Towards Personalized Guidance and Support for Learning
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PERSONALISED LEARNING IN DEVELOPING COUNTRIES – IS HIGHER EDUCATION READY?

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Summary

This conceptual paper examines the notion of personalised learning (PL) in a developing country context. The methodology employed is a review of literature and theories of Distance Education, as they pertain to the variables of context, technology, students and teaching staff with respect to PL in developing countries.

Problem

The basic premise of PL is the belief that each student is unique and learns in different ways. It has been suggested that PL actually originated from Howard Gardner's 1983 theory of multiple intelligences (Johnson, 2004).

Many Distance Education (DE) higher education (HE) institutions in developing countries have large student numbers, poor infrastructure, low uptakes of technology use and insufficient levels of digital literature skills. This is exacerbated by the challenges they face with regard to connectivity and bandwidth where both costs as well as accessibility are prohibitive.

PL is growing in importance and popularity in HE circles, but the question that needs to be asked, is whether it is not only possible, but also desirable in developing countries, particularly those employing a DE format.

The research question therefore is:

> *"Are developing countries ready for personalised learning?"*

Personalised learning

"The term personalised learning, or personalisation, refers to a diverse variety of educational programs, learning experiences, instructional approaches, and academic-support strategies that are intended to address the distinct learning needs, interests, aspirations, or cultural backgrounds of individual students", (Stevens, 2017). According to Stevens, PL refers to instruction in which the pace of learning and the instructional approach are optimised for the needs of each learner and typically, technology is used to try to facilitate PL environments. Providing PL experiences that allow all students equal access to quality education according to their needs and interests is an ideal all educators embrace (Lynch, 2017).

It is possible for PL to take place in traditional face-to-face settings as well as technology-enhanced learning environments. When face-to-face teaching takes place, PL often takes place when there is a low student to teacher ratio (Nandigam, Tiramala, & Baghei, 2015). An important element of PL is however its link to the use of technology. Feldstein and Hill (2015) contend that a more accurate term for PL would be "technology-assisted differentiated instruction".

Vassiliou and McAleese (2014), in their report to the European commission on new modes of learning and teaching in HE, put forward that PL pathways can be enhanced with student data, collected through the use of online provision of teaching. According to them, in a face-to-face environment, it is difficult for teachers to monitor the pace and progress of every student. It is their contention that the use of online technologies can therefore make use of data analytics in order to provide this personalised pathway for the students.

An argument can be put forward that personalisation made its appearance in many of the commercial fields e.g. retail and travel. According to Gous and Roberts (2010), the concept of the "New Tourist" was first advanced by Aurelia Poon in her book "Tourism, technology and competitive strategies" (1993). Poon is a leading commentator on future trends in tourism and she advocated that in future tourism would be flexible, segmented, environmentally sound and diagonally integrated rather than mass, rigid, standardised and packaged.

Another example is the retail industry where the original model was based on the "pile them high and sell them cheap" philosophy. The retailers decided which products on which to hang their hats, and then bought them in bulk and sold as cheaply as possible. During the 1980's (around the same time that the tourism industry started presenting flexible options based on consumer desires rather than packaged deals), the large retailers recognised that the customer wanted a larger choice and variety, even if it was a more expensive option.

It can therefore be argued that education is merely following the example of other disciplines that launched personalisation a few decades back. Bradshaw (2011) in the Financial Times (2011) quotes Rupert Murdoch from his speech to the e-G8 conference of internet entrepreneurs and European policymakers in Paris on 24 May 2011 "The same technologies that transformed every other aspect of modern life can transform education"

Methodology

This conceptual paper seeks to bring together various aspects that should be addressed when investigating PL in developing countries, The author acknowledges the scope of this topic is vast and cannot be exhausted in one paper. This particular paper looks at four aspects that are pertinent to the topic and serves as a starting point for the discussions. These four aspects are: an investigation into the actual context of developing countries, the role of technology in PL, the learner perspective and finally the role of the teacher/facilitator. In order to do this, various theories and empirical research relating to learning, distance education and the future roles of distance education staff are examined. In addition, the definition and reports on developing countries are looked at and discussed in the way in that they relate to DE.

