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A Review of Research on Collaborative Assessments in the Open Distance and e-Learning Environment

Ramashego Mphahlele

University of South Africa: Pretoria, Gauteng, ZA

Keywords

collaborative assessments, group assessments, Open Distance and e-Learning, peer assessments, and social constructivism

Abstract

This paper reviews 38 studies conducted between 2015 and 2022 on collaborative assessments in open-distance and e-learning (ODeL) contexts, focusing on the benefits, types, challenges, and strategies to improve collaborative assessments. This qualitative review aims to investigate collaborative assessments within the ODeL comprehensively. The objectives encompass thoroughly exploring theoretical foundations and empirical evidence to illuminate the pedagogical implications and effectiveness of collaborative assessment methodologies. Employing a systematic literature review approach, various scholarly articles, research papers, and educational studies were scrutinised to synthesise the current landscape. The review shows that effective communication, feedback, and appropriate technology are critical factors in promoting successful collaborative assessments, which can result in improved engagement, motivation, and better learning outcomes. However, challenges such as scheduling difficulties, technology challenges, group dynamics, and assessment quality may arise. Using social constructivism, this paper addresses criticisms of collaborative assessment in the ODeL context, identifies types of collaborative assessments, and presents strategies for implementation and addressing challenges. Based on these findings, recommendations are presented to educators, urging the integration of collaborative assessment methods into open distance and e-learning frameworks, accompanied by pedagogical support and training to optimise their efficacy and promote enriched learning experiences. The paper concludes by suggesting future research areas and recommendations for educators and instructional designers seeking to implement collaborative assessments in ODeL environments. Collaborative assessments can contribute to collaborative learning, providing students with a sense of community, engagement, and responsibility.

Introduction

In recent years, integrating technology into the distance learning environment, has, according to Haleem et al. (2022), significantly reshaped the education landscape. Sari and Sidiqa (2021) posit that the paradigm shift towards collaborative assessments within higher education settings has garnered substantial attention within theoretical frameworks and empirical investigations. This qualitative review embarks on a comprehensive exploration, synthesising the theoretical underpinnings and empirical evidence that underlie collaborative assessments in Open Distance and e-Learning (ODeL) contexts. By probing into the multifaceted dimensions of collaborative assessment methodologies, this review aims to illuminate the transformative impact, pedagogical

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implications, and effectiveness of these approaches within the dynamic realm of ODeL education.

ODeL has transformed how people learn and access education. ODeL has gained popularity as a means for students to attend education from any location because of the development of technology and the internet (Maboe, 2019). ODeL allows students to learn at their own pace and in their own time without attending classes or lectures. However, ODeL also presents particular challenges when it comes to assessment. Traditional assessments, such as written exams and essays, are not always suitable for ODeL students. Many educational institutions are turning to collaborative assessments to ensure that ODeL students receive a fair and accurate assessment. Collaborative assessments can take many forms. For example, a group of students could work together to complete a project or assignment. The group could then submit their work to the teacher for assessment. The teacher would then assess the group's work, considering each student's contributions.

Another form of collaborative assessment is peer assessment. This involves students assessing the work of their peers. The teacher would then assess the students' work, taking into account the feedback provided by their peers. This can be a valuable way of assessing the work of ODL students, as it allows for a more comprehensive assessment of the students' work. Some ODeL programmes use online tools to facilitate collaborative assessments. These tools allow students to submit their work to the teacher, who can assess it and provide feedback. This can be a useful way of assessing the work of ODeL students, as it allows for a more comprehensive assessment.

This paper aims to review research on collaborative assessments in ODeL to explore the following variables:

- benefits of collaborative assessments
- types of collaborative assessments used in the ODeL environment
- impact of collaborative assessments on grading
- challenges of implementing collaborative assessments
- strategies to improve collaborative assessments.

To guide the review process and ensure that it is comprehensive and systematic, a theoretical framework was used as a lens to make sense of the data and draw conclusions.

