11-5-2015

Global trends in higher education policies

Kathryn Moyle
ACER, kathrynmoyle@internode.on.net

Global Trends in Higher Education Policies

Professor Kathryn Moyle
Research Director: Education Policy and Practice
Australian Council for Educational Research
5 November 2015

Abstract

This paper outlines the current global context for higher education in 2015, as a basis for examining the key trends in teacher education in the first decades of the 21st century. The purpose of this paper is to outline the current global contexts for higher education, and to provide an overview of the policies found in teacher education in those countries that consistently produce students who perform highly on international standardized tests such as PISA, TIMSS and PIRLS[1]. The policies guiding teacher education in 'high-performing' countries tends to be aligned and inter-connected. These policies include public investment in education; creating identifiable career paths in teaching; attracting high-quality applicants; employing effective quality assurance policies and procedures; working in partnership with schools to train teachers; and using research and enquiry as ways to develop an informed, reflective, teaching profession. The paper then identifies broad principles that can be used to inform the development of future teacher education policies.

Introduction

One of the purposes of education is to develop students' skills, knowledge and understandings of various disciplines. Education plays a role instilling those values required for intellectual independence, participating in a civil society, the promotion of citizenship and that of the common good. Teacher education has a heightened role in preparing students to take their place in society. Teacher education prepares teachers to enable them to educate children to move from learners in schools to participants not only in the economy, but more broadly in their society. As such, many view teacher education as a site where the processes of lifelong learning can be fostered (Organisation for Economic Cooperation and Development (OECD), 2014a).

Alongside, and sometimes in tension with these aforementioned purposes, education has also become a traded commodity. Publicly-funded universities in Australia earned around $4.3 billion from international students in 2013 (Norton, 2014). The main growth in international students comes from a growing middle class in the densely populated countries of India and China. In 2014, Professor Simon Marginson indicated that the number of middle class people in Asia is "… expected to rise from 600 million in 2010 to more than three billion in 2030 [and] middle class families want tertiary education for their children" (Marginson, 2014, p18). Multi-lateral and bi-lateral trade agreements in the past few decades have included 'education' as one of the 'markets' for trade. The General Agreement on Trade in Services (GATS) of the

---

[1] PISA: Programme for International Student Assessment; TIMSS: Trends in International Mathematics and Science Study; PIRLS: Progress in International Reading Literacy Study

World Trade Organisation (WTO) is an example of such an agreement (WTO, 2015); and the inclusion of 'education' has long been an item that generates tensions and dissent.

Irrespective, the global higher education sector is dynamic, complex and growing. Trends in higher education encompass theoretical and practical questions about how a society reproduces itself, and the values it wishes to promote through education. These purposes co-exist with the economic issues that see the commodification of education. These respective purposes tend to operate in tension with each other rather than to sit happily together.

Global context of higher education

This paper establishes a global context for higher education by looking at three key trends in higher education: student mobility and enrolments; the role of technologies; and an increasing emphasis on research and publications. This first section of the paper is informed by recent reviews and national and international collections of data in higher education and teacher education. In particular, reports prepared by the OECD, United Nations Educational, Scientific and Cultural Organization (UNESCO), the United States (US) Institute of International Education and the British Council. The trends discussed here are not the only ones operating globally in higher education, but they do provide a useful backdrop for discussing policies in teacher education.

Student mobility and enrolments

The percentage of tertiary educated adults (25 to 64), has increased in all OECD countries, between 2000 and 2012 (OECD, 2014a). Furthermore, since 2000, the number of global internationally mobile students has more than doubled: from 2.1 million in 2000 to nearly 4.5 million in 2011 (OECD, 2014a). According to UNESCO, in 2009, global tertiary enrolments reached 170 million (UNESCO Institute for Statistics (UIS). Of these enrolments, China, India, the United States of America (USA), and Russia constituted 45% of the total global tertiary enrolments. Other economies with substantial numbers of tertiary enrolments were Brazil (6.2 million), Indonesia (4.2 million) Iran (3.4 million), South Korea (3.3 million), and Turkey (3.0 million (UNESCO, UIS, 2009).

The first decade of the 21st century saw global student enrolment rates growing at almost 6% annually between 2002 and 2009 (British Council 2012). Although there has been slower growth since 2009, there does continue to be growth in higher education student numbers (British Council, 2012). It is predicted that by 2024 there will be 32 million additional higher education enrolments globally, reaching 196 million students enrolled in tertiary education (British Council, 2013). Furthermore, by 2020, it is expected that India, China, US and Indonesia will account for over half of the world's 18 to 22 years old population (British Council, 2012). It is also forecast that by 2020 China, India, US and Brazil will account for more than half of the world's total tertiary enrolments, while Indonesia, Turkey and Nigeria will become more significant in the global tertiary education landscape (British Council, 2012).