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Figure 1 shows the model that provides the basis for this discussion article and demonstrates the link between the four trajectories that are being examined.

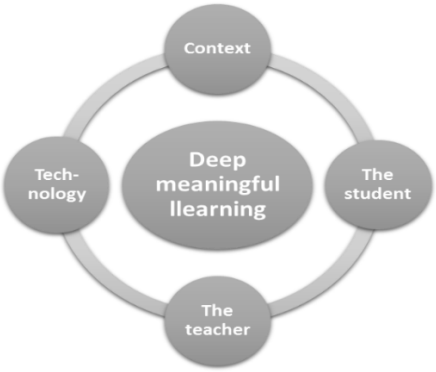

Figure 1. Four aspects of discussion on personalised learning

Context – the distance education institution in a developing country

An analysis of the concept of Open Distance Learning (ODL), within the context of an ODL institution in the developing countries will follow:

Definition of a developing country

There is no universal definition of a developing country versus a developed country. One of the factors used to distinguish developed countries from developing countries is gross domestic product (GDP) per capita. An unofficial threshold for declaring a country to be developed is a GDP per capita of $12,000. This figure is calculated by dividing the GDP by the population. Examples of countries that are classified as developing include Argentina, Brazil, China, Malaysia, Mexico, Russia, India and South Africa. It can be noted that none of these countries are from the Northern America or from Europe.

However, the World Bank (2018) describes developing countries as those countries with a Gross Domestic Income (GDI) per capita per year of less than $995 in 2017. The basic difference between the two is that GDP measures what the economy produces – goods, services, technology, and intellectual property, while GDI measures what the economy makes, tracking aspects like wages, profits, and taxes (Udland, 2015).

Another measuring device is the Human Development Index (HDI) which was developed by the United Nations. This index quantifies life expectancy, education, and income into a standardised number between 0 and 1, and most developed countries have an HDI index of above 0.8 (Investopedia, 2016). According to the Human Development Report (2016), developing countries have an average HDI of 0.668 and their average GNI equates to $9 257.

The following are characteristics of developing countries according to Ayesha (n.d.)

- Low per capita income;
- Excessive dependence on agriculture;
- Low level of capital formation – inequalities in the distribution of income;

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- Rapid population growth and disguised unemployment;
- Lower levels of human capital – education, health and skills;
- Dualistic nature.

Since 2016, the World Bank no longer makes a distinction between developing and developed countries. Instead, it classifies countries into one of four categories according to Table 1.

Table 1: World Bank classification of country groupings

Category	GNI in US Dollars
Low income countries	< $1025
Lower middle income countries	$1025 – $4035
Upper middle income countries	$4036 – $12 236
High income countries	>$12 237

According the International Monetary Fund (IMF) (2018), the following are but a few of the countries that they define as *developing*. They are defined as countries that have an emerging market and a developing economy. Table 2 lists a selection of countries that are classified as *developing* according the IMF. The countries listed here are those where there is a history of DE institutions.

Table 2: Developing countries according to the IMF (2018)

Bangladesh
Brazil
China
Egypt
India
Indonesia
Mexico
Nigeria
Pakistan
South Africa
Turkey

According to the World Bank (2018), more than 80% of the world's population live in developing countries, which includes Africa, most of Asia and Latin America, as well as Russia. They state further that over 50% of HE students in the world, hail from developing countries. A common scenario to many developing countries is the large number of students that seek access to HE. This has led to the concept of mega-universities.

Mega-universities

A mega-university is defined as "a distance teaching institution with over 100,000 active students in degree level courses" (Daniel, 1996; p.29). Table 3 shows how the top 10 mega-universities in the world all hail from developing countries; it indicates that the majority of mega-universities in the world emanate from developing countries with a large population e.g. China, Russia, Philippines, as well as Argentina, Brazil, Egypt, Thailand and Mexico, amongst others. Many of the universities in these countries serve in excess of 200 000 students.