Theoretical Underpinning of the Study

A growing body of literature recognises the importance of a theoretical framework as instrumental in supporting or invalidating findings on a phenomenon. Social constructivism is a suitable theoretical framework for reviewing research on collaborative assessments in ODeL environments due to its potential to inform the design and implementation of collaborative assessments (Secore, 2017). Collaborative assessments in ODeL environments involve students working together to complete assessment tasks. These assessments aim to promote learning through collaboration and to foster the development of important skills such as communication, critical thinking, and problem-solving. According to Thomas et al. (2014), social constructivism can provide a useful lens through which to understand the benefits and challenges of collaborative assessments in ODeL environments.

Social constructivism is a learning theory that emphasises the role of interaction and collaboration among students to create meaning and understanding (Kumar Shah, 2019). This theory provides an excellent framework for understanding collaborative assessment in ODeL

environments, since it helps explain how students interact and collaborate to learn and assess each other's learning. It also explains how collaboration can make the assessments more meaningful and adequate.

Methods

The main search for this review was conducted in November 2021 and updated in November and December 2022. The researcher searched 10 common electronic databases: PubMed, Scopus, Web of Science, JSTOR, Google Scholar, IEEE Xplore, ACM Digital Library, ProQuest, EBSCO, and ScienceDirect. The criteria outlined in Table 1 guided the search of sources.

Table 1: Criteria Determining Article Search

Criterion	Inclusion Criteria	Exclusion Criteria
Study Period	Studies conducted from 2015 to 2022 in ODeL and distance education	Studies conducted before 2015, even though they were in ODeL and distance education
Type of Studies	Empirical study conducted through either qualitative, quantitative or mixed methods approach	Conceptual studies and reviews
Participants	Studies which involved students as participants with specific types of collaborative assessment, such as peer or group assessments	Studies which did not involve students as participants with specific types of collaborative assessment, such as peer or group assessments

The electronic database searches yielded 1,449 potentially relevant documents. Of these 1,449 documents, 1,208 were duplicate hits, which were eliminated from further consideration. The titles and abstracts of 241 documents were reviewed to determine potential relevance, excluding 136 due to irrelevance to the review. The researcher obtained and reviewed 105 full-text documents and formally excluded 67 (35 had focused on collaborative learning, not assessment, and 32 featured contact institutions where collaborative assessments were conducted face-to-face). The search results are summarised in Table 2.

Table 2: Search Results Numbers per Database

Database	Raw Results	Filtered Results	Relevant Results
PubMed	129	26	7
Scopus	254	48	11
Web of Science	127	56	2
JSTOR	205	24	4
Google Scholar	257	62	10
IEEE Xplore	54	0	0
ACM Digital Library	37	0	0
ProQuest	243	0	0
EBSCO	76	25	4
ScienceDirect	67	0	0
Total	1449	241	38

Several ineligible sources were discovered throughout the literature search, including conceptual studies, and systemic and other reviews. Although these studies were not included in

this review, some of them were used in the discussion section to guide overcoming the challenges experienced when implementing collaborative assessments in the ODeL environment.

Location of the Studies

Study locations included Australia, Belgium, Canada, China, Israel, Japan, Malaysia, Nepal, Taiwan, Turkey, the United Kingdom, the United States of America, and West Africa. It should be noted that the location was not one of the search criteria, however, it is mentioned to give context to the reviewed studies.

Synthesising the Results

The studies containing collaborative assessments were subjected to the synthesis phase, which aimed to explore the variables mentioned in the introduction. All 38 papers were uploaded to Atlas.ti for coding.

