Article title: Using E-Portfolios for Meaningful Teaching and Learning in Distance Education in Developing Countries: A Systematic Review

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Using E-Portfolios for Meaningful Teaching and Learning in Distance Education in Developing Countries: A Systematic Review

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Abstract

Web-based technology has proven itself indispensable in education, especially in distance education and in developing countries. Technological advances and the Covid-19 pandemic have forced higher education institutions to be innovative in delivering education in their countries. This paper seeks to demonstrate the role and value of e-portfolios as an alternative teaching and learning tool in distance education and the online environment, especially in developing countries. A systematic review of peer-reviewed academic studies of e-portfolios between 2010 and 2020 was conducted. A total of 18 papers were selected according to the inclusion criteria. The review shows that the use of e-portfolios is still a relatively new trend in developing countries. The study also revealed that e-portfolios can infuse important skills such as self-directed learning, critical thinking and lifelong learning. These results have the potential to help institutions to creatively design appropriate support tools and strategies alongside the implementation of e-portfolios in their contexts.

Keywords: e-portfolios, assessment, self-directed learning, critical thinking skills, reflection, meaningful feedback

Introduction and Background

Teaching and learning strategies and methods in higher education institutions (HEIs) have been evolving. Currently, students have direct access to mass communication and information, rapidly developing technologies and the need to acquire relevant skills. In order to keep pace with emerging technology trends in education, HEIs are forced to embrace and increasingly use technology to teach and support students. As a result, HEIs are challenged to provide student-centred learning opportunities (Rodgers et al. 2006) which integrate the use of technology portfolios as an alternative teaching and learning tool in online distance education (DE) environments.

However, the emergence of the Covid-19 pandemic has changed the face of “normal” education delivery and compelled educational institutions to continue providing education to learners using technology as an alternative means (Deslandes and Coutinho 2020; Gurukkal 2020). Web-based technology has over time proven itself to be

increasingly indispensable in education, and more so in times such as currently experienced.

With the advancement of technology, conventional teaching portfolios have been reinvented with the use of digital portfolios, known as electronic portfolios (e-portfolios). The definition of a portfolio has changed, initially being seen as a physical archive for students' finest work (Herbert 1998) or merely a container (Polonoli 2000, 4), or a living document (Barrett 2011) and now as a lifelong learning tool. Literature offers many definitions of an e-portfolio, however, consensus among scholars is that the e-portfolio encompasses both a process and a product. As a process, the e-portfolio allows students to move beyond learning for the sake of learning and apply knowledge, skills and values found in real-life situations (Jimoyiannis 2012). E-portfolios have become one of the spaces where more flexible forms of computer-based assessment are in alignment with measuring the knowledge and skills that students need to function in an evolving digital age (Bates 2015).

The use of e-portfolios in developing countries is relatively new and in this regard, pose uncertainties with their use, implementation and effectiveness. However, developing countries need to integrate relevant technologies for effective teaching and learning, especially now with the current uncertainties and the need to find alternate methods of teaching and learning. Owing to the growing interest in e-portfolios in higher education (HE) (Chaudhuri and Cabau 2017), there is a need to understand the essence of e-portfolio pedagogical affordances and the issues to be dealt with for meaningful use (Oh, Chan, and Kim 2020). The purpose of this paper was to conduct a systematic review of peer-reviewed academic studies of e-portfolios between 2010 and 2020 to investigate and document the way in which e-portfolios can be used for meaningful learning and learner support in HE and DE in developing countries.

Literature Review

E-portfolios, as a process of learning, include digital artefacts, written reflection on both formal and informal learning experiences, collaborative assignments, community engagement, research activities, and learning achievements (Light, Chen, and Ittelson 2012). Barrett (2011) points out that the e-portfolio uses technologies which allow students to build and organise artefacts in various media types such as audio, video, graphics and texts, thereby developing digital skills needed in this era. In addition, digital tools used allow users to interact with content and to disseminate knowledge and content (Baker-Doyle and Yoon 2020), meaning that users can collaborate by sharing and revising existing content.

