

An analysis of heutagogical practices through mobile device usage in a teacher training programme in Malawi

ANDREW CHIMPOLOLO
Senior Lecturer
Faculty of Education and Media Studies
University of Malawi (Polytechnic)
Private Bag 303
Blantyre 3
MALAWI
E-mail: achimpololo@poly.ac.mw
Mobile: +265 999921567

Abstract: This paper analyses the mediation of heutagogical practices using mobile devices in a teacher training programme in Malawi. Existing literature suggests that the use of mobile devices facilitates the development of heutagogy, an educational approach characterised by interdependent learning, double and triple-loop learning and participation in communities of practice. The study draws on heutagogical principles and Diffusion of Innovation theory by Rogers (1995). It adopts the case study method, and uses questionnaire, semi-structured interviews, focus group discussions and personal diaries for data collection. Mobile phone ownership is almost universal at the college and the majority of the student-teachers possess at least one internet-enabled device. Despite laptop ownership and institutional access to computers being low, a relatively high number of student-teachers frequently use computers in their studies to complement mobile phones. With regard to heutagogical practices, few student-teachers claim to engage in interdependent learning as well as double and triple-loop learning. Conversely, the majority of them tend to participate in communities of practice,

particularly those involving students only. In addition, few student-teachers hold the intention to use their devices in their own teaching.

Keywords: Heutagogy, Mobile devices, Teacher training

Introduction

Teacher education in Malawi is highly plagued by staffing challenges. According to the Malawi Education Sector Performance Report (MESPR), more than 60% of the teachers in secondary schools are unqualified (Ministry of Education Science and Technology [MoEST], 2015). The government of Malawi hires under-qualified and unqualified teachers to fill acute staffing gaps at the secondary school level (MoEST, 2015). Secondary school student-teachers are recruited either among fresh secondary school graduates or through upgrading schemes which target practicing, unqualified or under-qualified teachers who want to advance their qualifications. The staffing problem is further compounded by underfunding. A higher percentage of the 2014/15 budget appears to have been allocated to higher education (30% with about 12,000 learners) and secondary education (14% with about 761,000 learners) compared to basic education (53% with about 3,688,000 learners) although the overall allocation was insufficient (Nkhokwe, Ungapembe & Furukawa, 2017). The pupil-teacher ratio (PTR) at the secondary school level, which was 41:1 in 2015, is higher than the MoEST target of 20:1 (Index Mundi, 2017, sourced from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) Institute for Statistics). The MoEST, through the National Education Sector Plan (NESP) for the 2008 – 2017 period, acknowledges that limited funding leads to inefficiencies that affect the quality of teacher

education (MoEST, 2008). A poor learning environment in colleges impacts negatively on the preparation of teachers and demotivates potential student-teachers to enroll (see also Msiska et al., 2013).

In terms of pedagogy, there is currently a divide between policy and practice in as far as teaching is conducted at all levels of the education system in Malawi. Whilst government policies and donor-funded programmes direct educational institutions to use learner-centred approaches, the education system is characterised by teacher-centred approaches (Mizrachi, Padilla & Susuwele-Banda, 2010; Chilemba & Bruce, 2015). Although the teacher training curricula promote the application of learner-centred approaches, Mizrachi et al. (2010) observe that the reality in training institutions is different as lecturers tend to use teacher-centred approaches. They further note that most student-teachers lack the ability to transfer skills from college to the workplace after their graduation. It is assumed in the present study that the student-teachers get influenced by the teacher-centred approaches in the training colleges as well as lack use of ICTs and other resources. Learner-centred approaches are desired in education because they promote learner independence, increase motivation and enhance learners' control of the learning process (Blaschke, 2012).

Heutagogy is one learner-centred approach which the student-teachers could adopt in their teaching and learning activities. The approach helps to increase self-efficacy, enables learners to manage their own learning as well as reflect upon what is learned and how it is learned (Booth, Blaschke & Hase, 2016). Heutagogy also promotes collaboration among learners. Mobile devices

provide an opportunity for the student-teachers to operate independently as they would be able to access online teaching and learning resources at their convenience. The use of mobile devices could also help to enhance teaching and learning processes among the student-teachers in the face of acute teacher shortage. MACRA (2014) reveals that 74% of tertiary students in Malawi had access to Internet through their mobile phones. Three main heutagogical principles are considered in the present study based on the works of Blaschke (2014) and Hase (2009; 2014). The first one, interdependent learning, concerns a learner's ability to learn by oneself through practices such as exploration, discovery, research, testing hypotheses, validation and collaboration (Hase, 2014). These practices not only help in knowing how to access information but also how to conduct meaningful research and be able to validate knowledge. Interdependent learners know how to access information and verify sources by accessing appropriate journals and books or networking with experts and peers to find out if what is being read can be substantiated (Hase, 2014). This includes the ability to think rather than blindly accept everything seen.