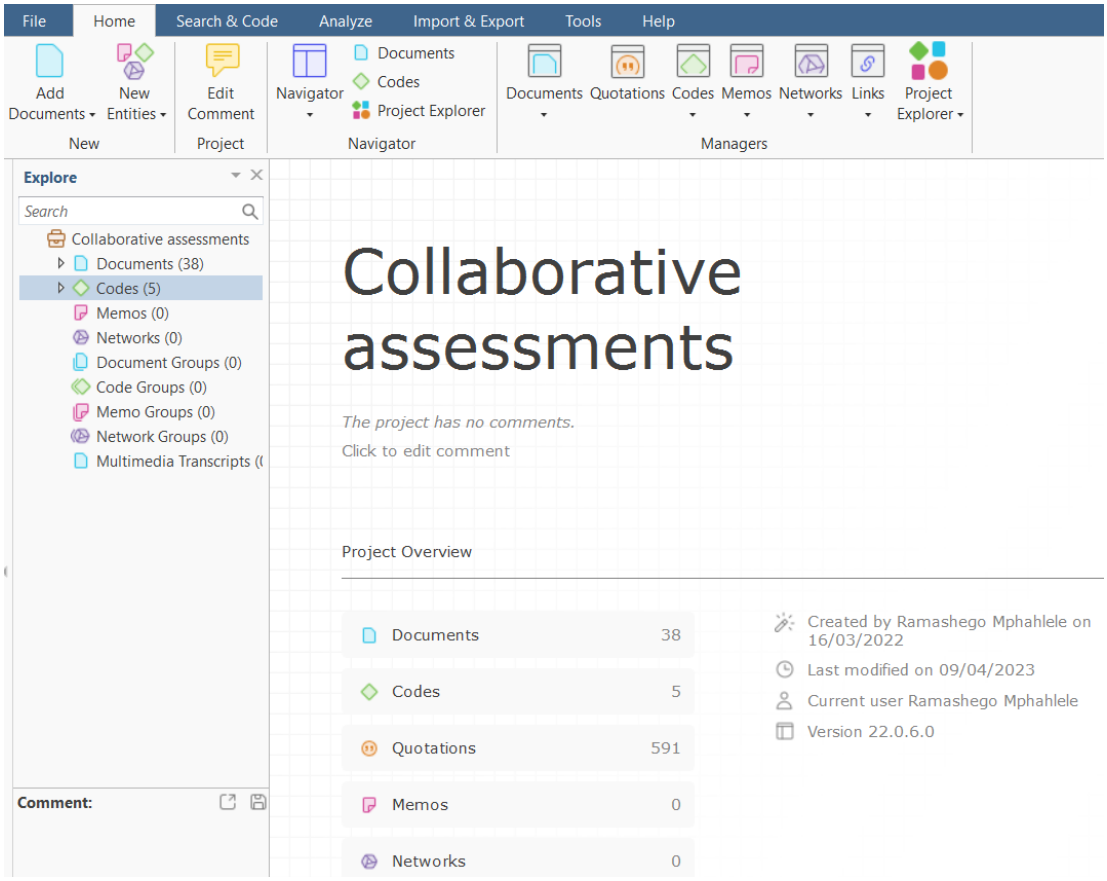

Figure 1: Codes and quotations created in Atlas.ti

Figure 1 shows that five codes and 591 quotations were generated from the 38 studies. The five codes from the variables were generated, and the groundedness results are presented in Table 2.

Table 3: Code Definitions and Groundedness

Code	Description	Groundedness*
Benefits	Aspects of collaborative assessments that have the potential to transform the way students learn and assess their knowledge and skills	50
Challenges	Aspects of collaborative assessments that pose a difficulty, obstacle, or problem that hinders effectiveness	131
Collaborative Assessments	Assessments that involve the joint efforts of multiple individuals or teams	464
Group Assessments	Assessments that provide a valuable opportunity for individuals and teams to work together towards a common goal and demonstrate their skills and abilities in a collaborative setting	415
Peer Assessments	Evaluations of an individual's work or performance by their peers	411
Strategy	Strategies used to conduct collaborative assessments and address implementation challenges	56
Total		1471

* Number of connected quotations

Results

Since the codes were intentionally formulated from the study variables, the codes were also used as themes to present the results in this section.

Types of Collaborative Assessments

The n = 38 studies showed that collaborative assessment is a broadly perceived concept implemented differently worldwide. There was an overlap of n = 19 studies that referred to types of collaborative assessments as peer and group assessments, while only n = 2 studies focused on peer assessment as the only type of collaborative assessment. Atlas.ti code-occurrence showed group assessments' and peer assessments' groundedness as 415 and 411, respectively, as shown in Table 2. The 415 groundedness of group assessment was generated from n = 21 studies, while n = 19 studies used peer assessment.