It is also predicted that by 2024, almost 3.9 million students will be studying in institutions overseas (i.e. away from their home country) (British Council, 2013). Of the students who do study away from home, less than 2% come from Australia, China, Indonesia, Japan, New Zealand, the Philippines, Thailand and Viet Nam. In comparison, students who study outside their home countries tend to come from China, India, Brunei Darussalam, South Korea, Saudi Arabia and Singapore (British Council, 2013). It is predicted that students from these countries will continue to go to the US, United Kingdom (UK), Australia, Canada, Germany, France and Japan to undertake their tertiary studies.

There is however, a shifting balance in student mobility towards Asia, that should be tracked over time to see how it develops (British Council, 2013). Marginson (2014) predicts considerable growth in Asia. The OECD (2014a) notes that to a great extent global student mobility follows international and regional migration patterns.

> "*The growth in the internationalisation of tertiary enrolment in OECD countries, as well as the high proportion of intra-regional student mobility show the growing importance of regional mobility over global mobility. Student flows in European countries and in Eastern Asia and Oceania tend to reflect the evolution of geopolitical areas, such as closer ties between Asia-Pacific countries and further co-operation among European countries beyond the European Union*" (OECD, 2014a, p344).

While students are undertaking whole undergraduate degrees away from home, students are also undertaking degrees that require studying in another country for part of their degree. Government strategies are leading to policies that promote international experiences for tertiary students. Germany for example, is encouraging its university students to study overseas, with a program that aims by 2020, to have half of all degree students study in another country as part of their degrees (University of Oxford, 2015). This trend is often referred to as 'internationalising the curriculum'.

According to the British Council (2012), internationalisation of teaching and research are key objectives for many tertiary institutions around the globe. Countries including Qatar, the United Arab Emirates, Singapore and China have all promoted internationalisation in national policies (Gibney, 2013). University agendas concerning 'internationalisation' incorporate recruitment, research collaborations, capacity building activities, as well as the curriculum (University of Oxford, 2015). The reasons for this trend include to raise the standards of learning, teaching and leadership; ensure global relevance of programs; attract the best students and staff to the university; generate revenue; generate new knowledge through research; and to promote diversity within the university (British Council, 2012). Some universities also see it as their responsibility to the common good, to accept students who are experiencing inequality and hardship, such as newly arrived asylum-seekers (see for example, Newcastle University, UK, 2015).

According to the OECD, the growth in higher education student enrolments is being driven by efforts to cultivate knowledge economies in developing and emerging countries (OECD, 2012). Marginson (2014) argues however, that there is no clear evidence that economic demand is consistently driving participation growth in higher

education. Nonetheless, the use of technologies in higher education is seen as aiding participation in both teaching and learning, as well as for use in evidence-based or data-driven decision-making approaches to learning, administration and policy development. The trends in the use of digital technologies in higher education are explored next.

Role of technologies
The use of technologies in teaching and learning in higher education is increasing across the globe. One of the countries seeing the greatest increase in the use of technologies in higher education is Africa. To illustrate, in 2014 the Republic of South Africa released a *White Paper* on post-school education and training (Department of Higher Education and Training, Republic of South Africa, 2013). This *White Paper* explicitly encourages universities to expand online and blended learning opportunities[2].

In Australia, there is a strong trend towards off-campus enrolments, largely due to improved uses of technologies (Norton, 2014). The Grattan Institute indicates that more than a quarter of Australian university students now study off campus, while some universities provide blended learning opportunities, and physical study centres to support online students (Norton, 2014). The European Commission's High-Level Group on the Modernization of Higher Education has created guidelines for governments and institutions to develop a suite of strategies at both the national and institutional level for the adoption of new modes of learning and teaching with technologies (New Media Consortium, 2015).

Teaching and learning with technologies in higher education is taking several different forms. Distance education is being seen as one way to meet the demand for higher education, although predictions about growth are difficult to predict. The growth of Massively Open Online Communities (MOOCs) have pushed some universities into online learning environments (Brown, 2015). Personalizing learning has been attempted with various technologies as diverse as learning management systems, blogs and wikis, through to virtual reality. To use technologies in meaningful ways in teaching and learning requires an understanding of the purposes for doing so; the relationships between technologies; students' learning styles; and students' preferences for instructional strategies, such as blended and online learning.

