Association for Educational Assessment (IAEA) Conference in Brisbane. He maintained that there is a disconnect between teachers and ICT and its use. He argues that students see technology as an extension of themselves, but limitations are placed on the creative use of ICT by school and teacher policies, practices and beliefs.

One issue is that, within New Zealand, the processes and policies within a school are developed for digital natives by digital immigrants and this can often cause the sort of divide that Atherton refers to. There is a risk that the nature of the 21st century student is not fully understood by the digital immigrants that establish assessment policy and processes. This will change over time as more digital natives go back to school as teachers, but today's students should not have to wait until this occurs.

Atherton's view that 21st Century students see technology as an extension of themselves is a critical perspective. A core philosophy underpinning examinations in the New Zealand context is to provide students with the best opportunity for them to demonstrate their knowledge, skills and understanding. If students are more at home with technology, and are in a better position to demonstrate their knowledge, skills and understanding through its use, then it could be considered an injustice to New Zealand students to continue with pen and paper examinations.

The Nature of Knowledge

Another issue in New Zealand is the focus of external assessment in many subjects on the recall of knowledge or the application of knowledge which, to some extent, reflects the current way teaching and learning occurs in New Zealand. This focus on recall of knowledge is problematic in that knowledge is changing at such a prodigious rate. In Michael Wesch's 2011 internet video *Rethinking Education*, Ray Kurweil refers to the knowledge on the internet as increasing exponentially and Tim O'Reilly maintains the internet has no top to it.

The notion of knowledge as a changing concept is not new but the use of technology has accelerated the speed with which new knowledge is disseminated. Wesch, Kurweil and

O'Reilly raised issues around knowledge creation, and promoted concepts such as the social and collaborative production of knowledge.

These notions are problematic for New Zealand schools that retain a traditional approach to teaching and learning and will remain problematic as long as external assessment maintains a traditional focus.

In 2009 Kimber and Wyatt-Smith wrote

Just as we can no longer think of knowledge as a fixed entity, we must find ways to carry forward those capabilities that can adapt to, critique and create newer notions of co-created knowledge. (p. 12)

Assessment will need to reflect the context described by Kimber and Wyatt-Smith. Co-constructed knowledge or socially developed knowledge are notions that are contrary to traditional “board and talk” pedagogical practice where knowledge is approached as a fixed entity. Within the paradigm Kimber and Wyatt-Smith describe, assessment of knowledge becomes redundant and new paradigms for assessment must be found.

Kimber and Wyatt-Smith also wrote

The current synergy of thinking between business, education and research suggests that today's students require a different, more complex skill set than in the past, and that their teachers have particular responsibilities in elevating seemingly superficial levels of online activity to more critical, creative, empathetic and ethical activity. (p12)

These ideas question the whole focus of current assessment practice and NZQA has a challenge in changing its NCEA examinations and assessments. The conundrum facing NZQA is where the push for this comes from. Ideally, it should come from teaching practice, with assessment reflecting what is happening in the classroom. However, many schools are reluctant to introduce new methods and ideas until the NCEA examinations change. This creates a “chicken and egg” scenario that NZQA will need to manage.

The solution may lie in the New Zealand Curriculum. In order to realise the vision of the New Zealand Curriculum, students need to learn how to discern and filter knowledge, make connections across bodies of knowledge and create new knowledge. These processes need to be taught in class. In some subjects, recently revised standards clearly reflect the New Zealand Curriculum vision, and external assessment needs to be aligned with these objectives.

The Danish experience, where students have access to the internet during some of their examinations, is worth noting. Candidates are not asked to recall knowledge but to research elements of knowledge and make connections between the elements.

NZQA views technology as an enabler of change within the New Zealand education context, but questions have to be asked about New Zealand society's readiness to accept these ideas. Assessment cannot operate in a vacuum, and the social context in which these changes can be implemented needs careful consideration. Any process that creates changes to an area of New Zealand educational life that is so highly valued, through the use of an element that the community does not totally trust, has the potential to be problematic.

Care needs to be taken with the implementation of the digital examination process. There are a range of tools available that can be used to enhance the validity of the assessment. The issue is that while some schools will be able to move towards CBE within a short period, others will take some time.

New Zealand needs to develop a digital examination mode because it will be of benefit to the 21st century students now in schools who prefer to work in a digital environment. The assessment will be more closely aligned to teaching and learning through examinations that are meaningful and timely. Improvements to the validity of the assessment will be able to be implemented, and assessment will be driven by understanding.

NZQA is of the view that the increasing use of technology in external assessment is not only desirable, it is critical to New Zealand students for whom the digital environment is one in which they instinctively interact. Not moving to a digital external assessment system is not justifiable this far into the 21st century.

Conclusion

Robert Kozma (2009), in his call to action regarding assessment of 21st century skills, listed a number of advantages brought about by the introduction of computer technology into large scale assessment. These include an enhanced ability to efficiently collect quality data, to take advantage of a range of tools that are now integral to teaching and learning, and a reduction in the logistical costs associated with large scale paper-based examinations.

When compared to paper-based assessment, the use of computer technology in assessment has been recognised as providing a more valid way of assessing the skills that are required in the 21st century. Kozma also wrote that

Traditional assessments also fail to measure all the skills that are believed to be enabled and acquired by the regular use of new, technology-based learning environments (p.17).

Bridgeman (2009), Bennett (2011), van Lent (2009) and Hermans (2009) have all reported similar findings to Kozma. Computer-based assessment enables more successful and valid assessment of 21st century skills and competencies than the traditional paper-based assessment. If New Zealand is to fully realise the ideals of the New Zealand Curriculum in ensuring that its students are prepared for the future, then it requires valid assessment of these skills and competencies.

The implementation of technology in schools also raises questions about pedagogical and curriculum change. It is not acceptable to place 21st century technology in schools and use it in a 19th century teaching, learning and assessment model. The opportunities for significant positive change cannot be underestimated and these should be driven by the needs of the students and not by the assessment.

The rationale for moving to a digital model has to be underpinned by solid principles. Decisions must be made with the focus on the students, not on the technology. Changes should be made only as steps enhancing the current process. Digital examinations provide an opportunity for a range of enhancements that would benefit the student. A wider range of questions can be used that assess a wider range of abilities and provide students with more opportunities to demonstrate what they know and can do.

The current generation are used to using technology. Research noted earlier indicates that a digital environment is a better environment for the digital natives to undertake external assessment. They can type faster than they write; they prefer a digital environment and they are intuitive users of technology. The world in which they live, and will spend their adult lives, is one in which extensive use is made of technology for work, play and communication. Technology permeates their lives, is an integral aspect of the way they live, and is seen as an extension of themselves.

NZQA has set itself a target of moving to on demand assessment within ten years. This is very achievable and should prove to be positive for students and cost effective in the long term. NZQA is taking a leadership role and being proactive in the use of technology in assessment, but at the same time is working with the sector so that the pace of change can be managed by schools. The issues raised in terms of developing a model of technology-managed assessment for New Zealand are not insurmountable, but will require good communication, commitment and “buy in” from all parties concerned.

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