Premier’s TAFE NSW Scholarship

Investigating low cost scalable ways for vocational education trainers to meet a growing demand for skills

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My report discusses how the Australian vocational education and training *(*VET) sector can adapt African technology innovations to meet a growing demand for skills through learning games and content on mobile devices. Firstly, background research and issues in implementing vocational education in Africa are described. Later, comparisons between educational challenges in NSW and Africa are discussed. Research into play and learning helps us understand why gamification is so effective in engaging children and adults. With limitations of educational technology in mind, finally, two recommendations are made on import and export opportunities:

1. Adapt African innovations for Australian Indigenous learners, which would also be of benefit to non-indigenous learners.
2. Export the NSW World Wide English Program to Tanzania.

Implementing these recommendations would be the first step in building a partnership between TAFE NSW and Tanzania in the area of vocational education training. While Australia can benefit from African innovations in education technology, conversely, African developers and innovators are mutually interested in what they can learn from Australia. South Africa and Australia, as Commonwealth countries, and Zanzibar is an ex-British Colony, share many values. The British International curriculum is the preferred curriculum in most private schools in Africa, and our Australian education system is held in similar high esteem. This is a strong foundation for building a mutually beneficial partnership.

Background

My report is based on the five-week study tour I undertook as a recipient of a NSW Premier’s TAFE Scholarship 2016 to observe and document the innovative use of educational technology in South and East Africa. The aim of my study tour was to investigate low-cost scalable ways for educators to meet a growing demand for skills through learning games and content on mobile devices. The study tour included industry visits to educational institutes, formal and informal interviews, cultural tours and literature reviews. Two outcomes from this study tour are this report and a series of [blog posts](http://www.moojoo.com.au/gamification/study-tour/) entitled:

* [eLearning in Africa – Final thoughts](http://moojoo.com.au/blog/blog/2016/03/11/elearning-in-africa/)
* [Flying Home](http://moojoo.com.au/blog/blog/2016/02/21/flying-home/)
* [Afri-one Team](http://moojoo.com.au/blog/blog/2016/02/21/afri-one-team/)
* [Edu-tainment in Swahili](http://moojoo.com.au/blog/blog/2016/02/21/edu-tainment-in-swahili/)
* [Vocational Training in Zanzibar, Tanzania](http://moojoo.com.au/blog/blog/2016/02/20/tourism-in-zanzibar-tanzania/)
* [School of St Judes, Arusha, Tanzania](http://moojoo.com.au/blog/blog/2016/02/20/school-of-st-judes-an-australian-sponsored-school-in-arusha-tanzania/#more-84)
* [East African Innovation at Buni Tech Centre](http://moojoo.com.au/blog/blog/2016/02/20/east-african-innovation-at-buni-tech-centre/#more-77)
* [XPrize Dev4x – numeracy and literacy education via offline android tablets](http://moojoo.com.au/blog/blog/2016/02/20/xprize-numeracy-and-literacy-education-via-offline-android-tablets/#more-114)
* [South Africa – A rainbow nation exploring identity](http://moojoo.com.au/blog/blog/2016/02/20/south-africa-a-rainbow-nation-exploring-identity/#more-70)
* [Moodle community leading the way in open education](http://moojoo.com.au/blog/blog/2016/02/19/moodle-community-leading-the-way-in-open-education/#more-81)

Prior to the study tour, a review of TAFE NSW strategies and the vocational education in South and East Africa found areas of alignment in regards to import and export opportunities that could benefit both countries. The TAFE NSW [Statement of Owner Expectations](https://www.tafensw.edu.au/about/assets/pdf/soe.pdf) states that key objectives to effective asset management and service provision are:

* exploiting new technologies and leading edge forms of service provision
* growing education export opportunities in both Australia and offshore
* strengthening the skills base of the NSW economy and supporting economic growth for NSW communities
* delivering training solutions that are relevant to industry requirements and developing courses that are relevant to today’s workplaces and that give students an edge in their chosen career

The innovation happening in Africa could assist in meeting these objectives. Another area of relevance is Indigenous Australian education. Identifying and adapting relevant content developed in Africa could contribute to meeting objectives of the TAFE NSW Aboriginal education policy to close the gap in learning outcomes between indigenous and non-indigenous learners.