Alongside of the increasing use of technologies in teaching and learning, there is also a growing call by bureaucrats and politicians in particular, to use data and assessments to improve policies and practices in schools and higher education. The recording and analysis of data, often supported with the use of technologies, is known as 'data-driven decision making' and 'evidence-based planning'.

There is little quantitative research on data-driven decision making, but as Dr Andreas Schleicher from the OECD states: "a person without data is just a person with an opinion". There are examples of how higher education institutions integrate student

---

[22] Online learning refers to the whole program or course being offered via the Internet. Blended learning refers to mixed use of face-to-face- and online settings to form the learning environment for a particular course or program of study.

learning assessment, evaluation of operations, strategic planning, and budgeting in order to maximize institutional effectiveness (see for example, Hanover Research, 2013). Research on data use in education tends to fall into the following three groups:

- How data-driven decision-making promotes improvements in student outcomes;
- The mapping of initiatives to promote data use (e.g. university-wide data systems); and
- Descriptions (rather than analytical examinations) of the ways in which data is used (Wagner & Ice, 2012).

At the global policy level, the World Economic Forum uses the inclusion of technologies in education along with the quality of education policies and the management of education institutions, among the many indicators used to measure countries' international competitiveness, through the production annually, of the 'Networked Readiness Index' (see Bilbao-Osorio, Dutta & Lanvin, 2013; Dutta, Geiger & Lanvin, 2015).

To identify the capacity of over 140 countries to leverage technologies for their national benefit, through the use of multiple indicators, the Networked Readiness Index assesses the overall political and business environment of a country; their level of information and communication technologies (ICT) readiness; usage of technologies among the general population, businesses and government; and the overall impact of technologies on the economy and society. As such, how the use of technologies is represented in policies and implemented in schools; the ways in which the education sector is led and managed; and general indicators such as secondary schools and tertiary education gross enrolment rates; are among the indicators used to assess a country's performance in a globalised economy (Dutta, Geiger & Lanvin, 2015).

The first three top performing countries overall, on the Networked Readiness Index in 2015, as assessed by the World Economic Forum were Singapore, Finland and Sweden (Dutta, Geiger & Lanvin, 2015).

Increasing emphasis on research and publications
The third global trend in higher education being addressed here is the increasing emphasis globally, on producing co-authored research and publications. In the first decades of the 21st century there is evidence of increased interconnectedness among members of the academic community. This trend is running concurrently with the trend that world economic markets are becoming increasingly integrated (Gibney, 2013). In science and engineering, evidence suggests that internationally co-authored articles are more frequently cited than single authored articles (British Council, 2012). The countries generating the highest average citations per document include Switzerland, the Netherlands, the Nordic countries, the UK and the US. At the institutional level, Harvard University produces the highest number of collaborative research articles, followed by Toronto (Canada) and Oxford (UK) universities (British Council, 2012).

Research, the publication of articles in esteemed journals, and the number of citations received, are among the criteria used to identify the rankings of the top performing universities worldwide. There is considerable national and international competition among universities to be identified as a top university in lists such as *THE World University Rankings* by Times Higher Education UK, *Academic Ranking of World Universities* by the Shanghai Ranking Consultancy, China, and rankings by the *Center for World University Rankings*, prepared in Saudi Arabia. According to the National Science Foundation in the US, in 2011 there were 51 countries globally, that produced over 1,000 science journal articles per annum (National Science Foundation, 2014).

Research in the UK shows that it is those countries that have high levels of research mobility, that are also those countries exhibiting high levels of research collaboration (UK Department of Business, Innovation and Skills, 2013). But the benefits of international collaborations are not just limited to the top ranked universities. A study by academics at Nanyang Technological University used citation data as an indicator of researchers' impact through their publications, to investigate whether there were benefits for young universities as well as the more established ones. The researchers found that the effect of international collaboration on the impact of publications by researchers in both young and established institutions brought benefits to those involved in these international collaborations (Khor & Yu. 2015). Indeed, national governments are supporting universities to compete internationally on research and publications. China for example, spends $179 billion per annum in this area, and aims to increase its spending from 1.8% of gross domestic product to 2.5% by 2020 (OECD, 2014a).

It is against this backdrop of global trends in higher education, that we now turn to examine global trends in teacher education. The following section provides an overview of the policies found in teacher education in 'high performing' countries. The evidence from countries with high-performing school education systems suggest that in these countries teacher education programs are guided by a range of aligned and inter-connected policies and procedures.