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Based on the criteria mentioned above for a country to be classified as a developing country, Table 3 shows the relationship between the largest mega-universities in the world (by student numbers) and their classification according to the IMF (2018), Human Development Index (HDI) (2016) and Gross Domestic Income (GDI) (Udland, 2015). It can be seen that the top 10-mega universities all hail from developing countries.

Table 3: Comparison of top mega-universities to their country's indicators for being classified as a developing country

Mega-university	No of students	Country	Dev IMF	HDI (2015)	GDI (2015)
IGNOU	4 000 000	India	√	0.624	5 663
Open University of China	2 700 000	China	√	0.738	13 345
Anadolu	1 974 000	Turkey	√	0.767	18 705
Allama Iqbal	1 326 000	Pakistan	√	0.550	5 031
Bangladesh OU	650 000	Bangladesh	√	0.579	3 341
Terbuka	646 000	Indonesia	√	0.691	10 053
Shanghai Open University	610 000	China	√	0.738	13 345
Dr BR Ambdekar	450 000	India	√	0.624	5 663
Unisa	350 000	South Africa	√	0.666	12 087
NOUN	300 000	Nigeria	√	0.527	5 443
NUDE	260 000	Spain	x	0.884	32 779
Korea OU	211 000	Korea	x	0.901	34 541
OU	174 000	United Kingdom	x	0.909	37 931
Madya Pradesh	150 000	India	√	0.624	5 663
Modern Univ of Humanities	140 000	Russia	x	0.804	23 286
Norte do Parana University	130 000	Brazil	√	0.754	14145
National centre for DE	120 000	France	x	0.897	38 085

Although the top ten mega-universities are all classified as coming from developing countries (according to the IMF (2018)) and have a HDI of less than 0.8 as per the HDI (2015), the mega-universities in China, Turkey, Indonesia and South Africa all have a GDI above $995. It is interesting to note that those countries that have been classified as developed countries have a GDI of over $32 000 and an HDI of over 0.8. Figure 2 provides a graphical perspective on the size of the student population at the top 10 mega-universities and their HDI levels.

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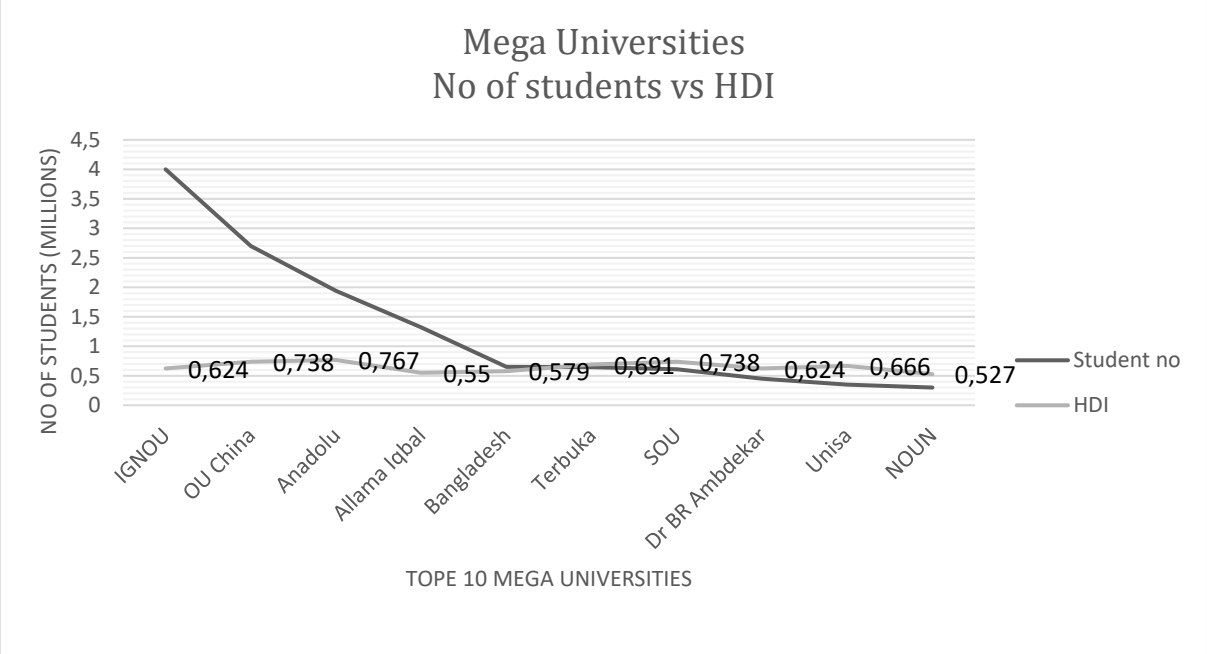