Regarding group assessments as part of collaborative assessments, some studies highlighted a need to collaborate effectively as it is a workplace requirement. The study by Kennedy-Clark et al. (2017) relates well with the current study, as it was conducted in one of the regional distance education providers in Queensland (Central Queensland University), which offers flexible (external/distance) and multi-modal (external/distance and internal/on-campus) study options.

Bremert et al.'s (2020) study was about two teachers who used collaborative assessments in their classes. The findings revealed that working in collaborative groups in both teachers' courses improved assessment scores compared to completing the exam individually. Kennedy-Clark et al. (2017) observed two collaborative assessments over five weeks and found that group assessments build a conversational classroom environment that supports successful student collaboration as students feel comfortable sharing their ideas and designs with their peers.

Peer assessment appears to be less used in the studies. In Australia, Sekendiz (2018) focused only on peer assessment as part of the collaborative assessment using a Moodle activity called 'workshop'. Sekendiz's study revealed some negative findings where students were less motivated, and he advised that careful consideration should be given to the time required for peer assessments. The studies by Ma et al. (2020) and Flournoy and Bauman (2021) in China and Canada, respectively, explored individual contributions to collaborative learning through self- and peer assessment. Their findings revealed that self- and peer assessment helped students divide individual responsibilities and ensured that group members carried out their fair share of group tasks. The other study conducted in China by Fang et al. (2021) showed that, in peer assessment, students could play the roles of assessors and assessees and, through the process of watching other's work and receiving other's opinions, they could improve their own work and reflect on their learning. Lastly, the study by Cooper (2017) in the UK coupled peer assessment with self-assessment, and the method tended to alleviate anxiety.

Together, these studies' results provide essential insights into peer assessment as a form of collaborative assessment, such as:

- providing a structured learning process for students to critique and give feedback to each other on their work
- helping students develop lifelong skills in assessing and providing feedback to others, equipping them with skills to self-assess and improve their work
- enabling students to evaluate their work and discover what they do not yet know when they observe and reflect on the range of approaches made apparent to them during peer assessment.

Other studies, such as those conducted in Taiwan and Turkey, did not identify the collaborative assessments as either peer or group; instead, they referred to collaborative assessments as a general term. Kuo et al. (2020) conducted their study using a multidimensional item response analysis on 53,855 students to explore CPS scales and represent the students' collaboration and problem-solving performance. The results showed that Taiwanese students performed slightly better when establishing and maintaining a shared understanding of the three collaboration competencies. Collaborative competencies mentioned in Kuo et al.'s (2020) study are:

- establishing and maintaining a shared understanding
- taking the appropriate action to solve the problem
- establishing and maintaining team organisation.

Although Kuo et al.'s (2020) study does not explicitly specify that it was conducted in the ODeL environment, the collaborative competencies apply to the ODeL environment.

Ozaydin et al. (2018) used an expanded experimental design to compare the collaborative and individual learning of 30 students from a vocational college located in the Turkish Mediterranean Region in an online learning environment. Their results indicated that collaborative learning activities in the experimental group increased students' motivation. Therefore, instructors may be encouraged to use collaborative learning activities in the online learning environment.

Benefits of Collaborative Assessments

Learning in the ODeL environment differs from traditional classroom learning, where students can interact and collaborate in learning and assessment activities. Higley (2018) cautioned that developing collaborative online activities (including collaborative assessments) requires understanding how students process information when online. Higley further recommends that collaborative assessments lead to positive student performance outcomes. In this study, n = 16 studies indicated that various collaborative assessments in ODeL have the potential to create an audience of constructive critics and opportunities for new learning connections. N = 10 studies further suggest that collaborative assessments provide several benefits to students in ODeL environments and have the potential to transform the way students learn how to work together to complete a task, which promotes teamwork, communication, and problem-solving skills. Although the aforementioned benefits are interrelated, the following section unpacks each key benefit of collaborative assessments found in the n = 16 studies.