Global trends in teacher education

As part of *Sustainable Development Goal 4* (United Nations, 2015), the international community has undertaken to provide every child with 12 years of education, by 2030. This undertaking is dependent upon having enough trained teachers in classrooms. This in turn means that countries have to train suitable candidates to be teachers, (not to mention principals). Indeed, well trained and knowledgeable teachers and school leaders are considered globally, as necessary for strong, high quality education systems.

There appear however, to be global teacher shortages on the horizon. According to UNESCO UIS (2015), if in 2015, the world was to be able to teach every school-aged child in the world, it would have required an extra 2.7 million primary school teachers. To achieve universal primary education by 2020, countries will have to recruit 10.9 million primary teachers. About 2.2 million new teaching positions have to be created

and 8.7 million teachers are expected to leave the profession, and have to be replaced. By 2030, the total number of teachers required is expected to be 25.8 million. About 3.2 million of these teachers will be required for new positions, and the remaining 22.6 million will take account of attrition (UNESCO UIS, 2015). In the following decades, it can be expected that a portion of these children will continue to secondary school and onto higher education. Teachers will be required at these levels too.

The quality of teachers and school principals is influenced by the quality of the teacher education program they complete, and by their ongoing professional learning. Teacher education policies in high performing countries are inter-connected across the lifespan of a teacher: from pre-service through to in-service teacher education. There are identifiable career paths from early career teacher to highly accomplished teacher to principal.

A recent Australian study commissioned by the Australian Institute for Teaching and School Leadership (AITSL) (2014), based on case studies and literature from around the world, identified the following 'broad success factors' for the implementation of effective teacher education:
1. A clear vision of effective teaching that informs the entire program. (A clear vision ensures that all those involved in pre-service teacher education present a consistent message).
2. Integration of theory and practice.
3. Highly skilled and well supported supervising teachers.
4. Sustainable, scalable partnerships (AITSL, 2014).

These 'broad success factors' tend to be obvious and explicit in 'high performing' countries. As such, the focus here is on the policies and practices used in teacher education in 'high performing' countries, in order to identify common principles and practices in successful teacher education programs.

'High performing' countries
Over the past decade, students in several cities and countries in the same geographical region as Indonesia and Australia have consistently produced results that place them among the top performers on international measures of student performance. These cities and countries include Shanghai, Singapore and the Republic of South Korea. In 2012, the OECD conducted its first international test to assess 15 year old students' creative problem-solving skills. This computer-based test was undertaken by 85,000 students in 44 countries and economies (OECD, 2014b). Students in Singapore and Korea achieved the highest scores. The OECD concluded that the students in these countries are "… quick learners, highly inquisitive and able to solve unstructured problems in unfamiliar contexts" (OECD, 2014, p1). Interestingly, these are the same countries that perform highly on the World Economic Forum's Networked Readiness Index. So the question to be asked here is: what are these countries doing in teacher education, to enable school students to consistently achieve the highest scores, internationally?

Teacher education policies and practices

Teacher education policies used in 'high performing' countries show that they adopt a suite of aligned and interconnected policies, that are funded and implemented. These policies include the following:

- Public investment in education;
- Creating identifiable career paths in teaching;
- Attracting high-quality applicants;
- Employing effective quality assurance policies and procedures;
- Working in partnership with schools to train teachers; and
- the use of research and enquiry as a way to develop an informed, reflective, teaching profession.

Each of these approaches is briefly explored below. The trends discussed here are not the only ones operating globally in teacher education, but these do provide insights into trends common in teacher education in 'high performing' countries. This section is based upon two global reviews of literature prepared by researchers at the Australian Council for Educational Research (ACER): the first for the Teacher Education Ministerial Advisory Group (TEMAG) (2014), in Australia; and the second for the Australian Department of Foreign Affairs and Trade (DFAT) (2015).

Public investment in education

High-performing countries invest in education. Teacher salaries in Singapore and Korea are amongst the highest in the world. In Singapore, in 2010, the school education budget was approximately 3.6% of GDP and 20% of total government expenditure; second only to defence (OECD, 2012). Korea also invests heavily in education, offering high salaries and attractive conditions for teachers.

In Singapore and Taipei, teaching is promoted as a highly attractive, well paid career. Key policies include the provision of job security, pensions and other benefits, plus an emphasis on teacher professional development to increase teachers' confidence and job satisfaction. The work satisfaction of teachers in Chinese Taipei is among the highest across all careers in that country. Cultural and social norms reinforce the notion of teaching as a respected and highly attractive profession in most high-performing countries, for example Singapore, Chinese Taipei, Germany and Finland (Ingvarson, Schwille, Tatto, Rowley, Peck & Senk, 2013).