Figure 2. Comparison of student numbers at mega-universities and their HDI

The universities with the highest number of students all display an HDI level of between 0.550 and 0.767 compared with the figures ranging from 0.804 to of 0.909 for the developed countries.

According to Avegrou, Hayes, and La Lovere (2016), there is a marked disparity between the distribution of physical access to the internet, as well as mobile technologies between developed and developing countries. The International Telecommunications (ITU) report (2016) states that almost two thirds of people living in developing countries do not have access to the internet.

From the above it can be deduced that the largest mega-universities in the world all hail from developing countries where the HDI is relatively low. This has a direct impact on PL using technology, as the lack of resources is seen as the root of many of the problems facing HE institution in developing countries, where the government funding per student is significantly lower than the developing nations.

Technology as a mediating tool for Personalised Learning

Many HE institutions in developing countries employ a range of technologies for teaching and learning purposes. Taking the model of Taylor (2001) of 5 generations of DE delivery modes, the 5th generation refers to total online delivery. This is made possible through employing integrated technologies that are reliant on a competent infrastructure, accessibility to reliable internet connectivity, students, and staff who are proficient in digital literacy understanding and skills.

In their report on HE in developing countries (World Bank, 2000), the authors stress the need for better access to technology and resources in order to connect these developing countries to the advancing trends in global teaching. They contend that although recent developments in

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communication technology have improved the viability of DE, economic viability remains problematic due to the high costs and extensive infrastructure requirements.

In this respect, it is prudent to refer to the concept of the Iron Triangle as presented by Sir John Daniel, the former head of the Commonwealth of Learning (COL) (Daniel, 2013), as well as the 5 different generations of distance education (DE) as put forward by Taylor (2001).

The Iron triangle and the 5 generations of distance education delivery

According to Daniel (2013), DE can be represented through the analogy of an Iron Triangle. He states that the challenge in DE is to increase access, improve quality and cut costs. When representing access, quality and costs as 3 vectors, it can be seen how difficult it is to achieve this in a face-to-face teaching environments. As can be seen in Figure 3, the goal of distance education is to optimise the triangle, increasing access and quality and at the same time, to reduce costs. If you pack more students into the classroom to raise access, you could be accused of damaging the quality. Try to up the quality with more and better teachers and learning resources and the costs will go up. Cut costs directly and you will threaten both access and quality.

