Changing the TVET paradigm: new models for lifelong learning

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ABSTRACT

The digital revolution is rapidly transforming the world of work and the skills profiles of many occupations. The pace of change necessitates continuous skilling and reskilling, through lifelong learning. Traditional models of TVET which view formal training as terminal will not prepare workers for the constantly evolving world of work in an age of technological transformations. This paper argues for the need to integrate informal and non-formal learning in TVET systems and address the pedagogical implications of this integration. Research on emerging innovative approaches to TVET in both developed and developing country contexts is reviewed, with a special focus on new models for work-based and community-based learning, which can promote transformative, lifelong learning. The actual and potential role of technology within these models is highlighted, together with recommendations for policy and practice.

KEYWORDS

Digital revolution; life-long learning; new paradigm of TVET; technological change; transformative learning; pedagogy; andragogy; heutagogy

Introduction

According to the World Economic Forum (2016), approximately 65 per cent of today's children will work in jobs that do not yet exist, jobs that will require a new suite of technical and soft skills. Rapid advancements in technology are largely responsible for this shifting landscape. Phelps, Hase, and Ellis (2005) describe the dynamics of the technological revolution, claiming that change is not only non-linear and unpredictable, but also inevitable. Technology is being integrated into all professions and industries and is transforming traditional occupational profiles. The International Labor Organization (ILO) observes that in the majority of industries, products, processes and services are undergoing constant change, and new occupations are emerging. It argues that 'in a modern labor market with permanent innovations and the requirement for lifelong learning, the ability to self-learn in a team approach is equally or even more important than having a broad range of technical and vocational know-how learned from theoretical coursework and imitation of skills by learners’ (International Labor Organization [ILO], 2010, p. 13). Similarly, the Foundation for Young Australians (2015) describes how technology is being used to automate increasingly more complex tasks,
concluding that learners will require flexible skill sets to prepare them for the jobs of the future. Traditional models of Technical and Vocational Education and Training (TVET), which view initial training as terminal, will be inadequate in preparing workers for a constantly evolving labor market.

Lifelong learning, which covers the spectrum of non-formal, informal and formal learning, will become essential for TVET learners, who will require continual upskilling and reskilling to keep up with industry changes and unforeseen technological advances. Lifelong learning has received increasing attention in the context of the Sustainable Development Goals (SDGs), featuring prominently in SDG4 on education. It is envisaged as a way to enhance skill sets and boost the economy, but also build global citizenship and peace. The Delors Report asserts that lifelong learning should contribute to social cohesion and democracy claiming that ‘in the twenty-first century everyone will need to exercise greater independence and judgement combined with a stronger sense of personal responsibility for the attainment of common goals’ (Delors et al., 1996, p. 23). Yet, despite the lofty aims of SDG4, there is little in the way of guidance on how this transformational kind of lifelong learning can be operationalized, and there are no clear indicators related to non-formal or informal learning in SDG4.

Information and communications technology (ICT) has been advanced as a means for increasing opportunities for lifelong learning, particularly in higher education. Technology has the power to transcend time and place and allow an individual to learn and undergo assessment outside of formal environments, at their own pace and convenience. However, the integration of technology into TVET systems in many parts of the world is still minimal (Latchem, 2017). Moreover, the use of technology must go hand in hand with models that are open and flexible, if lifelong learning in TVET is to be realized. Using technology within the same restrictive pedagogical models which are predominant today will not increase access, which is essential for the continual skilling and re-skilling necessary for the future world of work as well as the holistic development of individuals for social cohesion and democracy.

This paper argues for the need to integrate informal and non-formal learning in TVET systems and addresses the pedagogical implications of this integration. Research on emerging innovative approaches to TVET in both developed and developing country contexts will be reviewed, with a focus on new models for work-based and community-based learning which can promote transformative, lifelong learning. The actual and potential role of technology within these models will be highlighted and recommendations for policy and practice will be advanced.