Ingvarson, Reid, Buckley, Kleinhenz, Masters & Rowley (2015) argue these policies have created a strong incentive among the abler graduates in high performing countries to join the teaching profession (Ingvarson, et al 2013). Furthermore, they argue that in those countries where entrance to teaching is competitive, the salaries are also competitive (Tatto, Krajcik & Pippin, 2013). Ingersoll (2007) adds however, that lifting entry requirements for teacher education courses has to occur in concert with ensuring teachers' salaries and working conditions are commensurate to those of other professions competing for similar graduates. He proposes that as pay and conditions improve, a critical mass of high-calibre professionals will emerge. He posits that this creates an incentive in itself that attracts potential candidates, and that high-

quality people want to be part of a respected professional cohort with colleagues of at least equally high calibre. These observations it is argued, have implications for policies that govern the selection and registration of teachers and the accreditation of programs (Ingvarson et al, 2013).

Creating identifiable career paths in teaching
Secure and rewarding career paths that attract highly able people to a teaching career are found in most 'high performing' countries. Many education systems around the world provide 'vertical' career pathways, where teachers can move into principal positions and other leadership roles. But in the 'high performing' countries, their education systems also offer 'horizontal' promotion positions, which allow teachers to remain more closely connected to the classroom (Darling-Hammond, 2010). In Singapore, for example, career paths are defined and transparent, comparatively well paid, and matched to teacher interests. Teachers can choose between master-teacher, curriculum developer or school leadership positions. Principals are appointed based on merit (OECD, 2012). Furthermore, the role of the school principal is seen as a legitimate career in itself, and school principals are considered more than simply administrators. Instead they are looked upon as wise educational leaders.

Attracting high-quality applicants
Teacher education programs necessarily, are affected by the quality of students who undertake such programs. Barber and Mourshed (2007) have pointed out that when the quality of people taking part in a program drops, so does the quality of the courses themselves, because the quality of classroom experiences is highly dependent on the quality of the people in the classroom.

To ensure quality in teaching and learning, high performing countries focus their education policies directly on recruiting academically successful students and treating teachers as professionals (Tatto et al., 2013). High entrance requirements into teacher education in these countries, makes the study of education a highly valued discipline in which to participate. According to a report prepared by Barber & Mourshed, (2007), the top-performing systems they studied recruited their teachers from the top third of each cohort graduating from their school systems: 'the top 5% in South Korea, the top 10% in Finland, and the top 30% in Singapore and Hong Kong' (Barber & Mourshed, 2007, p. 16). In Canada, admission requirements are set by individual teacher training institutions, but they select all pre-service teachers from the top 30% of student cohorts. As such, prospective pre-service teachers require a high Grade Point Average to gain entry to teacher training (Mehta & Schwartz, 2011; Morris & Patterson, 2013).

Ingvarson, et al., (2013) indicate that in Chinese Taipei, the *Teacher Education Act* requires that students must be enrolled in their second or higher year of university, or enrolled as masters or doctoral students before they can be admitted to a teacher education program. All applicants have to pass the national university entrance examination, which has mathematics as compulsory subject. In Finland, entry to teacher education is highly selective. According to Sahlberg, (2011) in 2010, more than 6600 applicants competed for 600 available places in pre-service education

courses. In 2011–2012, nearly 2400 applicants competed for the 120 places in the Faculty of Education at the University of Helsinki (Sahlberg, 2011).

In addition to requiring high academic achievement in prospective teachers, some 'high performing' countries are commencing to use aptitude tests to assess a person's suitability for a career in teaching. Several states in Australia for example, use psychological testing to determine potential teachers' ability to undertake work in difficult circumstances, such as to live and work in remote Indigenous or mining communities.

Employing effective quality assurance policies and procedures
Effective teacher education programs are characterised by quality assurance processes. Self-evaluation generally plays a central role in these processes. Successful education systems also have established and well-regulated teacher education systems that include rigorous procedures for the accreditation of teacher education programs. These processes may be within education faculties, across whole universities or both (DFAT, 2015).

To illustrate: in Japan, each teacher education institution has to conduct a self-evaluation prior to the external program accreditation processes being conducted every seven years. The external accreditation processes are performed by the Japan Institution for Higher Education Evaluation (Tatto et al., 2013). In a similar vein, Chinese Taipei also has explicit quality assurance requirements that occur at every stage of the teacher education qualification: from selection through to certification.