The strength of e-portfolios lies in the extensive use of reflective learning practices. Through interaction with content and with others, reflective learning, creatively designed learning activities and continuous feedback and authentic assessment, students first master self-learning and self-evaluation skills and then are able to co-learn and co-

produce knowledge with peers (Cheng and Chau 2013; De Jager 2019). Studies show that the process of building e-portfolios assists students in becoming active and independent lifelong learners (Beckers, Dolmans, and Van Merriënboer 2016), who, in a technology-enriched space, can cultivate their learning and knowledge through collaborative projects and peer learning. E-portfolios' ubiquity (Roder and Brown 2009) and flexibility (Shroff, Trent, and Ng 2013) mean anyone can participate. Although learners have computing needs, such as relevant digital gadgets, the use of e-portfolios is an important alternative teaching and learning tool for education in developing countries where vast numbers of students do not have the resources to travel to places of education and as a result, rely on DE and online learning.

Portfolio pedagogy can be used for reflection and assessment to showcase skills and achievements, using appropriate communication modalities (Boulton 2014; FitzPatrick and Spiller 2010). However, e-portfolios seem to be far more effective when they are used as a process of learning rather than only as a product (TeachOnline 2014).

Benefits and challenges of using e-portfolios in education are well documented in the literature (Akleh and Wahab 2020; De Jager 2019). Developing countries may realise the benefits of adopting well-designed modules that incorporate e-portfolios in their programmes. Although Bates (2015) argues that e-portfolios are one of the examples of ways in which educationists are gradually developing unique “affordances” of the use of the internet, students in developing countries are faced with major challenges in adopting educational technologies owing to a lack of digital literacy, limited access to the internet, electricity and connectivity. However, the Covid-19 pandemic lockdown revealed that humans are capable of adapting and surviving major changes, however sudden and uncomfortable.

Theoretical Framework

At the centre of educational e-portfolios is the drive for student centeredness; thus the theoretical frameworks guiding this study are social constructivism and self-directed learning theories. Constructivism is a synthesis of multiple behaviourist and cognitive theories that assist in probing learning and development with the premise that learning is a process in which people construct meaning by making sense of their experiences.

Social constructivism asserts that the “process of knowing is affected by other people and is mediated by community and culture” (Amineh and Asl 2015, 16). Social constructivism requires that teachers situate learning activities in the context of students' lives, thereby enhancing the meaningfulness of their learning experiences. Learning as a social activity (Chugh and Ruhi 2018) acknowledges that learners enter the educational space with preconceived ideas and experiences. Using e-portfolios therefore allows learners to construct new concepts in their personal learning environments based on their experience and current knowledge.

Self-directed learning theory on the other hand, is “a process in which individuals take the initiative, with or without the help of others, in diagnosing their learning needs, formulating learning goals, identifying human and material resources for learning, choosing and implementing appropriate learning strategies, and evaluating learning outcomes” (Knowles 1975, 18). Morris (2020) asserts that self-directed learning is a critical workplace competence that needs to be fostered in formal educational settings. E-portfolios are supported by constructivist and self-directed learning principles in that learning activities are designed to support students in constructing knowledge and understanding, both individually and collaboratively.

Methodology

A systematic literature review of peer-reviewed academic papers was conducted with searches from three academic databases – Educational Resource Information Centre (ERIC), Web of Science, and Scopus. The purpose of this systematic review was to identify and present empirical evidence from the existing literature (Pham et al. 2014) of the way in which e-portfolios can effectively be used to teach and support learning in HE and DE. The review question driving the study was: “How can e-portfolios be used for meaningful teaching and learning in distance education for developing countries?” This research purposefully selected academic journal papers based on the inclusion and exclusion criteria (Table 1).