Issues in Implementing Vocational Education

The background research before my study tour included understanding the African VET context. Many [issues are affecting African countries in implementing and expanding formal vocational training](http://www.africaneconomicoutlook.org/en/theme/developing-technical-vocational-skills-in-africa/the-rationale-for-technical-and-vocational-skills-development/taking-stock-of-technical-and-vocational-skills-development/access-to-technical-and-vocational-education-in-africa/). My [report](https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=2&ved=0ahUKEwj51KDO4OzLAhVhG6YKHdsSCpQQFgghMAE&url=http%3A%2F%2Fwww.ffc.co.za%2Findex.php%2Fdocman-menu-item%2Freports%2F608-2014-2015-tr-chapter-10-funding-of-the-south-africa-further-education-and-training-sector&usg=AFQjCNEA8z8wgOeB495DmPAPMtbAH6TFDg&cad=rja) identifies the main issues as:

* access to resources: electricity, Internet, textbooks, equipment, transport, schools and teachers
* high unemployment and youths who ‘heavily discount the future’
* low enrolment that is partly due to the perception that vocational training leads only to low-status occupations and forecloses access to higher levels of education. Pupils who enrol in this kind of education are considered to be those who have failed in general education
* seriously underfunded and obsolete equipment and weak managerial capacity that affects the quality of training programmes
* structural dysfunctions of the local labour markets that has stymied attempts to expand vocational schooling in Sub-Saharan Africa since the 1960s
* intergenerational effects of exclusion from education based on race and gender

There are similarities in the challenges being faced in NSW to those in Africa. Many students have no or low Internet access due to poor finances, low infrastructure or remote locality. The delays and issues with Australia’s National Broadband Network rollout have created pockets of no or low access which are impacting the use of educational technologies and especially new cloud-based apps. In regional areas there are limited employment opportunities. This is particularly the case for many Australian Indigenous learners, whose quality of [life issues](https://www.coag.gov.au/closing_the_gap_in_indigenous_disadvantage) are generally similar to those in developing countries. Like Africa, NSW has a history of excluding people from the economic system based on race and gender. TAFE NSW has both the capital and cultural assets to address these challenges. Where universities are generally highly competitive and exclusive, TAFE NSW has a history of providing affordable education to those who need it the most. Solar powered offline/online robust mobile devices preloaded with engaging learning content, games and offline resources would be effective in both NSW and Africa.

Despite these issues in implementing vocational education, there are people who are developing innovative educational activities in South and East Africa using gamification and mobile technologies.

Case Studies of Gamification in Education

An underlying focus of the tour was gamification in education, a new transmedia approach to education/edutainment. The next generation of learners, based on their experience in video games, expect good interface design, autonomy, and immediate feedback on performance and progress. They will be the first generation to see a merging of traditional linear books, television, and radio as highly interactive digital learning experiences, as described by Jordan Shapiro in the article ‘[Generation blockhead](http://www.forbes.com/sites/jordanshapiro/2014/07/22/generation-blockhead-how-minecraft-mods-the-grown-ups-of-tomorrow/#298ee34d7b78) – How Minecraft mods the Generations of tomorrow’. Gamification is a multidisciplinary approach that brings together game design and curriculum design to translate the underlying form of games and play into an engaging and [effective pedagogical](http://ajjuliani.com/play/) model. The research ‘[A Playful Game Changer: Fostering Student Retention](http://www.henningpohl.net/papers/Krause2015.pdf)’ found increases in student retention when game-elements were carefully integrated with learning. Gamification is a powerful approach to behaviour change that, by merging our cognitive and emotional functions, can build the autonomy and competence (self-efficacy) required to be effective long-term learners.

My [blog site](http://www.moojoo.com.au/gamification/study-tour/) contains six case studies that provide an overview of innovative gamification techniques being developed in Africa. What the case studies have in common is the integration of (ancient) natural play and modern technology that can quickly scale for delivery to millions of learners. They cover a wide range of game–elements and simulations designed to work on televisions, radio, mobile phones, laptops, desktops and tablets. While this holds much promise, there are barriers and dangers to consider which are discussed in the next section.

Limitations of Educational Technology

In South and East African education, chalkboards, lecture and rote learning are still the standard approach to education. The innovative approaches outlined in the case studies are rare examples. The issues faced in moving on from traditional teaching to incorporate modern educational technology include:

* unstable electricity delivery, with short or long outages experienced daily
* patchy Internet access when away from major cities, yet very good 3g/H in some suburbs
* tropical/humid weather that shortens the lifespan of electronic equipment and affects how touch screens react in moist air
* lack of technical support organisations and education technology training
* donations and seed funding creates a problem of ongoing expenses and maintaining equipment

Low-cost android tablets that can be solar charged resolve issues around electricity and maintenance costs when compared to a computer lab setup. They can be used in a personal BYOD (bring your own device) approach or a classroom approach. There is an urgent need for technical support and educational technology training, and long-term financial planning to explore this new alternative to desktop computing.

Aside from technical issues, there are also social and political barriers of cronyism and corruption that are holding back educational reform. As smart phones and tablets become more widely used they will eventually become lower targets for theft. The Ubongo approach to offer education on devices you already own sidesteps this serious issue. It is a grassroots community approach rather than a top-down state-controlled approach.