In Hong Kong and South Korea, accreditation practices are similar to those of Japan (DFAT, 2015). The self-evaluation component of the quality assurance processes used in Hong Kong, requires that feedback from staff, students and past external examiners has to be included (Tatto et al., 2013). In South Korea, financial status and administrative decisions are tied to the evaluations of teacher education programs. These evaluations include a site visit, which is conducted by a team from the Ministry of Education, Science and Technology (MEST) (Tatto et al., 2013).

In Singapore, the National Institute of Education (NIE) is the sole provider of teacher education courses. The main focus in the program evaluations and in individual assessments in this country, is that of improvement. The evaluations take into account goals and interests; and available inputs to achieve identified goals. Data is collected in evaluations, that is linked to outcomes that can be used for decision-making purposes. Quality assurance mechanisms in Singapore rely on close cooperation between the Ministry of Education (MOE), the NIE and schools, which requires that there are strong feedback mechanisms in place (DFAT, 2015).

On the other hand, Finland does not use a state-directed accreditation system of teacher education programs. Evaluations of the programs however, are conducted by the Finnish Higher Education Evaluation Council, which is an independent body. The evaluation processes used are consultative, and involve a wide selection of stakeholders, including international perspectives gained from foreign education experts.

Moving to Canada, most Canadian provinces have in place processes for ensuring the quality of teacher education. These processes are usually conducted through the respective Ministries of Education. In Ontario and British Columbia though, Colleges of Teaching provide certification to graduates of teacher education programs in the institutions the Colleges of Teaching have accredited (DFAT, 2015).

In summary then, external accreditation of teacher education programs, periodic internal and external evaluations of those programs, and self-evaluation are all characteristics of teacher education programs, in high performing' countries.

Working in partnership with schools to train teachers
The relationships between teacher education programs and schools in their respective jurisdictions are strong in 'high performing' countries. In these countries, teacher education programs work with specifically designated schools to train teachers. Pre-service teachers undertake their practicum in these schools under the supervision of expert mentors and supervising teachers.

In Finland for example, there are eight teacher education institutions, that work in partnership with 'training schools'. Teacher-training schools cover all levels of schooling (Tatto et al., 2013). Pre-service teachers practice teaching in the training schools under the close supervision of 'master' teachers. These schools are 'model' schools where new knowledge and teaching practices are researched and developed in collaboration between pre-service-teachers, school teachers and university staff. Teachers in the training schools have a higher status than those in other schools, and are paid more than other teachers (DFAT, 2015). Along similar lines, in Chinese Taipei, Singapore and Germany, university and school teaching staff cooperate to mentor, supervise and assess pre-service teachers (DFAT, 2015).

The use of research and enquiry as a way to develop an informed, reflective, teaching profession
The use of research and enquiry form an integral part of teacher education programs in 'high performing' countries. These programs are grounded in research, and employ data driven decision-making processes, so that policies and practices are evidence-based (DFAT, 2015). In Shanghai for example, structured, self-reflection processes, and school-based action research projects form some of the strategies used to generate local, school-based data upon which decisions can be based. In Finland, every student is required to complete a master's thesis that presents original research in either education studies or in the subject discipline in which they intend to teach. These programs integrate theory and practice through building close relationships between universities and schools, to ensure the practical experiences of pre-service teachers is based upon authentic learning experiences.

Technologies
The use of the technologies in teaching and learning is increasing in schools, just as it is in universities. Skills in using information and communication technologies (ICT) to enrich school classrooms, is an emerging skill required by all classroom

teachers. Behar & Mishra (2015) argue that the most effective use of technologies to help improve educational outcomes lies in using the strengths of ICTs as integral elements in the development process of pre-service teachers. But research suggests that academics teaching pre-service teachers lack the skills themselves to educate pre-service teachers in approaches to teaching and learning in schools, that involves the use of technologies (Moyle, 2010).

As such, the role of technologies in teaching and learning in both schools and universities, generally remains an under-developed field of study both in theory and practice. It is interesting to note however, that in those countries where school students are performing at the highest levels internationally on literacy, numeracy and problem-solving tests, are the same countries that are judged by the World Economic Forum as being countries that are the most able at leveraging technologies for education and economic gains (i.e. Singapore, Korea, Finland and Sweden).

Conclusions

Global trends in higher education are seeing considerable growth in the numbers of students enrolled in tertiary education. These numbers are growing each year, especially in India and China. At the same time, there is a growing demand globally, for primary teachers, if all children on the planet are to receive a school education. This growing demand for school level education is shining a light on the necessity for high quality pre-service teacher education.