Table 1: Inclusion and exclusion criteria

Inclusion Criteria	Exclusion Criteria
Published 2010 to 2020	Published before 2010
Papers published in English only	Papers in languages other than English
Primary empirical research	Reviews or theoretical articles
Journal articles, full-text, open access	Grey literature, blogs, fee-based papers, newspapers, e-books, etc.
Developing countries	Developed countries
HE (college, university, post-secondary, tertiary)	Not basic education (high school, primary school education), corporate education and training, technical and vocational education and training
DE (e-learning, blended)	Face-to-face education, contact universities
About e-portfolios (web-based, digital portfolios)	Non-educational, not about e-portfolios or other types of e-portfolio (e.g. PDF, hard-copy/traditional portfolio)
Educational e-portfolios	Non-educational, e.g. professional development portfolios, showcase portfolios

The refining process identified 190 papers (Figure 1) which were then uploaded to the EPPI-Reviewer software for further screening and synthesis. EPPI-Reviewer is a “web-

based software program for managing and analysing data in literature reviews” (EPPI-Centre 2021, para 1), developed and maintained by the EPPI-Centre at the University College in London.

Figure 1: Flow diagram (Adapted from Moher et al. 2009)

The 18 selected studies listed in Table 2 were qualitatively synthesised using the extensive coding system developed by Bond et al. (2020). Systematic review studies use content analysis (Zawacki-Richter et al. 2018), which was also relevant for the data analysis in this study. Coding reports were generated from the EPPI-Reviewer and exported to the researchers for further analysis. To minimise bias and ensure interrater reliability, a measure of the agreement between two researchers was calculated using Cohen’s kappa (Pérez et al. 2020). To achieve this, items were screened in small batches, the kappa was calculated, and agreements and disagreements were discussed, resulting in Cohen’s kappa improving to 0.76.

Table 2: Overall findings reported in the reviewed papers

Authors (date)	Overall Findings	Country
Abd-Wahab et al. (2016)	Reflection, deep learning, instantaneous and meaningful feedback, self-regulation improved, digital skills	Malaysia
Akleh and Wahab (2020)	Reflection, digital skills, learning from peers, continuous and authentic assessment, learning by doing	Bahrain
Carl and Strydom (2017)	Digital skills, metacognitive learning, deep learning, lifelong learning	South Africa
Chau and Cheng (2010)	Reflection, self-regulation improved, learning from peers, instantaneous and meaningful feedback, understanding concepts	Hong Kong
Cheng and Chau (2013)	Ownership of learning, deep learning, critical thinking skills, metacognitive learning, peer learning	Hong Kong
De Jager (2019)	Reflective, self-regulation improved, critical thinking skills, feedback	South Africa
De Swardt et al. (2019)	Critical thinking, reflection, ownership of learning, learning by doing, metacognitive learning	South Africa
Kabilan and Khan (2012)	Improve content knowledge, learning from peers, deep learning, digital skills	Malaysia
Lukitasari, Hasan, and Sukri (2020)	Continuous and authentic assessment, engagement (increased/enhanced), deep learning, learning from peers, lifelong learning	Malaysia Bangladesh Indonesia
Mapundu and Musara (2019)	Self-regulation improved, flexibility and convenient, continuous and authentic assessment, interaction and collaboration, authentic learning	South Africa
Mohamad, Embi, and Nordin (2016)	Reflective, deep learning, digital skills, self-regulation improved, metacognitive learning	South Africa
Harun and Jhee (2012)	Reflective, productive learning, continuous and authentic assessment, instantaneous and meaningful feedback, interaction	Malaysia
Sellami (2017)	Reflection, feedback, deep learning	Tunisia
Shroff, Trent, and Ng (2013)	Ownership of learning, self-regulation improved, critical thinking, continuous and authentic assessment, learning by doing	Hong Kong