**Lifelong learning, transformative learning and TVET**

*Lifelong learning* has gained prominence in development and education discourse and is viewed as an essential facet of sustainable development. However, there is still a lack of clarity about what lifelong learning means, and how it can be operationalized. According to Medel-Añonuevo (2002) ‘[M]any are still unable to distinguish between lifelong learning as a common-sense principle – of learning from the cradle to the grave – and lifelong learning as an educational principle that has to be realized in policies, programs and projects’ (p. xx). This challenge is apparent in SDG4 which aspires to promote inclusive and equitable quality education and lifelong learning opportunities for all,
yet in the targets and indicators of this Goal, the emphasis is on formal education (Carr, Balasubramanian, Atieno, & Onyango, 2018). Burchi and Rippin (2015) claim that, ‘there is nothing specific about access to knowledge beyond schooling’ (p.27) in the SDGs, and thus lifelong learning is often conceptualized and operationalized as formal learning.

The focus on formal education in discussions of lifelong learning, while practical, is problematic, as much of the learning that we undertake is in informal and non-formal environments. Even at the height of our educational journey we spend only 18.5% of our waking hours in formal educational environments – the rest of our learning occurs in informal and non-formal contexts (Bransford & Stevens, 2005). Coffield (2000) argues that informal learning is indispensable, as it is how we acquire the everyday knowledge, practices, values and cultural norms required to live in society. As such, lifelong learning must be understood beyond the limited structures of conventional formal learning and the mindset changed to include informal and non-formal learning.

Informal and non-formal learning require different pedagogical models from those applied in traditional formal learning environments. The teacher-led classroom model of learning is not a reality outside of formal education; rather, andragogy and heutagogy become essential for informal and non-formal learning. Andragogy is self-directed learning that is typically not reliant on an instructor or teacher, while heutagogy is autonomous and self-determined learning. The heutagogical approach places learning in the hands of the learner, who decides not only when and how they learn, but what they learn. Blaschke (2012, p. 60) asserts that the heutagogical approach can be viewed as a progression from pedagogy to andragogy to heutagogy, with learners likewise progressing in maturity and autonomy.

Not only is lifelong learning rarely conceptualized beyond formal learning, but present approaches are utilitarian, focusing mainly on skills acquisition for employment rather than the holistic development of the individual and society. However, given the ambitious goals of Agenda 2030, the conceptualization of lifelong learning solely as a means for skill building will be inadequate. Lifelong learning for sustainable development demands a shift in the current paradigms, in which learning is positioned not only as a form of capacity building, to one that view learning as transformative, leading to capabilities, or the ability to apply skills and competencies in novel contexts. Mezirow (1997) argues that transformative learning enables learners to make their own interpretations rather than act on the beliefs, judgements and feelings of others, developing independent, autonomous thinkers. This paradigm shift places emphasis on learners’ abilities to adapt to changing circumstances as well as change the circumstances they are in. This ability is crucial if we expect the societal transformation required to achieve sustainable development.

Ensuring that learning is transformative is of particular importance in TVET. Marope, Chakroun, and Holmes (2015) discuss the transformation of TVET in terms of economic growth, social equity and sustainability claiming that TVET systems must play a central role in the sustainable development agenda. Similarly, Majumdar (201) argues that since ‘TVET is the major producer’ of the future workforce, the sector has a responsibility to prepare future workers to contribute to sustainable development. UNESCO-UNEVOC (1999, p. 3) point out that in addition to preparing people for the world of work, TVET is expected to be an instrument of social cohesion and integration … .
Promoting flexible access to lifelong learning and training and enabling vocational guidance and counselling to reach all members of society.

In a landscape of rapid technological advances and increasingly uncertain and complex work environments, lifelong learning will need to become part of TVET if sustainable development is to be achieved. However, many systems and models of TVET do not have clear mechanisms for lifelong learning, despite the fact that workers often undertake learning on their own, in non-formal and informal environments. UNESCO (2015) claims that for the transformation of TVET, informal and non-formal learning must be encouraged, recognized and validated (Latchem, 2017, p. 8).

Innovative models of work-based and community-based learning in TVET

While current TVET systems face numerous challenges in achieving the ambitious goal of transformative lifelong learning, there are innovative models and approaches, many of which leverage technology, to operationalize transformative lifelong learning in TVET. There is a growing body of literature on the use of ICTs for the delivery of academic TVET courses and programs; however, there is little discussion on how ICT could be used to facilitate and recognize work-based or community-based learning, which are essential to lifelong learning. Work-based learning aims to use real-life practical work scenarios to develop skills and competencies, with a focus on informal and non-formal learning opportunities. Work-based Learning ‘is driven by an educational institution . . . towards the attainment of a qualification whereas Workplace Learning . . . is driven by an organization (eg. workplace supervisors) or individuals that is embedded in daily work practices’ (SkillsFuture Singapore, 2016, p. 10).