The second principle revolves around double and triple-loop learning. Double and triple-loop learning are both facilitated through self-reflection. As the learners engage in interdependent activities such as exploration, research and collaboration, they need to reflect upon what is learned and how it is learned (Blaschke & Hase, 2016). Double-loop involves analysing what has been learnt and how the new knowledge and the path to learning have influenced the values and belief system (Hase, 2009). Thus, the learner reflects upon the problem-solving process and how it influences the learner's own beliefs and actions. Triple-loop learning involves double reflection

in and on action as well as outside contribution by learning lessons from experience (Barbat, Boigey & Jehan, 2011). While double-loop learning promotes the application of knowledge and experiences to familiar as well as novel situations, triple-loop learning helps to develop better understanding of how to respond to the learning environment and deepening one's comprehension of why one chooses certain studying patterns. The third principle concerns participation in communities of practice where people with common interests and goals engage to develop knowledge and themselves both personally and professionally. Within such communities, members share their experience and tacit knowledge in free flow, improving their abilities and skills, and fostering learning (Agrifoglio, 2015). The development of heutagogy can be linked to the concept of mediated learning experience since in both situations learners are guided to 'learn how to learn' (meta-cognition) by someone who is more knowledgeable (Greenberg, 2000). The goal is to assist someone to become a more skilled and independent learner. This paper provides an analysis of heutagogical practices through the use of mobile devices among student-teachers at Domasi Teachers Training College in Malawi. This is a public institution established in 1993 to train secondary school teachers as one way of addressing an acute shortage of qualified teachers which continues to affect the education sector to date.

Methodology

This study was an action research case study within the interpretive paradigm. The interpretive paradigm is primarily concerned with generating context-based understanding of people's thoughts, beliefs, values and associated social actions. When applied to educational research, the paradigm enables researchers to build rich local understandings of the life-world experiences of

teachers and students, and of the cultures of classrooms, schools and the communities they serve (Taylor & Medina, 2013). In the present study, the paradigm was used to analyse the attitudes and experiences of the student-teachers concerning the heutagogical use of mobile devices. The data collection exercise included multiple methods comprising a questionnaire survey, two sets of semi-structured interviews (one involving the College Principal, Dean of Students, Dean of Education and Head of Mathematics and the other with the student-teachers [12 of them]) and focus group discussion (FGDs).

Of the total 696 student-teachers in second, third and fifth year at Domasi College, 394 student-teachers participated in the survey representing 57%. The other student-teachers in the three years were either away on teaching practice or chose not to participate due to other reasons. All the 394 student-teachers at the college (394) took part in the questionnaire survey. A total of 12 semi-structured interviews were held with randomly selected participants. In addition, three FGDs were conducted – one for each year of study – which involved a total of 18 student-teachers. Each FGD had 6 participants who were selected through purposeful sampling to ensure that the groups were as diverse as possible in terms of gender, and discipline. This sample size was based on Stewart and Shamdasani (1990) who postulate that an effective FDG has between 6 and 8 participants (cited in Gill, Stewart, Treasure & Chadwick, 2008). The questionnaire had two sections. The first section collected demographic information pertaining to the type or field of study, year of study, gender, age, teaching experience and place of work. The second section comprised questions concerning the kinds of devices in possession of the student-teachers, extent to which mobile devices are used as learning tools and any indications on the emergence of

heutagogical practices among the student-teachers. The other questions explored the student-teachers' attitudes towards the use of mobile devices both in their studies and teaching activities and the influence of device characteristics (based on the Diffusion of Innovation [DoI] theory proposed by Rogers in 1995 [see Rogers, 2003]) on the student-teachers' perceptions. Most of the items in this section were developed based on the five-point Likert Scale.

The first set of semi-structured interviews were conducted during the situational analysis phase and focused on contextual profiling of the research site to obtain background information about the college and the research participants (student-teachers). The second set comprised interviews with the student-teachers. During the interviews, the participants provided useful and elaborate data on their experiences regarding the heutagogical use of mobile devices. They further provided valuable insights on past events regarding the general use of ICTs at the college. Three focus group discussions (FGDs) were conducted with the student-teachers. The FGDs, which took two-hours each, complemented the questionnaire survey and provided an opportunity for the participants to clarify complex issues. The participants were allowed to identify new issues and forgotten aspects which were not highlighted in the questionnaires. Data analysis was an on-going process in this study and was conducted in three main phases. The first phase began right in the field during the data collection exercise where emerging themes were identified and preliminary data categorisation was done. Qualitative data analysis programme, NVivo version 11 was used for data management. The second phase focused on formal analysis of the data collected through the questionnaire, semi-structured interviews and FGDs. The third phase concerned interpretation and discussion of the results based on heutagogical principles and DoI.

