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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 article 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

Assessment; critical thinking skills; e-portfolios; meaningful feedback; reflection; self-directed learning

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 et al., 2011). Barrett (2011) pointed out that the e-portfolio uses technologies that 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 allow users to interact with content and disseminate knowledge and content (Baker-Doyle & 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 & Chau, 2013; De Jager, 2019). Studies show that the process of building e-portfolios assists students in becoming active and independent life-long learners (Beckers et al., 2016) who, in a technology-enriched space,

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can cultivate their learning and knowledge through collaborative projects and peer learning. E-portfolios' ubiquity (Roder & Brown, 2009) and flexibility (Shroff et al., 2013) mean that anyone can participate. 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 distance education (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 & Spiller, 2010), but 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 & Wahab, 2020; De Jager, 2019), and as a result, developing countries may realise the benefits of adopting well-designed e-portfolios in their modules and/or programmes. Bates (2015) argued that e-portfolios are one of the examples of ways that educationists are gradually developing unique affordances using the internet. However, students in developing countries are faced with major challenges in adopting educational technologies owing to limited access to the internet, as well as a lack of digital literacy, electricity, and connectivity.

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 behavioralist 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 & Asl, 2015, p. 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 & 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 experiences 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, p. 18). Morris (2020) asserted 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.

Table 1. Inclusion and exclusion criteria.

Inclusion Criteria	Exclusion Criteria
Published 2010–2020	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-portfolios (e.g., PDF, hard-copy/traditional portfolio)
Educational e-portfolios	Non-educational, e.g., professional development portfolios, showcase portfolios

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) on how e-portfolios can effectively be used to teach and support learning in higher education (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 presented in Table 1.

The refining process identified 190 papers (see Figure 1) that 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.

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. It is important that reviewers achieve a reasonable level of agreement as this can negatively impact the results if the disputes are not resolved (Al-Qaysi et al., 2020; Chou et al., 2019).

Findings

The overall findings of the reviewed papers positively correlate with the idea that e-portfolios are a powerful tool for promoting learning (see Table 2). Three interlinked themes emerged: (a) reflective learning in e-portfolios; (b) instantaneous and meaningful

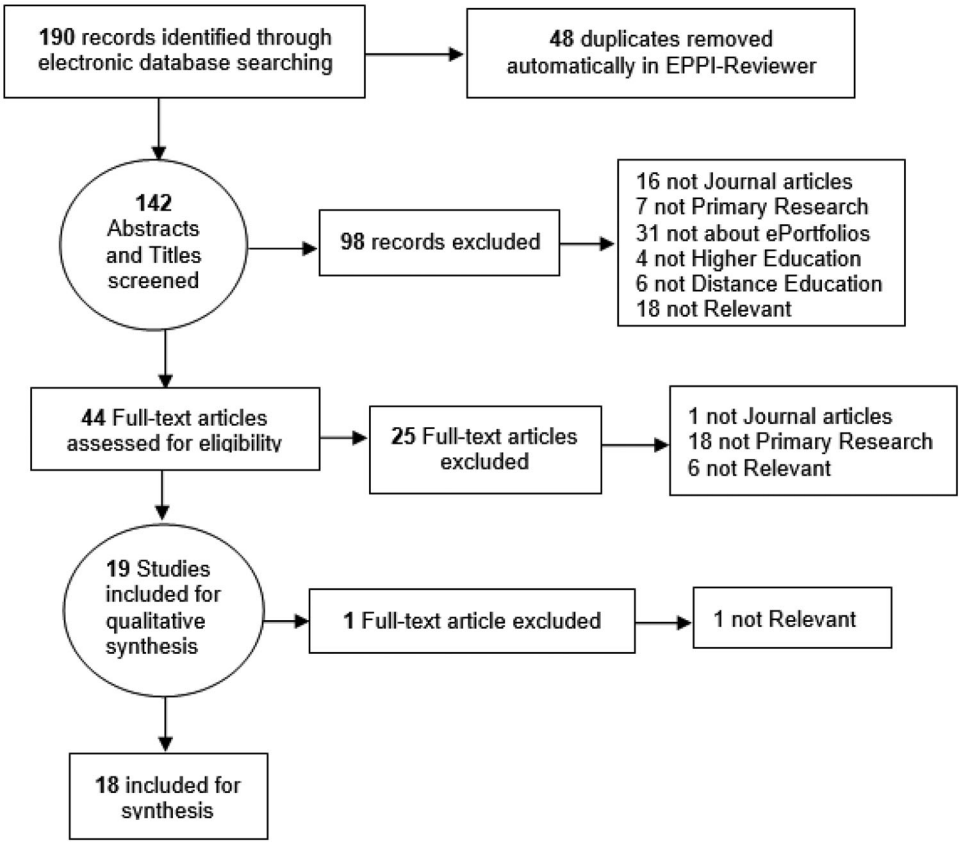

Figure 1. Flow diagram (adapted from Moher et al., 2009).

feedback; and (c) continuous and authentic assessment. The fourth theme presented the challenges highlighted in the included studies (see 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 et al., 2012).