According to Billett (2001) work environments are full of opportunities for learning through practice. Work-based learning, when coupled with reflection and introspection, can also be transformational for learners as it allows them to move beyond theory and make decisions about how to apply their learning. This ability links closely to the notion of transformative learning which aims to develop independent, autonomous thinkers. Murphy et al in their study of nursing students in the UK found that many learners felt ‘ill equipped to deal with the demands of patient care in what they are taught, and how they are taught in schools of nursing does not prepare them for the unpredictable care delivery environment’ (Bhyrub, Hurley, Neilson, Ramsay, & Smith, 2010, p. 324) suggesting that practical experience should be an essential part of training. This example highlights the importance of practical work-based learning as part of transformative learning, to develop learners who can apply their knowledge and make independent decisions in diverse and complex situations outside the classroom.

Although TVET is normally considered the domain of institutions or employers, community-based TVET can reach rural and marginalized groups, particularly those that work in the informal economy. According to Adult Learning Australia (2014) ‘formal VET and higher education sector are simply one tool for identifying educational value and success and the correlation is particularly weak for disadvantaged groups’. In community-based TVET, learners interact with other community members, often through a community-based facilitating organization. This type of non-formal, community-based learning has been shown to ‘provide strong outcomes for disadvantaged groups’ (Adult Learning Australia, 2014, p. 16) who may not have access to learning
because they do not have the financial resources, or they are not in formal employment or education.

There are several challenges in implementing and validating both work-based and community-based TVET models. The following section will present examples of how technology is being harnessed for work-based and community-based learning, with a focus on apprenticeships within formal TVET systems, and social media for the informal sector. The role of technology will be discussed in reference to its ability to promote heutagogical approaches that facilitate lifelong, transformative learning. Based on the analysis of these examples, recommendations for policy and practice will be put forward.

Heutagogy and the role of technology in work-based learning

According to Bhoyrub et al (2010, p. 326) ‘Heutagogy ... provides an alternative lens from which to both view and construct practice-based educational components’. While heutagogy is often seen as inherent in work-based learning opportunities like apprenticeships, Fuller and Unwin (2008) describe an ‘expansive-restrictive continuum’ of apprenticeships which integrates heutagogy to varying degrees. The expansive approach consists of a learner centric, lifelong system which emphasizes the importance of learning and reflection. In an expansive apprenticeship both institutions and employers support apprentices in their individual learning journey, rather than dictate how and what they must learn. Within a restrictive system, apprentices have little control over the scope of their learning opportunities. According to Fuller and Unwin (2008) ‘in the contemporary economic and social context, the use of apprenticeship to attain a restricted skill base may be viewed as limiting the apprentice’s opportunities for personal development, and for educational and vocational progression’ (p. 8).

While the expansive apprenticeship model clearly employs heutagogical principles which can facilitate transformative, lifelong learning, one of the challenges is that these kinds of apprenticeships can be time consuming, expensive and require a great deal of coordination between employers, institutions, and the learners. Hartwig (2007) states that the use of eLearning for apprenticeships is a model, driven by these challenges, as well as the rapid evolution of industry and a shortage of places in tertiary education institutions. The e-Apprenticeship model attempts to deliver formal learning opportunities while apprentices are engaging in work-based learning, thereby avoiding the time and opportunity costs normally associated with the formal learning components of expansive apprenticeships. This model aims to create a seamless integration between pedagogy (through the formal education components) and heutagogy (through the work-based learning), providing learners with the opportunity to integrate theory into practice.

The e-Apprenticeship model has been piloted in the Canadian TVET system and is explored in a 2017 study by Little. Apprenticeships in Canada combine workplace training (80–85 per cent of the time) with college, training center, private provider or online training (15–20 per cent of the time) and normally involve four years of employment and supervision. The classroom portion is six to eight weeks each year, during which apprentices leave their workplaces to attend classes (Little, 2017, p. 169). However, several Canadian colleges have piloted e-Apprenticeship programs in an attempt to decrease direct and opportunity costs to learners and employers, while
improving student outcomes. One such model is the E-Apprenticeship Alternate Delivery Design Initiative (EADDI) at Red River College in Manitoba. This model was conceived in response to a report of the Manitoba Apprenticeship Futures Commission, which recommended that the community colleges, public schools and other accredited training providers explore the opportunities for using alternative means of delivery for increasing the capacity of the technical training system to meet the projected need for skilled tradespeople (Little, 2017, p. 170).