Results and their discussion

The results have been discussed under two major themes: access and use of mobile devices and extent of heutagogical practices. The latter has further been analysed in terms of the related principles of interdependent learning, double and triple-loop learning and participation in communities of practice.

Access and use of mobile devices

Access to computers among the student-teachers seems to be limited at the college with only 12 functioning computers open to all student-teachers and another 10 reserved for computer science student-teachers. Furthermore, about 47% of the student-teachers who participated in this study own a laptop. Despite limited institutional computer access and low laptop ownership, general computer use seems to be relatively high among the student-teachers. The results indicate that 65% of the student-teachers use a computer for academic purposes every day. Additionally, six percent use it at least once a week, nine percent use it once a month and 20% never use it at all. Mobile phone ownership is almost universal among the student-teachers. About 98% of the student-teachers in this study had a mobile device. Approximately 91% had one mobile phone while 13% owned two mobile phones. In addition, eight percent of the student-teachers had either a tablet only or both. It should be noted that not all phones or tablets are necessarily Internet-enabled. It is important to note that these results only refer to ownership and do not entail actual use. The present study shows that a slightly higher percentage of the student-teachers own a mobile device than an earlier survey report which indicated 88% as the ownership rate for

students pursuing tertiary education in Malawi (MACRA, 2014). This difference could be attributed to the increase in mobile phone access in Malawi over the past few years (see Porter et al. 2016) as well as the fact that over half of the respondents (about 75%) in the present study are in-service student-teachers who earn a salary and can afford a mobile phone. In terms of Internet-enabled devices, a total of 83% of the student-teachers owned at least one such device excluding the overlaps with laptops. The results suggest that only a percentage equivalent of that of the laggards (17%) does not own an Internet-enabled device. According to Rogers (2003), laggards are near isolates in social networks and tend to be suspicious of innovations and change agents.

It appears that daily use of mobile devices in studies is relatively frequent among the student-teachers. About 61% of the student-teachers claimed to use their mobile devices for study purposes every day. A further 20% indicated that they do so at least once a week, 12% at least once a month, and seven percent never at all. The results suggest that student-teachers in the late majority have started using mobile devices in their studies on a daily basis at the college. According to Rogers (2003), individuals in the late majority make a decision to begin using technology as a result of increasing network pressures. The results show no correlation between daily use of mobile devices and year of study, gender or subject studied. Surprisingly, most of the fifth year student-teachers and those studying science own laptops appear to use computers extensively. Despite the slight difference in figures for male (64%) and female (56%) student-teachers, the student-teachers' observations seem to differ based on gender. While a female student-teacher explained that she mostly uses her mobile device for chatting with friends, a male student-teacher indicated that mobile devices have made his academic life simpler. He explained

that: "I do a majority of my academic work on my tablet. I even write my class notes on it." He further pointed out that the practice has enabled him to explore so much about the potential of using mobile phones as learning tools. There is a significant correlation between daily use of mobile devices and location of work ($p\text{-value} \leq 0.0001$). About 96% of the student-teachers who work in urban areas and 40% of those in rural areas indicated that they use their mobile devices for studies every day. In addition, 77% of those who did not indicate their location of work stated that they do so every day. During interviews, an urban-based student-teacher explained that: "I get on to the Internet every day to read about what I learn in class. It's a great idea and I learn a lot. I've even managed to influence my three friends to do the same". She added that the friends thanked her for this. This student-teacher appears to be an opinion leader who succeeded in influencing the behaviour of her friends through peer-to-peer communication channels. A rural-based student-teacher pointed out that he uses his mobile phone sparingly because there is no electricity at his school. He stated that "I use my phone only for important communications. If I use it for teaching and learning activities, that will eat up my battery power which means that I will spend a lot of money to have it charged again". In most rural areas in Malawi, people charge their mobile phones in shops at a cost. While as noted above that student-teachers are required to use computers in some of their courses, one student-teacher observed that: "The College has few computers so we rely on our phones to do internet searches. In fact, it's very convenient since we can do it everywhere." The use of mobile devices appears to compensate the shortage of institutional computers and low Internet access among the student-teachers.