Increased Student Engagement

According to Gray and DiLoreto (2016), student engagement is students' willingness, need, desire, and compulsion to engage in and succeed in the learning process. Students' degree of interest, interactions with other students, and willingness to learn about the subjects have all been referred to as indicators of student engagement (Briggs, 2015). From n = 16 studies, n = 9 emphasised motivation as the most important factor needed for student engagement. Students who work collaboratively are more motivated to learn and are more responsible towards their peers (Onlu et al., 2020). Surahman et al. (2018) concluded that collaborative assessments increase students' participation in learning. It can function to develop high-level thinking skills in producing quality learning work. Greenhow and Lewin (2015) highlighted the need to tear down the taboos associated with social and digital media for students to thrive in a collaborative, engaging, and purposeful environment.

Improved Learning Outcomes

Collaborative assessments have been shown to improve learning outcomes in ODeL. The following are findings from n = 4 studies. Ozaydin et al. (2018) compared the outcomes of students who participated in collaborative assessments with those who completed individual assessments and found that collaborative assessments in ODeL positively impacted students' academic performance and learning outcomes. Another study, by Fergusson and Hughes (2021), reported similar findings, indicating that collaborative assessments led to better learning outcomes and increased student engagement in ODeL. The study also found that collaborative assessments helped to promote critical thinking and problem-solving skills among students. Hsu et al. (2019) examined the impact of collaborative assessments on students' learning outcomes in a MOOC (massive open online course) environment. The study found that collaborative assessments helped to enhance students' cognitive and social learning outcomes and promoted deeper learning. Cacciamani et al. (2021) found that collaborative assessment tasks helped promote students' self-regulated learning and fostered a sense of community in the blended learning environment.

Generally, these authors highlight that collaborative assessments can improve learning outcomes in ODeL environments. Other studies (n = 7), not included in this section, suggest that collaborative assessment tasks can help promote a sense of community among students.

However, designing effective collaborative assessment tasks that maximise learning outcomes is essential.

Development of Critical Thinking and Problem-Solving Skills

Critical thinking and problem-solving skills are essential skills for academic success and future employment (Onlu et al., 2020). From the Atlas.ti analysis, n = 3 studies' findings showed the benefits of collaborative assessments for developing critical thinking and problem-solving skills. Das and Chakraborty (2018) examined the impact of collaborative assessment on critical thinking skills among undergraduate students enrolled in a distance education programme. They found that collaborative assessment led to significant improvements in critical thinking skills compared to individual assessment. Similarly, Fattahi and Karimi (2020) explored the impact of collaborative assessment on problem-solving skills in an online course. Students could learn from each other and engage in meaningful discussions that helped them understand complex concepts. Lastly, Johnson et al. (2018) found that peer assessment led to improvements in critical thinking and problem-solving skills, as students could provide feedback to each other and learn from each other's strengths and weaknesses. Most of these authors highlight the need to explore both the challenges and benefits of participating in collaborative assessments to make informed decisions about engaging in such assessments and how to approach them effectively. The next section presents the challenges experienced in collaborative assessments, as Cooper (2016) cautioned that it is important to recognise the challenges facing those who wish to adopt these alternative assessments.

Challenges of Using Collaborative Assessments in ODeL

From the Atlas.ti analysis, the challenges code generated 131 quotations from n = 34 studies. These studies established the barriers to participation that emanate from scheduling difficulties, technology challenges, group dynamics and assessment quality.

Scheduling Difficulties

The most common challenge in the n = 34 studies regarding scheduling collaborative assessments, especially group work, was the students' different time zones, work schedules, or other commitments that made finding a mutually convenient time to work together difficult. In n = 14 studies, the authors indicated that scheduling difficulties resulted in incomplete assignments, causing stress and anxiety for some students.

Technology Challenges

Atlas. ti generated quotations from n = 21 studies that pointed out that technology was one of the challenges of collaborative assessments in ODeL. Collaborative assessment often requires using technology tools such as video conferencing, shared online documents, social bookmarking, digital whiteboards and communication platforms (Niari, 2021). However, n = 10 studies asserted that technical difficulties such as poor internet connectivity, incompatible software and hardware, and limited access to technology can hinder the effective use of these tools. It can lead to communication breakdowns and impact the quality of the collaborative work produced. Gillett-Swan (2017) emphasised the technology challenge that arises through the limits involving the technical capability of the software, particularly in terms of its functionality, where, at times, normal simple tasks such as viewing a video can become increasingly complex, causing frustration for students.