The EADDI received approximately $2 million CAD in funding and piloted 10 units, which were launched online in 2010. The EADDI model aimed to: improve access to training for marginalized groups; reduce disruption to learners and communities; foster lifelong learning and ICT skills in learners; provide lower-cost delivery. The learners attended an on-campus orientation session at the outset of the program. The learners then returned to their communities to work with an employer and simultaneously complete six months’ of part-time study (10–12 hours a week) which incorporated online teaching (one half day per week, twice a week) and self-paced study. The learners were required to have access to a high-speed Internet connection, a computer, a headset/microphone and a webcam. At the end of the six-months they returned to the College to review their experience and take a final exam. Those who successfully completed were granted the same credentials as those given to apprentices who studied on campus (Little, 2017).

The model faced numerous challenges, especially from the point of view of learners and instructors. Student feedback on the scheduling of the programs was mixed, and some students were not familiar with online learning. Little (2017) noted that ‘one of the lessons learned was that there needed to be pre-testing of online students to gauge who was comfortable with online self-study and who needed support or other accommodations in their studies’ (p. 173). Similarly, instructors felt ill-prepared for online teaching and had difficulty with the technological, instructional and communication skills required in this mode of delivery. Little (2017) concludes that strategic efforts to assess, sensitize, prepare and train learners and instructors in online learning would have improved the success of the program.

However, despite the challenges, the study found that ICT-based instruction lowered the cost of study and allowed learners to stay in their communities and earn an income while working. Such a model also benefits employers who do not have to deal with apprentices taking leave for mandatory classroom-based instruction (Little, 2017, p. 169–170). More importantly, in terms of lifelong and transformative learning, the study found that the model allowed learners to ‘immediately apply what they learn online in their workplaces’ (Little, 2017, p. 170). The apprentices were gaining valuable informal learning experiences through their day to day work, which they could connect to the theory they were learning. The simultaneous experience of learning on the job and in the classroom is a way to integrate informal/non-formal and formal learning, blending both pedagogy and heutagogy within an expansive model, while addressing the practical limitations and costs that extensive face-to-face learning in a formal environment can incur.

Another example of the integration of technology in apprenticeship systems is evident in the German dual mode system. In this dual system, vocational education
and training takes place both with companies and in part-time courses at vocational schools. While the Canadian apprenticeship model utilizes technology for content delivery, the German model also leverages technology to track and verify learning that takes place on the job, during the apprenticeship period. Hartel (2017) examined the use of an online report book, called BLok in the German TVET system, focusing on its ability to link formal and informal/non-formal learning. The online BLOK report book is a Web 2.0 application that allows apprentices to record proof of their achievements and how these relate to their learning plan. It also facilitates reflection on the learning experience. The BLoK enables multiple stakeholders, including the apprentices, teachers, trainers and workplace supervisors to evaluate the progress of the apprentices’ skills and competencies and discuss their strengths, weaknesses and needs. BLok also has a messaging function which allows the various actors to synchronize arrangements for training: a supervisor can immediately see what an apprentice is learning in the classroom and adjust his/her workplan accordingly. Following the initial pilot phase, the BLok online report book was adopted for nationwide use and has been in operation since the 2012/2013 apprenticeship year. Hartel (2017) suggests that Web 2.0 applications, such as Blok, ‘blur the boundaries between teachers, training supervisors and students, because everybody involved can collaborate on developing, adapting and updating content and learning tasks, and making work-based learning outside of formal learning venues a reality’ (p.62). The BLok facilitates recognition of informal and non-formal work-based learning that may be otherwise hard to track and verify, while also creating a platform for sharing this information amongst various stakeholders.

Within the context of lifelong learning, the Blok is not only a practical administrative tool which can capture informal/non-formal learning, but also one which can encourage transformative learning. A training supervisor described BLok as a facilitator for student ownership and control over their learning: ‘With this, it is possible for an independently thinking apprentice to come up and say, instructor, there still is a big gap [in this assignment]. I have a zero, whereas here I already have 300 per cent; that’s something we have to look into!’ (Hartel, 2017, p. 64).