Authors (date)	Overall Findings	Country
Strydom and Barnard (2017)	Ownership of learning, Critical thinking, continuous and authentic assessment, self-regulation improved, engagement (increased/enhanced)	South Africa
Thang, Lee, and Zulkifli (2012)	Digital skills, deep learning, reflection, self-regulation improved, critical thinking	Malaysia
Van Wyk (2017)	Reflective, enhance content knowledge, continuous and authentic assessment, ownership of learning, interaction, self-regulation improved	South Africa
Yang, Tai, and Lim (2016)	Reflective, ownership of learning, metacognitive learning, self-regulation improved, critical thinking	Hong Kong

Findings

The overall findings of the reviewed papers positively correlate with the idea that e-portfolio is a powerful tool to promote learning (see Table 2). Three interlinked themes emerged: (1) reflective learning in e-portfolios; (2) instantaneous and meaningful feedback; and (3) continuous and authentic assessment. The fourth theme present the challenges highlighted in the included studies (Table 3). Digital skills and self-directed learning, although crucial in HE and DE, are automatic by-products of e-portfolios because learners gain multimedia and independent learning skills through developing e-portfolios (Thang, Lee, and Zulkifli 2012).

Table 3: Challenges of e-portfolios reported in the reviewed papers

Source	Identified challenges
Abd-Wahab et al. (2016)	Internet Facilitation of learning Plagiarism Time-consuming
Akleh and Wahab (2020)	Hardware and software challenges Time-consuming Workload for teachers Security and privacy issues Digital literacy
Carl and Strydom (2017)	Cognitive overload
Chau and Cheng (2010)	Workload (requiring extra time and effort from teachers) Teacher identity
De Jager (2019)	Digital literacy Ethical problems (plagiarism)

Source	Identified challenges
De Swardt et al. (2019)	Internet connectivity
Harun and Jhee (2012)	Workload for teachers Digital literacy Assessing and moderating students e-portfolios
Kabilan and Khan (2012)	Internet connection Negative attitudes/perceptions of learners Workload for students (weekly submissions) Time-consuming Assessment techniques Ethical problems (plagiarism)
Lukitasari, Hasan, and Sukri (2020)	Digital literacy
Mapundu and Musara (2019)	Time-consuming Security and privacy issues
Sellami (2017)	Lack of awareness Time-consuming Workload for students (weekly submissions)
Strydom and Barnard (2017)	Lack of ICT skills by faculty
Thang, Lee, and Zulkifli (2012)	Poor internet connections Digital literacy Facilitation of learning (lack of guidance from instructors) Time-consuming Poor ICT facilities
Yang, Tai, and Lim (2016)	Teaching presence Negative attitudes/perceptions of learners Ethical problems (plagiarism)

Of interest is the number of papers on e-portfolios which have been published since 2010. The overall increase of e-portfolio research was prevalent in 2017, as indicated in Figure 2.

Of the 18 selected papers, six were from South Africa, five from Malaysia and four from Hong Kong (Table 2). This study also shows that e-portfolios are mostly used in HEIs in Asian developing countries and in some HEIs in South Africa.

Figure 2: Number of published papers per year (2010–2020)

Discussion

Reflective Learning in E-Portfolios

Reflection is considered an integral part of e-portfolios (Bassot 2015) and has been acknowledged to have the power to promote learning and to develop expertise (Ebil, Salleh, and Shahrill 2020). This study found that almost all of the 18 reviewed papers reported reflection to be the most used tool to enhance learning in e-portfolios (Table 2). Ebil, Salleh, and Shahrill (2020, 5800) argue that “theoretical roots of reflection are found in constructivism”, which gives learners an opportunity to make sense and create meaning of their learning experiences. As “reflective learning is the core of e-Portfolio” (Mohamad, Embi, and Nordin 2016, 233), it offers learners the opportunity to interact with content and with each other to solve problems, helping to create self-confident, self-directed and highly motivation students. Reflective learning has long been believed to develop and improve students’ self-directed learning skills (Garrison 1997) which not only helps them to take ownership of their learning but also to gain lifelong learning skills. Van Wyk’s (2017) study revealed that the use of e-portfolios in teaching subjects such as Economics in HE enhanced reflective practices of learners. However, Ebil, Salleh, and Shahrill (2020) suggest that reflection can be guided, being a skill that should be encouraged and taught. The studies also revealed that reflective practice gives students the opportunity to adjust their e-portfolios according to feedback and recommendations (Chau and Cheng 2010; De Jager 2019), which gives students the opportunity to analyse past learning experiences and make meaning of new information (Thang, Lee, and Zulkifli 2012).