Another barrier to improving education through technology is social inequity due to finances, gender or race. Rather than seeing technology as an easy solution to complex problems, it should be viewed as a powerful tool that can be used in many different ways; technology will take you down whatever road you are on faster.

In the United States the gap between rich and poor is growing despite access to education. South African tertiary education has been severely disrupted this year by protests and riots against the increasing fees resulting in education being exclusively for the wealthy. The [#feesmustfall](https://www.google.com.au/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&cad=rja&uact=8&ved=0ahUKEwiZj5yOpvHLAhUnJqYKHROUBVIQFggzMAU&url=https%3A%2F%2Ftwitter.com%2Fsearch%3Fq%3D%2523FEESMUSTFALL&usg=AFQjCNH3bhisc8QtNwXNWitJ-XU_XWi1aA) campaign on social media has bought this to the world’s attention and should serve as an alarm call for all countries.

The scalability of educational apps, open educational resources, and courses are forcing radical changes in education for the current generation. However, it will take a concentrated effort to avoid further inequity. Tressie McMillan , a keynote speaker at the [ICDE UNISA conference in South Africa](https://youtu.be/al6useEBbD0), made the point that, ‘Educational technology alone cannot solve complex social problems as educational expansion does not automatically produce more and better jobs – without extra investment we are setting up educational expansion to fail…The wider community must be deliberately make credentials matter for disadvantaged groups to broaden the labour market.’

Shai Reshef, President & Founder of University of the People in the United States, expressed the opinion in his [Keynote speech](https://www.youtube.com/watch?v=al6useEBbD0) at the 2015 eLearning Conference that a government of any country has an obligation to offer an education to all of the people who want to continue studying. The success of the University of the People’s tuition-free model of online study is confronting to more traditional financial models. They offer university courses tuition-free and charge only for exams and official credentials. The future of learning is not yet decided; whether gamification and personal mobile learning devices are used to create further inequity or reduce it is yet to be seen.

The main outcome of my study tour was to reflect on how these observations and interviews can be used to improve Australian VET education and then communicate the findings broadly. The following two recommendations are being presented to the NSW Minister of Education and NSW Minister of Small Business at a panel discussion in June 2016 with the NSW Premier’s Scholarship Committee.

*Recommendation 1:
Explore the use of gamification with Australian Indigenous learners*

The approaches described in the case studies could inspire alternative ways to improve learning outcomes for Australian Indigenous learners. The case studies provided can be divided into three levels of facilitation:

* 1. un-facilitated online learning
	2. technology in traditional classrooms
	3. learning with minimal facilitation/supervision

The following table looks at each of these categories and makes recommendations on how these ideas could be used with Aboriginal learners.

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| 1) Unfacilitated learning  | How can these ideas be used with Aboriginal Learners? |
| Ubongo interactive cartoons – gamified learning through SMS (Some English episodes are available.) | Ubongo Kids education resources could be adapted and translated for use in Aboriginal communities in Australia. Using narrative, music and a hip-hop giraffe teaching maths is very engaging. Smart phones could be used by remote learners for interactive activities. |
| Simulations, Virtual Environments and Learning Management Systems | Remote learners could virtually experience different environments and learn new skills. Some of the software is open source and could be re-used or adapted for Australia.  |
| 2) Technology to support traditional classroom facilitation | **How can these ideas be used with Aboriginal Learners?** |
| Have centrally distributed and controlled classroom device sets like BRCK  | Using equipment from Africa, or similar if they become available in Australia, set up digital classrooms with relevant content. These can be used in remote locations or off-campus where learners feel less intimidated.  |
| 3) Minimal facilitation | **How can these ideas be used with Aboriginal Learners?** |
| Ubongo Kids Clubs invite small groups of children to watch the episodes together and complete worksheets. Community members are involved but do not play the role of a traditional teacher. These groups gather in places where communal televisions are usually used for watching sporting events together. | Set up Kids Clubs using Ubongo or other edutainment and educational apps. This idea builds on collaborative learning. Indigenous children have increased responsibility for their siblings outside of school, and can use these relationships to become peer mentors within small groups.  |

There is a precedent that educational technology can improve educational experiences for Indigenous learners as demonstrated in Emerging Technology Trials managed by the Australian National Vet eLearning Services in 2013.

In the [Northern Territory](http://flexiblelearning.net.au/infographic/about.html) Aboriginal learners enjoyed mobile devices enabling outdoor learning; tablets were used to capture photos and videos that were then used as study materials. Using social media and blogging rather than exercise books resulted in higher engagement.