According to Hartel’s 2017 study ‘continuing evaluation of BLok shows that it has a positive effect on apprentices’ willingness to reflect on their learning and learning needs. This means that they are assuming a degree of responsibility for their learning’ (Hartel, 2017, p. 63). The tool was found to encourage learner reflection, which ‘is regarded as a key requirement for the development of occupational competence and self-managed learning skills’ (Hartel, 2017, p. 63). This kind of reflection is essential in developing learners who will continue to learn throughout life. Similarly, it allows a learner to have a sense of control over their own development, which is an important aspect of the heutagogical approach, and can foster the critical and autonomous thinking that is essential for transformative learning.

The Blok also supports Recognition of Prior Learning (RPL), which is an important approach for validating lifelong learning, particularly the informal and non-formal learning that occurs in the workplace. The mismatch between experiential knowledge and the codified knowledge has been a crucial issue in RPL. One of the conundrums of the academic world lies in capturing experiential knowledge, as learners find it difficult to ‘de-constitute and re-constitute previous unconscious performance into a codified propositional form’ (Trowler, 1996, p. 97). According to Cooper, Orrell, and Bowden
(2010), the structure, purpose and character of experiential knowledge derived in the workplace and community engagement is different from formal academic knowledge. With the growth of technology such as BLok, electronic portfolios (ePortfolios) of on the job learning, are being used to create, maintain and engage with records of work experience, and can include not only documents but multi-media files. According to Cameron (2012), ‘the use of e-portfolios in recognition of prior learning (RPL) processes in workplace and professional practice contexts has attracted little attention in the literature due to its emergent nature’; however, there is a great deal of potential in this model if integrated in apprenticeships and accepted by TVET institutions in a systematic way.

**Technology-enabled community-based learning in the informal sector**

According to Jackson (2016) the informal sector contributes 41% of the GDP globally. It is also a major source of non-agricultural employment in many developing countries. In informal sectors learning often takes place through social conversation, and friends, neighbors and other community members are seen as resources. Numerous studies have shown that networking and social capital are essential elements of heutagogy (Blaschke, 2012).

In contrast to the trade and enterprise related informal sector, agriculture has evolved a strong framework for skills development through formal, non-formal and informal systems. Globally, a large percentage of the labor force is in agriculture. The FAO (2014) estimates that the agricultural sector alone employs more than a billion people, representing a third of all workers worldwide. Traditionally, TVET in agriculture has taken place through university or government extension programs, with farmers who were already working in the field. While extension is normally delivered in the field (or the workplace) rather than in the classroom, it nevertheless inherited the didactic framework of formal education. Traditionally, extension has been based on conventional pedagogies and a top-down approach where the farmer is perceived as a passive learner; however, with declining investments in extension systems, the traditional, didactic approach is proving to be a hurdle in the development of the agricultural sector. The didactic Training and Visit and Transfer of Technology (ToT) approaches which characterize most extension models have not yielded results due to the complexity of the modern, globalized world along with the scale and cost of the training required (Christoplos, 2010).

To address the inefficiencies of traditional extension, The Commonwealth of Learning (COL) developed a ‘Lifelong Learning for Farmers’ (L3F) model, a community-based program which aims to skill and empower farming communities using ICT by linking social capital, human capital and financial capital. In L3F, human capital is conceptualized as learning, knowledge acquisition, reflective practices, skills, and competencies among the farming communities. Topics include specific agricultural skills and practices, as well as financial literacy, corporate literacy and entrepreneurial skills. The initiative integrates the concepts of pedagogy, andragogy and heutagogy in a blended learning format. Such blended learning takes place in the context of a vertical flow of knowledge (from universities, research institutions, secondary stakeholders to the primary stakeholders) and a horizontal flow of knowledge (between the primary stakeholders in
A peer-to-peer learning approach). Semi-structured asynchronous learning is emphasized in the vertical flow of knowledge, whereas structured group-based learning as well as informal learning are encouraged in the horizontal flow of knowledge. Learning materials are developed at the local level in local languages with the participating community playing a major role. The process of developing, using, reusing (and in some cases abandoning) learning materials is dynamic and responsive to the spatial-temporal context.