To gain insights into the characteristics and policies used in teacher education, programs have been reviewed for pre-service teachers in countries where students perform well on the international standardized tests of PISA, TIMSS and PIRLS. The literature about teacher education discussed in this paper points to the following three broad, inter-related principles for effective policies in teacher education.
1. The recruitment of talented people requires teaching to be seen as an attractive career, by making graduate salary levels comparable to those for other professions and the civil service, and to ensure that conditions of teachers' work are favourable;
2. Procedures are in place to recruit and select pre-service teachers from the top third of graduating secondary students (or their equivalent e.g. career-change applicants); and
3. Quality assurance mechanisms are in place to ensure the continuing high quality of teacher pre-service and continuing professional learning programs.

Furthermore, in these countries, there is alignment and inter-connections between the respective education policies that provides explicit pathways through the curriculum being taught, and in the education careers available to university graduates.

The challenge for countries not recognized as 'high performing' is to map a pathway that is relevant in their respective contexts, to achieving improvements in teacher and student performance. Judging by the policy settings used in 'high performing' countries, this map may require the simultaneous connection of teaching and learning in schools with teacher education in universities. In addition, it will require the

establishment of shared understandings about the ways of making judgements about the key performance indicators that could be used for reflection and ongoing development. Establishing such a context for improving national education achievements requires leaders who can focus on an agenda of improvement rather than only an agenda of accountability. This last issue is taken up in a forthcoming paper to be released in 2016.

References

Australian Institute for Teaching and School Leadership (AITSL), (2014). *Initial Teacher Education Data 2014*, AITSL, Melbourne, Australia

Barber, M. & Mourshed, M. (2007). *How the world's best performing school systems come out on top*. McKinsey & Company

Behar & Mishra (2015). CTs in Schools: Why Focusing Policy and Resources on Educators, not Children, Will Improve Educational Outcomes, in Dutta, S.; Geiger, T. & Lanvin, B. (eds) (2015). *The Global Information Technology Report 2015. ICTs for Inclusive Growth*, World Economic Forum and INSEAD, Geneva, Switzerland

Bilbao-Osorio, B.; Dutta, S.; Lanvin, B. (eds). (2013). *The Global Information Technology Report 2013: Growth and Jobs in a Hyperconnected World*, World Economic Forum, Geneva Switzerland,

British Council (2012). *The shape of things to come*: *Higher Education Global Trends and Emerging Opportunities to 2020*, British Council, UK, retrieved on 17 October, 2015, from http://www.britishcouncil.org/sites/default/files/the_shape_of_things_to_come_-_higher_education_global_trends_and_emerging_opportunities_to_2020.pdf

British Council (2013). *The future of the world's mobile students to 2024,* British Council, UK

Brown, M. (2015). *Six Trajectories for Digital Technology in Higher Education*, Educause Review, Educause, retrieved on 17 October, 2015, from http://er.educause.edu/articles/2015/6/six-trajectories-for-digital-technology-in-higher-education

Darling-Hammond, L. (2010). Teacher education and the American future. *Journal of Teacher Education,* 61:1-2:35–47

Department of Foreign Affairs and Trade (DFAT) (2015). *Supporting teacher development: A literature review*, Office of Development Effectiveness, DFAT, Australia

Department of Higher Education and Training, Republic of South Africa, (2013). *White Paper for Post School Education and Training: Building an Expanded, Effective and Integrated Post School System*, Department of Education and Training, Republic of South Africa

Dutta, S.; Geiger, T. & Lanvin, B. (eds) (2015). *The Global Information Technology Report 2015. ICTs for Inclusive Growth*, World Economic Forum and INSEAD, Geneva, Switzerland

Gibney, E. (2013). A different world, *Times Higher Education*, The Times, UK, retrieved on 17 October, 2015, from https://www.timeshighereducation.com/features/a-different-world/2001128.article

Hanover Research, (2013). *Insights*: *Data-driven decision-making in higher education*, Hanover Research, USA, retrieved on 17 October, 2015, from http://www.hanoverresearch.com/insights/data-driven-decision-making-in-higher-education/?i=higher-education

Ingvarson, L., Reid, K., Buckley, S., Kleinhenz, E., Masters, G. & Rowley, G. (2015), Best Practice Teacher Education Programs and Australia's Own Programs, Australian Council for Educational Research, Melbourne, Australia

Ingersoll, R. (2007). A comparative study of teacher preparation and qualifications in six nations. retrieved 4 October, 2015, from http://files.eric.ed.gov/fulltext/ED498318.pdf