In [South Australia](http://flexiblelearning.net.au/infographic/about.html), eLearning was less confrontational for Indigenous learners who were uncomfortable with the eye contact and close proximity in traditional classrooms. The participants enjoyed online maths activities and web conferences.

In [NSW](http://participationandskills.wikispaces.com/NSW191), young Aboriginal girls with low literacy increased their confidence to use digital story-telling and publishing. Digital media units were delivered through mobile-compatible content viewed on Google Nexus tablets. Gamification techniques were used to reduce the drop-out rates.

*Recommendation 2:
Distribute NSW AMES World Wide English Apps and program in Tanzania*

For millions of Tanzanians, English is an aspirational language linked to education and career advantages. A recurring theme during my study tour in Tanzania was the lack of support in learning English as a main barrier to education, as explained in [this video](http://www.npr.org/sections/goatsandsoda/2015/06/25/417174187/teens-make-film-in-broken-english-to-explain-why-theyll-fail-english) made by students living in Zanzibar. Because the Tanzanian national instructional language for secondary school and university is English, students, and teachers require a much deeper grasp of English than already exists. Currently, more than half of the students fail in final exams. As a [rapidly developing country](http://www.worldbank.org/en/country/tanzania/overview), the corporate world is seeking employees with better English skills to communicate in global trade and the growing tourism industry. Hence, Tanzanians are extremely keen to learn English, yet they do not have the educational opportunities of other African countries like South Africans, Kenyans and Zimbabweans.

An Australian credentialed course in English would have high credibility in Tanzania. Language learning apps, like Duo Lingo, are effectively reaching these markets but do not offer credentials. Given the high regard for the International British Curriculum, Australian certified credentials are attributed with similar value.

NSW Adult Migrant English Services (AMES) has a suite of products that are well-established and tested methods for learning English. The team at AMES have recently converted most of the content into HTML5 format suitable for tablets or smart phones. Each of the World Wide English modules are aligned to the Australian Core Skills framework, so this basic language qualification becomes a pathway to further study and credentials and to an ongoing partnership between the Australian education system and Tanzania.

The Ames World Wide English mobile apps move beyond a digital textbook and use such phone features as:

* a microphone to record oneself saying sample sentences
* audio for.listening to an example sentence as comparison
* video for watching scenarios of real conversations
* real time visual indication of pronunciation and intonation.

The app is supported by a web-based elearning course delivered through a learning management system. The [World Wide English program](http://ames.edu.au/apps/world-wide-english) would be of great benefit to training organisations and educational institutes across Tanzania. This recommendation is to distribute the AMES materials and a comprehensive roll-out plan that includes ongoing training and support. Local Web servers with wi-fi could be set up in places where Internet is unreliable. This would allow training to continue even if Internet and regular electricity were unreliable. This would involve training information and communications technology specialists via a custom developed program that could be mapped to Australian Skills Quality Authority standards and formally recognised as a qualification.

Conclusion

In conclusion, this report explores how educational technology can assist in facing challenges to implementing vocational education in both NSW and Africa. Aside from unfacilitated solo learning, educational technology can also be used to support traditional teaching and in non-traditional self organised learning environments. A review of TAFE NSW strategies and vocational education in South and East Africa found areas of alignment in regards to import and export opportunities that could be mutually beneficial. As there are similarities between NSW and Africa in no or low Internet bandwidth, the innovations of African developers can be adapted for use in local contexts, particularly with Indigenous learners. These methods would also be of benefit to non-indigenous learners in the following ways:

* Remote learners could virtually experience different environments and learn new skills.
* Open source software from Africa could be re-used or adapted for Australia (such as Afri-one and Xprize).
* Ubongo educational resources could be adapted and translated for use in Aboriginal communities in Australia.
* Smart phones could be used by remote learners for interactive activities.
* Digital classrooms could be set up with off-line content. They could be used in remote locations or for off-line/off-campus learning.
* Collaborative learning clubs could be set up using Ubongo or other edutainment and educational apps.

There is also an export opportunity with the AMES World Wide English program. An Australian credentialed course in English has high credibility internationally. Most other language learning apps, like Duo Lingo, do not offer credentials. Training is needed to set up local area networks with the World Wide English program and sets of tablets to be used to download the content so it is ready to be used offline or when the power is out. This starting point becomes a pathway to an ongoing partnership between the Australian education system and Tanzania.

Gamification is an effective way of improving motivation, learning outcomes and retention for those who need it the most. Although it is tempting to make quick profits in scalable solutions, it is important to remember that, if these create further inequity in society, then we will all be worse off. So although mobile tablets and phones are low-cost scalable ways for educators to meet a growing demand for skills through learning games and offline content, long-term planning and support is needed to make the best use of the available new technologies.