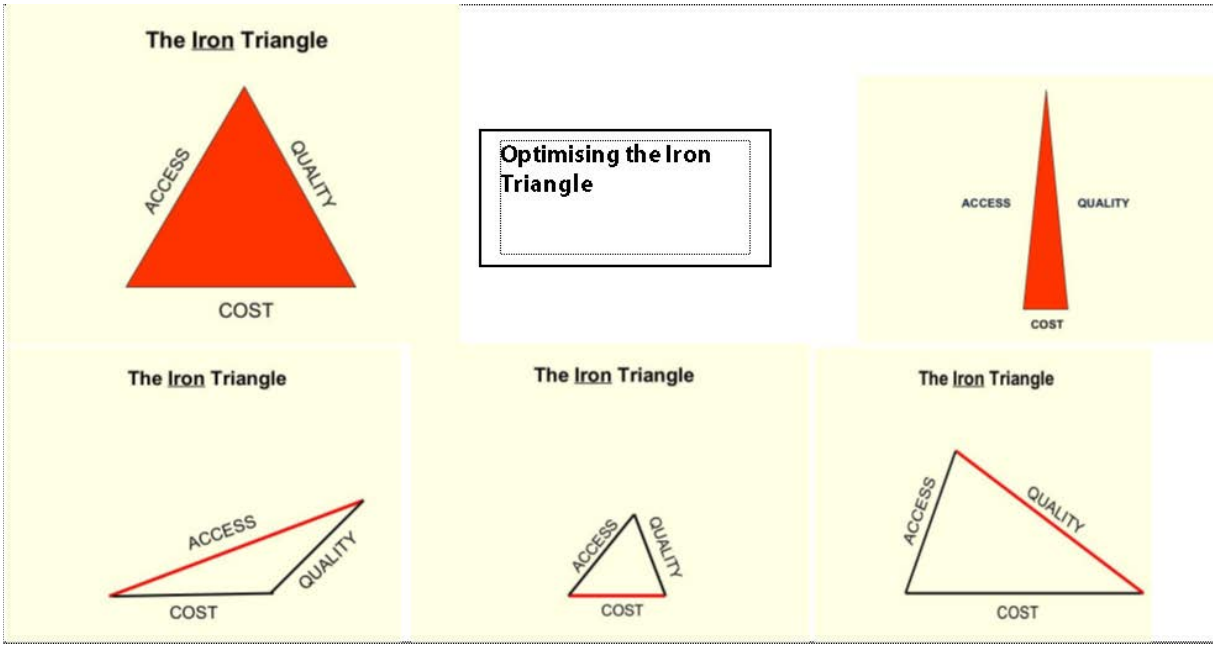

Figure 3. The Iron Triangle

To stretch the triangle and achieve, simultaneously, wider access, higher quality and lower costs, you need technology. The evolution of DE reflects the arrival of a succession of technologies that helped to offer better education to more people through space and time at a reasonable cost. By looking at all the new technologies that are being offered, one can see that both students and lecturers require new meta-skills. As new technologies in education emerge, the challenge is to remember why we are in the field of education – to teach people – a student-centred approach should remain.

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While Daniel (2013) refers to the important role that technology can play in distance education settings, it is also worth looking at the history of the modes of delivery of DE, with particular emphasis on developing countries. Table 1 provides an overview of Taylor's framework for 'the generations of distance education (Adapted from Hedenrych & Prinsloo, 2010; pp.8-9):

Table 4: Five generations of distance education

1st	Correspondence – single medium (print) – mass production of content
2nd	Teleconferencing – audio – communications network – synchronous
3rd	Multi-media and computer-assisted learning – interaction with content
4th	Flexible learning via online delivery – communication enhanced online
5th	Intelligent flexible learning – automated content and responses and campus portals

I would argue that developing countries employ a mix of these 5 generations of delivery. An example is Indira Ghandi Open University (IGNOU) in India where a fusion of technologies is used. IGNOU has a large multimedia centre where radio and video recordings are made and distributed to their learners. However, their main mode of delivery is still correspondence.

The University of South Africa (Unisa) makes use of a blended, hybrid range of technologies with the majority of courses still being delivered via print, while a select number of courses are fully online. According to the Unisa's Open Distance Learning Policy (2016), three different delivery channels are available. Firstly, print media remains the least expensive and most popular delivery mode. The second delivery mode includes technologies with limited student-teacher interaction, where resources such as digital media, satellite broadcasting and online distribution of content and information via the Lerner Management system (LMS) are presented in an asynchronous manner. Finally, a move toward multimedia with interactive possibilities that include audio conferencing and discussion forums in order to support interactive teaching and learning.

Moore's three types of interaction and Anderson's Equivalency theorem

This leads to the various modes of interaction in DE. Moore (1989) introduced his "Three Types of Interaction" in DE, looked at form the students' point of view. In this model, he proposed that there are three different types of interactions: student-teacher, student-student and student-content.