Of interest is the number of papers on e-portfolios that 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 (see Table 2). This study also shows that e-portfolios are mostly used in higher education institutions (HEIs) in Asian developing countries and in some HEIs in South Africa.

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 et al., 2020). The current study found that almost all of the 18 reviewed papers reported

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 et al. (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 et al. (2016)	Reflective, deep learning, digital skills, self-regulation improved, metacognitive learning	South Africa
Raja Harun and Jhee (2012)	Reflective, productive learning, continuous and authentic assessment, instantaneous and meaningful feedback, interaction	Malaysia
Mhiri Sellami (2017)	Reflection, feedback, deep learning	Tunisia
Shroff et al. (2013)	Ownership of learning, self-regulation improved, critical thinking, continuous and authentic assessment, learning by doing	Hong Kong
Strydom and Barnard (2017)	Ownership of learning, Critical thinking, continuous and authentic assessment, self-regulation improved, engagement (increased/enhanced)	South Africa
Thang et al. (2012)	Digital skills, deep learning, reflection, self-regulation improved, critical thinking	Malaysia
Van Wyk (2017)	Reflective, enhanced content knowledge, continuous and authentic assessment, ownership of learning, interaction, self-regulation improved	South Africa
Yanget al. (2016)	Reflective, ownership of learning, metacognitive learning, self-regulation improved, critical thinking	Hong Kong

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)
De Swardt et al. (2019)	Internet connectivity
Raja 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 et al. (2020)	Digital literacy
Mapundu and Musara (2019)	Time consuming
	Security and privacy issues
Mhiri Sellami (2017)	Lack of awareness
	Time consuming
	Workload for students (weekly submissions)
Strydom and Barnard (2017)	Lack of ICT skills by faculty
Thang et al. (2012)	Poor internet connections
	Digital literacy
	Facilitation of learning (lack of guidance from instructors)
	Time consuming
	Poor ICT facilities
Yanget al. (2016)	Teaching presence
	Negative attitudes/perceptions of learners
	Ethical problems (plagiarism)

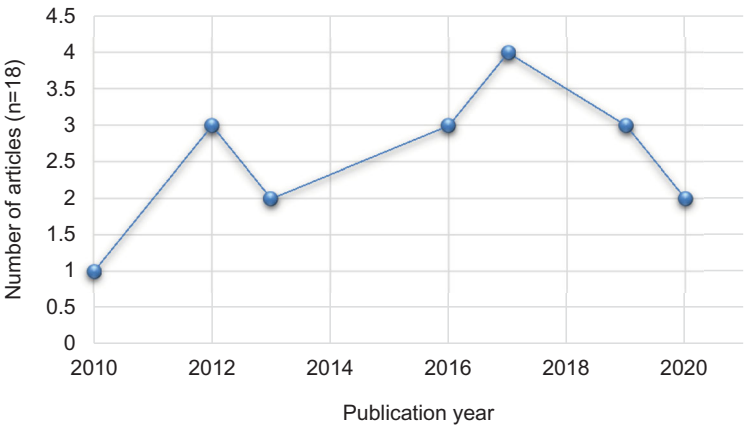

Figure 2. Number of published papers per year (2010–2020).

reflection to be the most used tool to enhance learning in e-portfolios (Table 2). Ebil et al. (2020, p. 5800) argued that the "theoretical roots of reflection are found in constructivism," which gives learners an opportunity to make sense and create meaning of their learning experiences. Since "reflective learning is the core of e-Portfolio" (Mohamad et al., 2016, p. 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 motivated students. Reflective learning has long been believed to develop and improve students' self-directed learning skills (Garrison, 1997) that not only help them take ownership of their learning but also gain life-long learning skills. Van Wyk's (2017) study revealed that the use of e-portfolios in teaching subjects such as Economics in HE enhanced the reflective practices of learners. However, Ebil et al. (2020) suggested that reflection needs to 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 & Cheng, 2010; De Jager, 2019), which gives students the opportunity to analyse past learning experiences and make meaning of new information (Thang et al., 2012).