The model employs micro-learning which breaks information down into easily digestible chunks, with specific learning outcomes. Since a substantial number of L3F participants are illiterate or semi-literate, the learning takes place in a multi-media context using audio-visual interaction, and ICT plays a vital role. The technology is placed in the socio-cultural context, keeping in view the financial feasibility, infrastructural viability and social acceptability. Since mobile phones have penetrated rural areas, they are used to strengthen learning wherever relevant through voicemails, text messages and call-in services. Other self-learning technologies such as CDs/DVDs and mass media such as community radios are also exploited to strengthen learning. Social media is an emerging tool in L3F, and it has also been leveraged in some variations of the model through community managed Facebook pages.

A 2018 study by Carr, Balasubramanian, Atieno, & Onyango, examined the use of Facebook for informal learning amongst L3F farmers in Tamil Nadu, India through COL partner Reddiarchathram Seed Growers Association (RSGA). A Facebook page for sharing information on agricultural practices was established by RSGA, with the expectation that social media could facilitate non-formal learning and knowledge sharing practices. With approximately 5000 members, the platform is a conduit for knowledge transfer among farmers in the region. Most of the posts consist of pictures taken from the field with simple text descriptions. The posts are contextual and time specific to address the distinct regional and seasonal issues of farmers. Needs assessments are conducted periodically and the feedback informs the content creation. RSGA responds to questions posted on the page by group members. Occasionally, members share their own experiences to respond to questions from their peers. Learning occurs through a vertical flow of knowledge (from RSGA to the Facebook friends) and a horizontal flow of knowledge (between friends).

Survey data from 386 respondents was analyzed, complemented by semi-structured interviews and field observations, to determine how the page is used for learning. The findings suggest there was a significant amount of learning and horizontal knowledge transfer taking place with nearly 80% of respondents stating that they shared what they learned through the RSGA Facebook page with others on Facebook, while more than 76% of respondents stated that they were also sharing what they learned with others in person. Additionally, some of the farmers interviewed stated that they visit other farmers they meet in the Facebook group to improve their understanding of the farming practices and techniques shared in the group. The platform gave farmers an enabling social context for learning and being part of a community. As the study highlights, social media can facilitate a heutagogical approach in which:

... learners are able to interact with the content that they choose, to the extent that they choose, with many transferring their learning into the real world through field visits and
face-to-face interactions, both customizing and contributing to the knowledge that was shared. (Carr et al., 2018, p. 308)

One of the challenges with non-formal community-based learning is that it can be difficult to assess and evaluate it as it rarely comes with accredited and recognized qualifications. While this may be seen as a weakness within the formal labor market, this narrative does not account for ‘the many economic and social benefits that flow from learning … including good health, wellbeing, social trust, and strong civil and social organizations’ (Adult Learning Australia, 2014, p. 15). Several evaluation studies of the L3F model reveal that the technology enabled, informal learning processes have had positive impacts on the L3F learners (Carr et al., 2018; Kumar & Kulkarni, 2013). Apart from increased profits and household incomes, the studies have also shown that L3F learners have higher empowerment index scores and improved social capital. While these benefits are not easily monetized, they speak to the aims of transformative lifelong learning, which is rooted in holistic development for the benefit of society as a whole.

The L3F model shows how community-based TVET within the informal sector can operationalize lifelong learning. The model encourages and facilitates continuous informal and non-formal learning through an integration of andragogy, pedagogy and heutagogy. Learning does not have a set beginning and completion time – rather learners in L3F continue to learn, and new information is constantly made available, based on the changing needs and desires of the community. This responsive model ensures that the learning is relevant, meaningful and rooted in the daily experiences of the learner. Technology in the L3F model is an essential tool for self-directed learning and for horizontal, peer-to-peer learning as it improves access to information and can link learners who are geographically separated. Blaschke notes that when social media is placed appropriately in a heutagogical context, students perceive an enhancement of cognitive and meta-cognitive skills, strengthening their ability to construct new knowledge.

Recommendations

Based on the analysis of research presented in this paper the following recommendations are relevant for policy-makers and practitioners.

Dual systems

Work-based learning experiences such as apprenticeships can be extremely effective in skill and competency development as they offer the opportunities to learn in real world situations. Dual systems, such as those in Canada and Germany, allow learners to gain theoretical knowledge in the classroom, and put this knowledge into practice in the workplace, through apprenticeships. In order to encourage lifelong transformative learning, institutions should adopt expansive rather than restrictive apprenticeship models to give appropriate emphasis to learning, reflection and personal development.
Community-based learning

Community-based organizations have an important role to play in facilitating lifelong learning in TVET for marginalized groups, particularly those outside the formal economy and education sector. Involving the learner and their community in content development can empower them and give them a sense of ownership over their own development, which can be a transformative process. Peer-to-peer social learning and collaboration can be facilitated to promote continuous, lifelong learning. With the growing ubiquity of social media, community-based organizations involved in skills training can look to platforms like Facebook, or WhatsApp to encourage and facilitate informal learning. In such a model, learning should be seen as part of a holistic approach to development which includes the strengthening of social capital, and increased access to financial capital.