Anderson (2003) expanded on Moore's model and presented the application of the three modes. Figure 4 indicates the three different modes of interaction that are possible within a DE environment (Anderson, 2003).

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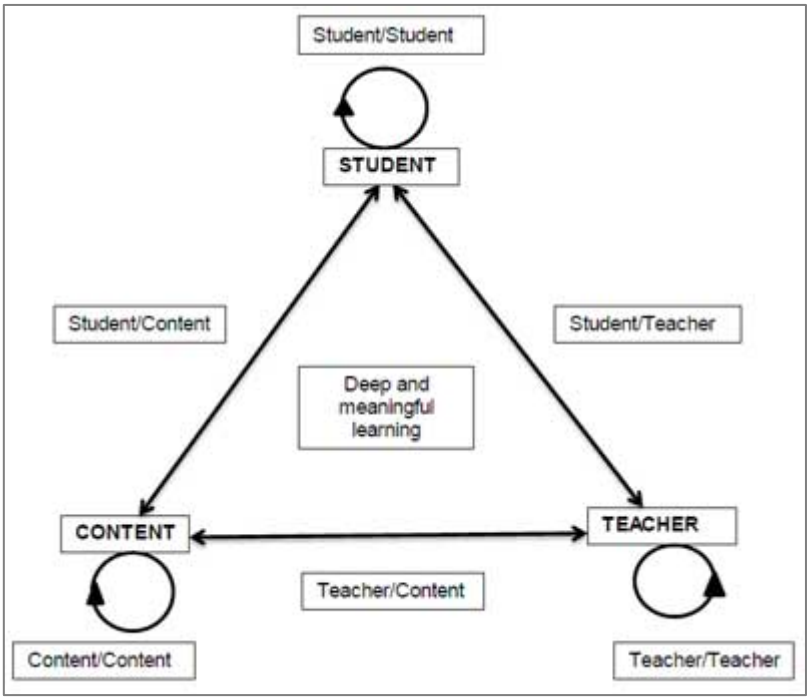

Figure 4. Modes of Interaction

Anderson's (2003) equivalency theorem provides a theoretical base for indicating the amount of each of these interactions that is required for deep, meaningful learning to take place. He proposed 2 theses:

- Thesis 1: Deep and meaningful formal learning can take place as long as one of the three forms of interactions (i.e., student–teacher, student–student, and student–content) is at a high level. The other two may be offered at minimal levels, or even eliminated, without demeaning the educational experience. Therefore, only one of the interactions is necessary at a very high level.
- Thesis 2: By providing high levels of more than one of the interaction types, students will enjoy a more satisfying educational experience. However, using more than one type of interactive experience is not as time and cost effective as using just one type.

Expanding on his 2003 model, Miyazoe and Anderson (2010) suggest that if all types of interaction produce similar learning outcomes, then it does not make sense to opt for the most expensive one – that of student-teacher interaction. Bernard, Abrami, Borokhovski, Bethel, Wade, Tamin, and Surkes (2009) go as far as to state that student-teacher interaction is actually the least effective form of interaction.

Drawing on the context of DE in developing countries, many HE institutions need to provide education to a large number of students and often with very scarce resources. The question to be asked then is to what extent technology is needed to provide a personalised learning experience. Hulsmann and Shabalala (2016) agree and state that there is a disparity between economies of scale and digital interaction in mega universities.

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Learner-centeredness – the students

What makes personalisation different is that it is student-centred and provides students more opportunity for agency around their learning. This can be achieved through collaboration between the learner and teacher to determine and drive the learning process, as well as the individual needs of each student being accommodated by the teacher (Pittcock, 2017). As students need to take ownership of their own agency, this involves a higher level of self-directed learning. Knowles describes self-directed learning (SDL) as "a process in which individuals take the initiative without the help of others in diagnosing their learning needs, formulating goals, identifying human and material resources, and evaluating learning outcomes" (Knowles, 1975).