Interestingly, reflective learning is also seen as valuable for faculty too, providing them with an opportunity to reflect on their own teaching practices, and to evaluate the course or learning goals (Akleh and Wahab 2020; Kabilan and Khan 2012). E-portfolios thus help faculty to creatively develop courses for tertiary education which result in the use of “relevant and meaningful instructional approaches” (Kabilan and Khan 2012, 1014).

E-portfolios align well with a student-centred approach and constructivist views of learning (Ebil, Salleh, and Shahrill 2020) and learning by doing (Reese 2011), which is “learning from experiences resulting directly from one’s own actions, as contrasted with learning from watching others perform” (Reese 2011, 1). Moye, Dugger and Starkweather (2014, 22) put it simply, saying that “knowing something and knowing how to do something are very different things”, which means that the e-portfolio affords students the opportunity to learn by doing and to use technology to solve problems (Moye, Dugger and Starkweather 2014).

Instantaneous and Meaningful Feedback

As reflection is considered integral to e-portfolios promoting learning and developing expertise, feedback is also a key factor for educational e-portfolios. Mapundu and Musara (2019, 203) argue that feedback “helps with the interaction of involved stakeholders”. Interaction is an important element of online learning (Parker 2020), especially in DE where the learner is geographically separated from the instructor (Moore 1989). Teaching tools such as e-portfolios thus provide space for instant communication and feedback to students.

Provision of feedback was also found to be of prime importance in many of the studies reviewed. Yang, Tai, and Lim (2016) argued that constructive feedback is a precursor for sustained learning support. Kabilan and Khan (2012) and Strydom and Barnard (2017) also reported that participants’ learning and achievement were attained by feedback given by peers and the instructor. Feedback as the vehicle for reflection, helps to improve student’s critical thinking skills (De Swardt et al. 2019; Mohamad, Embi, and Nordin 2016) and deep learning (Kabilan and Khan 2012; Lukitasari, Hasan, and Sukri 2020; Sellami 2017). The interdependency of these concepts is reported in the reviewed studies, indicating that reflection leads to self-directed learning (Mohamad, Embi, and Nordin 2016), critical thinking (De Swart et al. 2019; Thang, Lee, and Zulkifli 2012), and how meaningful feedback may improve learning (De Jager 2019; Harun and Jhee 2012).

Continuous and Authentic Assessment

If well designed, e-portfolios have the ability to offer continuous and authentic assessment. Yang, Tai, and Lim (2016) argued that e-portfolio use can be successful through coherent assessment design. Abd-Wahab et al. (2016, 7) argue that e-portfolios “provide students and educators with an assessment tool to improve academic success”, while Kabilan and Khan (2012) believe that e-portfolios are more transparent and

practical compared to the conventional tests. Therefore, when considering how to assess student learning, it is vital that assessment be designed to improve students' skills and understanding of course content. Thus, it is fundamental for assessment to be continuous and authentic requiring application of what students have learnt to a new situation, which demands judgement to determine what information and skills are relevant (Conrad and Openo 2018).