Assessment Quality

N = 3 studies showed that collaborative assessments can benefit students but may not always provide accurate assessments of individual student learning. Boudria et al. (2018) found that the challenge with assessment quality was due mainly to the massive number of participants where most of the students' submissions could not be assessed, especially open-ended ones or essays where automatic assessment was impossible.

Collaborative assessments can benefit students but may not always provide accurate assessments of individual student learning. In a group setting, some students may not contribute to the assessment, while others may benefit from the work of their peers without contributing significantly (Forsell et al., 2021). This can lead to grade inflation or deflation and not accurately represent each student's learning.

Gillett-Swan (2017) further draws attention to some of the barriers resulting from personal issues, such as anxiety associated with using technology, being out of one's comfort zone, (perception of) inequity in assessment — particularly in group assignments — and the (perceived) inability or difficulty in peer interaction, particularly in presentations.

Strategies for Implementing Collaborative Assessments

Atlas. ti generated 56 quotations from n = 20 studies about strategies for implementing collaborative assessments, and some of the strategies served as mitigations for the challenges mentioned in the previous section. Ma et al. (2020) mention use of anonymous assessments and random grouping to eliminate bias from social and interpersonal friendships among peers and to improve the validity of the collaborative assessments. On the other hand, Kennedy-Clark et al. (2017) recommend using self-assessment and peer assessment, which they refer to as SAPA. Their findings revealed the feasibility of SAPA in assessing collaborative processes and products of individual contributions and ensuring all group members perform a fair share of group tasks.

Sekendiz (2018) found the use of formative peer assessments, based on systemic pedagogical approaches such as a technology integration planning model, which assists with post-instruction analysis, ensured more success in subsequent applications. With a similar strategy but a different implementation, Ostuzzi and Hoveskog (2020) recommend peer feedback as a useful collaboration strategy for courses that deal with sustainability issues. They assert that peer feedback benefits providers and recipients because it allows them to take more active roles in the learning process. Another study, by Aouine et al. (2018), suggests the following strategies:

- Free strategy — which they view as implementing and promoting student cooperation, coordination and communication.
- Competitive strategy — the teacher launches a list of assessment tasks according to students' roles. Then, the student who logs in first can take the first task, the second student the second task, and so on, and students can take one or more tasks. The primary purpose of this strategy is to increase competition among students to encourage them to perform as many tasks as possible.
- Turnstile strategy — also called strategy by alphabetical order. Assessment tasks are allocated to students in alphabetical order according to their names. In this strategy, assessment tasks revolve among learners according to their names until all tasks are assigned. This strategy can be helpful for steps where the assessor is not sure about students' capacities.

- Dispatching by level/competence strategy — encourages teachers to conduct multi-level assessment tasks that are not the same level of difficulty and do not require the same skills to achieve them. Then teachers assign them to their students according to their levels/skills.

Aouine et al. (2018) cautioned that these strategies would work better in collaborative assessments when used with an extension of Learning Management Systems — Learning Design (IMS-LD). The findings presented in this section highlight the types of collaborative assessments and emphasise that, while collaborative assessments can provide several benefits to students, they also present challenges that must be addressed for successful implementation in ODeL. The following section discusses these findings.

Discussion of Findings

The review's findings are analysed, and their implications for teaching, learning, and assessment concerning social constructivism theory are discussed in this section. By doing so, this paper aims to contribute to the ongoing debate on the benefits and challenges of collaborative assessments in ODeL. Since this study is underpinned by social constructivism theory, this section discusses the findings through three concepts associated with social constructivism theory: knowledge construction, social interaction and socially shared cognition.

Knowledge Construction

The findings suggest that collaborative assessment is an effective strategy for promoting student collaboration and improving learning outcomes in the online learning environment. The studies conducted in Australia, Canada, China, Taiwan, Turkey, and the UK revealed some crucial insights into peer assessment that helps students develop lifelong skills in assessing and providing feedback to others, equips them with skills to self-assess and improves their work. It also enables students to evaluate their work and discover what they do not yet know when they observe and reflect on the range of approaches made apparent to them during peer assessment. Furthermore, peer assessment provides a structured learning process for students to critique and give feedback to each other on their work.