SDL is a foundation that can help establish features of a personalised system, particularly in helping students to manage their overall learning activities and monitor their own performance (Kim, Olfman, Ryand, & Eryilmaz, 2014).

Mentz and Oosthuizen (2016) highlight the fact that traditional teacher-centred practices are still the norm in most South African schools and HE institutions. This approach does not adequately prepare students for lifelong learning in the 21st century. As a result, SDL has become increasingly important, both in the South African education context, as well as education sciences in the international arena.

According to Green, Facer, Rudd, Dillon, and Humphrey (2005), "the logic of education systems should be reversed so that it is the system that conforms to the learner, rather than the learner to the system. This is the essence of personalisation".

Are our students from developing countries self-directed life-long learners?

Distance education teaching staff

The fourth aspect of PL that needs to be addressed is the role of the DE teaching staff. PL obviously requires new roles and competencies from the teacher and facilitators. The roles of distance educators are evolving as teaching itself reacts the new technologies and learning strategies. Roberts and Bezuidenhout (2016) carried out a content analysis form various literature sources that discussed the roles of distance educators. They identified 10 broad roles and these are: subject specialist, researcher, mentor, student support, technology expert, instructional designer, facilitator, management, administration, and being a team player.

Roberts (2018) undertook an empirical study where teaching staff at Unisa were asked to rank the importance of each of these roles currently, and projected 5 years into the future. In addition, they were asked to rate their own perceptions of the competencies in each of these roles. The results indicated that the roles of the distance educator as a technology expert and online instructional designer escalated in importance between current and future roles. Although, the role of a subject specialist remained top of the list, the role of being a technology expert moved from number 7 to number 2, and instructional designer progressed

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from number 9 to number 5. Both the roles of technology expert and online instructional designer were perceived by the teaching staff to be low.

Effective PL clearly requires a level of expertise in technology and online education. The results from the two studies carried out above indicate that staff development and Continuous Professional Development (CPD) are necessary components to upskill the teaching staff in areas that are vital to implementing PL.

Nancy Kassebaum, a former U.S senator summed it up by stating, "There can be infinite uses of the computer and of new age technology, but if teachers themselves are not able to bring it into the classroom and make it work, then it fails" (Crocker, 2015).

Conclusion and recommendations

The question being asked is whether developing countries are ready to implement PL. In order to address this question, it is imperative that various factors are first studied. In this paper, a cursory look was given into four different aspects of PL in developing countries. The areas that were considered are the actual context of DE in developing countries, technology requirements, the learners themselves and lastly the roles of the teaching staff – see Figure 1.

The top 10 mega-universities in the world, according to different criteria, are all from countries that have been classified as *developing*. It can be concluded then that most DE students worldwide hail from developing countries. In many cases, developing countries have high student numbers, low access to technology due to unaffordability, poor digital literacy skills and lack of access to the internet. In addition, they are hampered by the lack of monetary resources that are necessary to train teachers in the required skills.

It has been established that PL operates most effectively in a technology driven environment. Therefore, my contention is that access to technology increases the disparity between students from developed and developing countries. However, France (2018) cautions against placing too much emphasis on the technology aspect of PL. He states that meaningful learning does not have to take place only in a technology rich environment, but that is can be achieved "through differentiated pedagogy that honours the human condition of learning".

The development of SDL skills in students from developing countries has not been widely researched. It is recommended that this aspect be empirically studied in various developing countries to ascertain their level of SDL skills. A starting point would be the development of SDL programs in schools as well as HE institutions, which will assist students to gain the skills that are necessary for them to develop their own agency in PL.

Further research is required on the training and CPD of teaching staff in DE. The research carried out by Roberts (2018) should be expanded to include results from other developing countries. Teacher training in technology and online instructional design should be at the forefront of these CPD programs.

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This paper is a starting point in the discussions and debates that need to held regarding PL in developing countries. It is the author's hope that these conversions will be initiated and continued on a regular basis so that the specific context of developing countries is understood and encompassed into any plans regarding the implementation of PL.

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