Extent of heutagogical practices

The extent of heutagogy has been examined based on the student-teachers' self-reported practices. The practices relate to the extent of interdependent learning, double and triple-loop learning and participation in communities of practice.

Interdependent learning practices

The results reveal little evidence of interdependent learning – a learner's ability to learn by oneself through exploration, discovery, research, testing hypotheses, validation and collaboration – among the student-teachers. Less than half of the student-teachers (45%) indicated that they engage in interdependent learning to a high extent. Approximately 42% stated that they do so to a low extent while 13% indicated that they never do that at all. During interviews, a student-teacher observed that their study activities after class normally revolve around what has been determined by our lecturers “despite the fact that we determine the study times on our own. At the end of almost every class, we're given topics to study or assignments to work out.” Another one noted that “sometimes we do have the opportunity to study whatever we want but such occasions are rare. We have heavy workloads in each subject and our studying patterns follow what has been suggested in class.” The results entail that the student-teachers engage partially in interdependent learning as their study content is mostly determined by the lecturers. However, there is some autonomy as they have the opportunity to determine the study times on their own. These findings appear to corroborate the tendency towards teacher-centred education in Malawi (Chilemba & Bruce, 2015).

Engagement in interdependent learning does not seem to be influenced by year of study, gender and discipline. Despite this, the student-teachers' observations seem to vary depending on year of study. A fifth year student-teacher indicated that "I do a lot of exploration on the Internet to get new information. Sometimes, this involves discussions with others to assist each other on difficult areas". Conversely, a second-year student-teacher observed that interdependence could result into time wastage as "there is already enough material suggested by the lecturers to work on. Every week we have about two assignments to write, and this demands a lot of time to complete". With $p\text{-value} \leq 0.0001$, the majority of the urban student-teachers (93%) and few of those in the rural areas (21%) claimed to engage more in interdependent learning. About 59% of those who did not indicate their place of work also stated that they do so to a high extent. One urban student-teacher explained that: "After every class, I always feel the urge to read online resources to improve my understanding of concepts. It is very useful and I learn a lot". He added that in his studying pattern priority is given to subjects in which he performs poorly.

Double and triple-loop learning practices

Double and triple-loop learning encompasses the analysis of what has been learnt, how the process of learning occurred and how the new knowledge and learning process influenced one's thinking (self-reflection). It further embraces the ability to choose one's best style of learning and apply the knowledge and experiences one has acquired to both familiar and unfamiliar situations. The present study reveals low practice of double and triple-loop learning among the student-teachers. About 23% of the student-teachers reported that they practice double and triple-loop learning to a high extent, 57% to a low extent and 20% never at all. It appears that only innovators,

early adopters and a few in the early majority were practising double and triple-loop learning during the situational analysis.

There is a significant correlation between double and triple-loop learning and year of study. The majority of the second year student-teachers (31%) against few in third (21%) and fifth (16%) year indicated that they engage in double and triple-loop learning to a high extent, signifying p -value=0.04694 and p -value=0.00555 respectively. The gap between third and fifth year appears to be insignificant. A fifth year student-teacher pointed out that she does not ever remember getting involved in self-reflection about her learning processes. She pointed out that “I usually analyse what I have learnt, but I don’t scrutinise the process of learning itself”. These sentiments were shared by a third year student-teacher who discerned that he does not know his best learning style. “Honestly, I can’t tell what my best style of learning is. It just happens subconsciously”. Double and triple-loop learning appears to correlate significantly with discipline of study (p -value=0.01832). Most of the science student-teachers (31%) and few of those in the humanities (15%) indicated that they engage in double and triple-loop learning to a high extent. One science student-teacher remarked that “I usually reflect on how I learn and how I could improve my learning abilities...particularly when studying mathematics”. Self-reflection is a critical element of double and triple-loop learning as students need to analyse their study processes and determine their appropriate learning strategies.

Participation in communities of practice

Student-teachers' participation in online and face-to-face communities of practice seems to be high. About 70% of the student-teachers claimed to participate in communities of practice while 30% indicated that they do not. It appears that most of the student-teachers participate in communities comprising students only. Almost 59% of the student-teachers indicated that they are currently members of communities involving students only while only 11% participate in communities which include lecturers. One student-teacher observed that "I feel more comfortable to participate in communities made up of students only because we're all at the same level. I don't think of joining one which includes lecturers because I may fear to participate freely". While being part of a network including lecturers seems to be restricted to innovators and early adopters, participation in communities comprising students only appears to be common practice as student-teachers in the early majority and few in the late majority seem to have joined the trend.