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

E-portfolios align well with a student-centered approach and constructivist views of learning (Ebil et al., 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, p. 1). Moye et al. (2014, p. 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 et al., 2014).

Instantaneous and Meaningful Feedback

Interacting with students and giving them instantaneous feedback can be very effective in facilitating the learning process in DE and online learning. Feedback was found to be of prime importance in many of the studies reviewed. This is because e-portfolios allow for continuous assessment with provision of constructive and personalised feedback. Yang et al. (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 also helps improve student's critical thinking skills (De Swardt et al., 2019; Mohamad et al., 2016) and deep learning (Kabilan & Khan 2012; Lukitasari et al., 2020; Mhiri Sellami, 2017). The importance of involving students in the process of collecting and analysing performance-based data cannot be understated. At the broadest level, students need to know if they have mastered the content throughout the learning process. Giving them information about the

ways they are studying, reading, searching for information, or answering questions can be invaluable.

Continuous and Authentic Assessment

If well designed, e-portfolios have the ability to offer continuous and authentic assessment. Yang et al. (2016) suggested that e-portfolio use can be successful through coherent assessment design. Abd-Wahab et al. (2016, p. 7) maintained that e-portfolios "provide students and educators with an assessment tool to improve academic success," while Kabilan and Khan (2012) believed that e-portfolios are more transparent and practical in comparison to the conventional tests. 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 & Openo, 2018). The essence of every e-portfolio is evidence of the student's knowledge-in-use that denotes the achievement of desired levels of competency through active learning.

Challenges of Adopting E-Portfolios in Higher Education

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 necessary to develop quality e-portfolios that are supported by vigorous student-centered assessment approaches and methods that support meaningful learning in HE and DE. The lack of appropriate digital literacy was highlighted in several studies (Akleh & Wahab, 2020; De Jager, 2019; Lukitasari et al., 2020; Schaffer & Richardson, 2004; Thang et al., 2012), However, to mitigate this challenge, HEIs need to design innovative support and training strategies for both 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 ability to give instant feedback and 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 of using e-portfolio applications, software, and/or platforms that 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. For example, the internet connectivity and cost of mobile data are some of the major challenges faced by students in developing countries, particularly in rural areas (De Swardt et al., 2019; Abd-Wahab et al., 2016). However, with current cloud technologies (Vakaliuk et al., 2021), students may find it easier to upload larger files onto their cloud platforms, which can then be linked with their e-portfolios.

Assessing learning in online spaces has been one of the challenges. Raja Harun and Jhee (2012, p. 249) argued that an "excessive amount of time is required to read all the blogs posts for the grading purposes." However, 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 (see Table 3); however, in comparison to the identified benefits, as outlined in Table 2, 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 countries, forcing HEIs to migrate their teaching and learning activities to online spaces (Ogundokun et al., 2020). Creatively designed and executed e-portfolios may be just one of the possible solutions for lecturers and students during the pandemic. Therefore, the usability of the e-portfolio platform is key to the successful adoption of e-portfolios in HE (Gámiz-Sánchez et al., 2019).

Recommendations

The 18 reviewed studies include various recommendations for the use of e-portfolios, mostly mentioning training and support as key to their successful implementation. Based on the findings in this study, training is further recommended as an essential step in equipping both instructors and students with relevant skills to use e-portfolios for teaching and learning. The training will mitigate the prevalent challenges of digital literacy in developing countries and pave the way towards the smooth adoption and use of e-portfolios. HEIs, through a consultative-participatory approach, should also choose easily accessible and user-friendly e-portfolio platforms that help to ensure a smooth transition.

The current study also recommends orientation and information sessions at the beginning of a course or module to introduce e-portfolios to students. These sessions will be beneficial for instructors and students since they can be used to address expectations and uncertainties. Furthermore, it is important for instructors to creatively design learning activities that encourage students to actively develop their e-portfolios. The well-designed activities will also minimise the amount of time and effort needed for uploading files onto the e-portfolios.

Conclusion

This article 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 learning in HE and DE. Inclusion and exclusion criteria were used to select studies from developing countries in Africa and Asia. 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 and gaining the multimedia and digital skills, collaborative skills, and other vital skills necessary for 21st-century students to function in an evolving digital age. The reviewed studies strongly concur with the effectiveness of e-portfolios and listed the many benefits of using e-portfolios as a teaching and learning

tool. In conclusion, this study confirms the pedagogical affordances and many benefits that e-portfolios can offer HE and DE, as well as their relevancy in the present era.

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