Ingvarson, L., Schwille, J., Tatto, M. T., Rowley, G., Peck, R., & Senk, S. (2013) *An Analysis of Teacher Education Context, Structure, and Quality-Assurance Arrangements in TEDS-M Countries*. International Association for the Evaluation of Educational Achievement (IEA)

Khor, K.A. & Yu, L.G. (2015). Influence of International Collaboration on the Research Citation Impact of Young Universities, Institute of Strategic Studies Islamabad,

Marginson, S. (2014). *The social implications of high participation systems (HPS) of higher education*, University of Sheffield, UK

Mehta, J.D. & Schwartz, R. B. (2011) Canada looks like us but gets a lot better results, In M. S. Tucker (ed), *Surpassing Shanghai: An agenda for American education built on the world's leading systems*, pp141-165, Cambridge, MA, USA

Morris, J. & Patterson, R. (2013). Around the world: The evolution of teaching as a profession. retrieved 10 October, 2015, from http://nzinitiative.org.nz/site/nzinitiative/files/publications/Around%20the%20World%20-%202%20page%20summary.pdf

Moyle, K. (2010). *Building Innovation: Learning with Technologies*, Australian Education Review, Australian Council for Educational Research, Melbourne, Australia

National Science Foundation (2014). *Science and Engineering Indicators*, US Government, USA

Newcastle University, (2015). Undergraduate Study, Newcastle University, UK, retrieved on 17 October, 2015, from http://www.ncl.ac.uk/undergraduate/life/support/asylum/

New Media Consortium (NMC), (2015). *New Horizons: Higher Education 2015*, NMC, Austin, Texas, USA, retrieved on 17 October, 2015, from http://cdn.nmc.org/media/2015-nmc-horizon-report-HE-EN.pdf

Norton, A. (2014). *Mapping Australian higher education 2014-15*, Grattan Institute Report 2014-11, Grattan Institute, Melbourne, Australia

Organisation for Economic Cooperation and Development (OECD) (2012), *Education at a Glance 2012: OECD Indicators*, OECD Publishing

Organisation for Economic Cooperation and Development (OECD) (2014a), *Education at a Glance 2014: OECD Indicators*, OECD Publishing

Organisation for Economic Cooperation and Development (OECD) (2014b), *Singapore and Korea top OECD's first PISA problem-solving test*, OECD, Paris, OECD Publishing

Sahlberg, P. (2011). The Professional educator: Lessons from Finland. *American Educator,* 35(2):34–38

Tatto, M., Krajcik, J. & Pippin, (2013). Variations in teacher preparation evaluation systems: International perspectives. retrieved 1 October, 2015, from http://naeducation.org/cs/groups/naedsite/documents/webpage/naed_085999.pdf

Teacher Education Ministerial Advisory Group (TEMAG) (2014). Action Now. Classroom Ready Teachers, Australian Government Department of Education, retrieved 1 October, 2015, from http://www.studentsfirst.gov.au/teacher-education-ministerial-advisory-group

United Kingdom Department of Business, Innovation and Skills, (2013). *International Comparative Performance of the UK Research Base – 2013*, Elsevier, UK

United Nations, (2015). *Goal 4: Ensure inclusive and quality education for all and promote lifelong learning*, 2015: Time for Global Action, retrieved on 17 October, 2015, from http://www.un.org/sustainabledevelopment/education/

United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics (UIS) (2009). *Global Education Digest 2009: Comparing Education Statistics Across the World*, retrieved on 17 October, 2015, from http://www.uis.unesco.org/Library/Documents/ged09-en.pdf

United Nations Educational, Scientific and Cultural Organization (UNESCO) Institute for Statistics (UIS), (2015). *Sustainable Development Goal for Education Cannot Advance Without More Teachers*, UNESCO, retrieved on 17 October, 2015, from http://www.uis.unesco.org/Education/Documents/fs33-2015-teachers.pdf

University of Oxford, (2015). *International Trends in Higher Education*, University of Oxford, International Strategy Office, Oxford, UK, retrieved on 17 October 2015, from https://www.ox.ac.uk/sites/files/oxford/International%20Trends%20in%20Higher%20Education%202015.pdf

Wagner, E. & Ice, P. (2012). *Data Changes Everything: Delivering on the Promise of Learning Analytics in Higher Education*, Educause Review, retrieved on 17 October 2015, from http://er.educause.edu/~/media/files/article-downloads/erm1243p.pdf

World Trade Organisation (WTO), (2015). *The General Agreement on Trade in Services (GATS): objectives, coverage and disciplines,* WTO, USA, retrieved on 17 October 2015, from https://www.wto.org/english/tratop_e/serv_e/gatsqa_e.htm