Technology

Innovative uses of technology, such as online delivery of theory-based lessons in e-apprenticeship models, and digital tools to track learning can be used to reduce the costs, enhance access, and improve the quality of work-based learning experiences. ICT can also be used to deliver micro-learning that is relevant to learners’ immediate needs in the informal sector. Technology must be harnessed to support transformative lifelong learning in TVET; however, we must not see it as a panacea or a silver bullet. Transformational, learner-centered philosophies should be at the heart of technology-enabled learning. The quality and usefulness of ICT-enabled teaching and learning ‘depends upon careful attention to the issues of accessibility and equitability, principles of adult learning and instructional design and appropriateness of the delivery and support services’ (Latchem, 2017, p. 28).

TVET teacher training

The use of ICT for learning demands a paradigm shift in TVET teaching. Teachers must not only have the technical skills to manage the ICT, but also understand their new role as a facilitator of learning as opposed to an instructor. When technology is employed, appropriate preparation of and support for instructors is essential, especially for those who may not be experienced in principles of heutagogy and eLearning. TVET teacher training can also benefit from technology-enabled delivery. Such an approach will not only increase the reach of TVET teacher training, but also introduce and inculcate the very practices and pedagogies that the teachers will need to use to facilitate technology-enabled TVET.

Recognition of prior learning

Technology can be used to track and verify learning that takes place on the job, during the apprenticeship period and throughout an individual’s career. These records can then be used in applications for recognition of prior learning. Workplaces should consider how such tools can be integrated into professional development programs and standard
record-keeping processes, so that this kind of tracking becomes standard. However, tools to record prior learning are only meaningful within structures and systems with mechanisms to recognize an array of formal, non-formal and informal learning experiences. Institutional, national and international quality assurance and accreditation frameworks need to recast themselves within a frame of lifelong learning thereby enabling effective navigation through various learning pathways. Qualifications Frameworks, such as the Transnational Qualifications Framework (TQF), have a great deal of potential to facilitate the transition of TVET learners into higher education, and also allow trained workers to translate their home country qualifications for employment opportunities abroad. Policy makers and institutional heads must also ensure that there are clear and flexible learning pathways that consider various levels of credentials and diverse learning experiences.

Conclusion

In a landscape of technological change, lifelong learning will need to become part of TVET if sustainable development is to be achieved. This paper highlights the need to integrate informal and non-formal learning in TVET systems, and showcases the potential of technology and heutagogy to facilitate transformative, lifelong learning. The review of research demonstrates that innovative, technology-enabled models of work-based and community-based learning have the potential to prepare learners for the everchanging world of work, as well as mould reflective, autonomous thinkers who can contribute meaningfully to the sustainable development agenda. Policy makers and practitioners should review, adapt and replicate innovative work-based and community-based models where possible. Attention should be given to the use of technology in these models, with specific interventions to integrate heutagological principles in program design, and to train TVET teachers in using ICT. Governments, institutions and corporations alike must also ensure that there are frameworks and mechanisms in place so that informal and non-formal learning in TVET is facilitated, recognized and validated. TVET can no longer be solely the domain of education institutions; employers and community organizations will have an increasingly important role to play in the delivery of lifelong technical and vocational learning opportunities.

Disclosure statement

No potential conflict of interest was reported by the authors.

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Professor Asha Kanwar won several international awards, including the International Council for Open and Distance Education (ICDE) Prize of Excellence, and the Meritorious Service Award for outstanding contributions in open and distance education from the Asian Association of Open Universities. She has been conferred eight honorary doctorates from Universities in Asia, Africa, Europe and North America. Prior to joining COL, Professor Kanwar was a senior consultant in open and distance learning at UNESCO’s Regional Office for Education in Africa (BREDA). She has also served as Director, School of Humanities and as Pro-Vice Chancellor at the Indira Gandhi National Open University (IGNOU) in New Delhi, India. She was a Fulbright Fellow for post-doctoral research
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