Extensive participation in communities of practice appears to be low among the student-teachers. About 46% of the student-teachers indicated that they participate to a high extent while 24% stated that they do so to a moderate extent. One student-teacher explained that communities of practice "offer us a precious opportunity to network with knowledgeable people all over the world who share important information". Another one stated that "we have a group of over 30 students in our class in which we help one another on academic problems. Sometimes we meet face-to-face but most of the times we discuss issues through WhatsApp". Extent of participation in communities of practice correlates significantly with year of study. With $p\text{-value}=0.00176$, the majority of the fifth year student-teachers (61%) against few in second year (31%) indicated that they participate in communities of practice to a high extent. There is a minor difference between

fifth and third year (43%) as well as between third and second year. One third year student-teacher revealed that he was unable to participate extensively in CoPs due to teaching practice commitments. He stated that "I'm very busy this semester because of teaching practice. I don't use my phone the same way I did last year...I spend a lot of time preparing for lessons". Extensive participation in communities of practice correlates significantly with location of work (p -value= <0.0001). There is a major difference in the figures for urban (88%) and rural (25%) student-teachers. In addition, 56% of those who did not indicate their place of work claimed to participate in CoPs to a high extent. A rural-based student-teacher indicated that "I only participate in these communities when I'm here on campus because the phone network is very poor where I work". He added that he collaborates broadly during his presence at the college. The student-teacher's analysis of his environment portrays self-reflection as he is able to identify barriers and make appropriate decisions on how to improve his learning processes. Another rural student-teacher observed that "our group has been around for some time now and the membership keeps on growing. I'm happy to be part of this group as I get much support from my friends". She added that her participation decreases during college vacation due to poor phone network in her area. The student-teachers' experiences relate to the mediated learning experience (Greenberg, 2000) as she was able to students to examine her environment and become creative to determine novel ways of how to deal with barriers impeding heutagogical use of mobile devices.

Although the results show high participation of the student-teachers in communities of practice involving themselves, it appears that the participation slowed down significantly within the last six months before this study. With regard to recency of participation, few student-teachers (29%)

stated that they actively participated in communities of practice over the last six months. A further 21% reported that they had only done so over the last one year while 20% more than one year ago. One student-teacher explained that they became very busy after the first semester as they had to prepare for teaching practice in the second semester. "In this (second) semester, we have little time to use our phones. The code of conduct does not allow us to take or use mobile phones during teaching practice hence limited opportunity to access the internet". Another student-teacher observed that they made slight use of their mobile phones in the second semester because they had to work extra hard to ensure that they improve their final grades. He explained that "I wanted to limit my social activities, and unfortunately that meant little use of my phone". He added that every student-teacher in their class aimed at obtaining a minimum average of credit for their degree. Recency of participation does not correlate with year of study, gender and discipline. It is intriguing that there are no variations based on year of study because most of the fifth year student-teachers owned laptops and claimed to use computers extensively than those in the lower levels. During interviews, third year student-teachers indicated that they were encouraged by one of their lecturers to join academic communities where they could share and discuss educational issues. One of them stated that "sometimes we work in groups in class, and these groups continue to exist through WhatsApp even after the specific objectives have been completed. Students bring out academic problems and we help one another to solve them". He further revealed that the lecturer encourages them to join communities comprising students from different institutions to promote diversity. With $p\text{-value} < 0.0001$, there is a major gap in the figures for urban (66%) and rural (14%) student-teachers. Moreover, 33% of those who did not indicate their location of work claimed to have actively participated in CoPs in the last six months.

Consistent with the extent of participation, recency of participation corresponds with daily use of mobile devices in terms of location of work. In Malawi, student-teachers working in urban areas have a greater chance to use their devices for academic purposes than their colleagues in rural areas due to availability of relatively good mobile network.

Conclusion

Despite laptop ownership and institutional access to computers being low at the college, it appears that a relatively high number of student-teachers frequently use computers. Additionally, ownership of mobile phones seems almost universal and the majority of the student-teachers possess at least one internet-enabled device. The results suggest that over half of the student-teachers often use mobile devices and applications for academic purposes. The majority of the student-teachers appears to hold positive perceptions towards the use of mobile devices as learning tools based on the DoI characteristics. However, few student-teachers expressed the intention to use their mobile devices in their own teaching. With regard to heutagogical practices, few student-teachers claimed to engage in interdependent learning as well as double and triple-loop learning. Conversely, the majority of student-teachers indicated that they participate in communities of practice although they tend to do so in communities involving students only than those comprising lecturers.

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