Social Interaction

The benefits of collaborative assessments in ODeL show increased student engagement, improved learning outcomes, and the development of critical thinking and problem-solving skills. The social interaction brought by collaborative assessments creates opportunities for new learning connections, promotes teamwork and communication, and fosters a sense of community among students. Most studies confirm that when students work collaboratively with peers, they become more motivated to learn, take greater responsibility towards their peers, and participate more actively in the learning process.

Socially Shared Cognition

Social constructivists argue that cognition is not just an individual process but is socially shared within a community (Davis et al., 2017). Although there were several challenges relating to collaborative assessments found in the studies, such as scheduling difficulties, technology, assessment quality, and personal issues, other studies established strategies that could ensure that

knowledge is constructed and negotiated through social interaction and participation in communities of practice.

Conclusion

This paper reviewed 38 collaborative assessment studies, conducted empirically, in ODeL and distance learning institutions. Using three social constructivism concepts — knowledge construction, social interaction and socially shared cognition — this paper came to the following conclusions:

- (Types of collaborative assessments) The studies identified various collaborative assessment methods such as group assessments, peer assessments, and collaborative exams. Group assessments were the most commonly used method, followed by peer assessments.
- (Benefits of collaborative assessments) Most studies ascertained that collaborative assessments in ODeL environments provide numerous benefits, such as improved engagement, increased motivation, and better learning outcomes. Collaborative assessments promote critical thinking, enhance social skills, and facilitate peer learning.
- (Challenges of implementing collaborative assessments) Despite the benefits of collaborative assessments, the studies identified several challenges in implementing these assessments. These challenges included difficulties in managing group dynamics, ensuring equitable participation, and evaluating individual contributions.
- (Strategies to improve collaborative assessments) To address the challenges, the studies provided several strategies to improve collaborative assessments. The strategies include anonymous assessments; random grouping; use of the technology integration planning model; free, competitive, turnstile, dispatching by level/competence strategies, and incorporating technology tools that enable collaboration and feedback.

One challenge not mentioned in this paper thus far is plagiarism. Collaborative assessment can also increase the risk of plagiarism (Mahabeer & Pirtheepal, 2019). Students may be tempted to copy and paste each other's work or rely too heavily on the contributions of others. This could lead to academic dishonesty and students may not receive the feedback they need to improve their learning outcomes. This paper suggests an empirical study to explore the experiences of ODeL teachers in ensuring academic integrity in collaborative assessments.

Discussing the results using the concepts of social constructivism theory showed that collaborative assessments can be valuable for promoting student learning in ODeL environments. With careful planning and implementation, collaborative assessments can enhance student engagement, motivation, and learning outcomes, leading to a more effective and fulfilling learning experience.

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Author Notes

https://orcid.org/0000-0002-9917-7089

Ramashego Mphahlele is an Associate Professor at the UNISA's Institute of Open and Distance Learning. She taught mathematics, science and technology teaching in the Foundation Phase at the Department of Early Childhood Education and Development. She was seconded as a Professional Development Specialist in 2021 to UNISA's Centre for Professional Development. Ramashego's research interests include Mathematics and Science teaching, technology-enhanced cognitive justice, inclusive education, Open Distance and e-Learning and Open Educational Resources. She has authored and co-authored several journal articles and book chapters and has co-edited three books published in 2021 and 2023. She is currently co-editing a book with Prof Moeketsi Letseka titled *Open Educational Resources (OERs) in open distance and e-learning contexts in Southern Africa*. Ramashego has been honoured with the following research awards:

- the Research and Development Excellence Award in 2010 from the Tshwane South District of Gauteng Department of Education
- the Data Champion for the First term 2018 awarded by New Leaders Foundation for using the Data Driven Districts dashboard
- the Women in Research Emerging Researcher Prize for the academic year 2020 issued by the University of South Africa
- Real Impact Award 2023/2024 for Early Career Researcher Recognition Award issued by Emerald Publishers.

Email: Emphahrs@unisa.ac.za

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