Challenges of Adopting E-Portfolios in Higher Education

Although some studies superficially mentioned challenges that are stumbling blocks for the effective adoption of e-portfolios in their countries, most of the included papers elaborated on the challenges they faced in their respective countries (Table 3). Most of the identified challenges include digital literacy of lecturers and students, internet connectivity, lack of digital devices, and the lack of awareness of e-portfolios in HE. The major challenge in many developing countries is the level of digital literacy that is necessary to develop quality e-portfolios that are supported by vigorous student-centred assessments approaches and methods that support meaningful learning in HE and DE. The lack of appropriate digital literacy was highlighted in the studies (Akleh and Wahab 2020; De Jager 2019; Lukitasari, Hasan, and Sukri 2020; Thang, Lee, and Zulkifli 2012); however, to mitigate this challenge, HEIs need to design innovative support and training strategies for both the lecturers and students.

The appropriate choice of e-portfolio software and platforms may also help to reduce the negative attitudes reported in various studies. The design look and feel, ease of access and use, and the ability to give instant feedback and to promote interaction will determine the successful implementation of e-portfolios. Linked to the challenges of access to data, devices and connectivity prevalent in developing countries is the importance to use e-portfolio applications, software and/or platforms that will encourage adoption and use of the e-portfolios by lecturers and learners.

Another major challenge reported in various studies is the perceived time and effort to develop e-portfolios, with Abd-Wahab et al. (2016) reporting that uploading large files was difficult and time-consuming for students. With the current cloud technologies (Vakaliuk et al. 2021), students may find it easier to upload big files onto their cloud platforms, which can be linked with their e-portfolios. The lecturers could also design tasks that allows small chunks of files to be uploaded at a time. Given that the internet connectivity and mobile data are some of the major challenges, particularly in rural areas (De Swardt et al. 2019; Abd-Wahab et al. 2016), it is important that e-portfolio tasks be creatively designed to minimise the amount of time needed for internet connection.

Assessing learning in online spaces has been one of the challenges. Harun and Jhee (2012, 249) argue that an "excessive amount of time is required to read all the blogs posts for the grading purposes", however, the technology is being constantly updated to improve automation and efficiency for online assessment and the ability to give instant feedback to students. Most of the identified challenges are generally similar in many

developing countries (Table 3), however, in comparison to the identified benefits as outlined in Table 2, the e-portfolios seem to have much value to offer HEIs that want to innovate their teaching and learning. The Covid-19 pandemic had a great impact on many countries forcing many HEIs to migrate their teaching and learning activities to online spaces (Ogundokun et al. 2020). Creatively designed and executed e-portfolios may just be one of the possible solutions for lecturers and students during the pandemic.

Conclusion

This paper reported on a systematic review of peer-reviewed academic studies of e-portfolios between 2010 and 2020 outlining the way in which e-portfolios could effectively be used as a tool for teaching and supporting learning in HE and DE. Inclusion and exclusion criteria were used to select studies from developing countries in Africa and Asia. The included studies strongly concur on the effectiveness of e-portfolios and listed many benefits using e-portfolios as a teaching and support tool. However, most of the identified challenges are generic, have no bearing on e-portfolios, and can be solved by HEIs and their national governments. Constructivism and self-directed learning theories were used to highlight the fact that e-portfolios are based on learning by doing which fosters many benefits for learners, including ownership of learning, gaining of multimedia and digital skills, collaborative skills and other vital skills necessary for twenty-first century students to function in an evolving digital age.

The 18 reviewed studies include various recommendations for the use of e-portfolios, mostly mentioning training and support as key to the successful implementation of e-portfolios. Training is necessary to equip both instructors and students with relevant skills that motivate them and pave the way towards smooth adoption and use of e-portfolios and that mitigate the prevalent challenges of digital literacy in developing countries' contexts. Introductory training workshops are especially beneficial for students and should effectively be conducted at the beginning of the course or module to teach them how to create their e-portfolios. Instructors also require training and continuous support to enhance their e-portfolio teaching skills.

Furthermore, HEIs, through a consultative-participatory approach, should choose easily accessible and user-friendly e-portfolio platforms that help to ensure a smooth transition. In conclusion, this study confirms the pedagogical affordances and many benefits which e-portfolios can offer HE and DE, and their relevancy in the present era.

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