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Formative E-assessment as a Tool for Promoting Competence-Based E-Learning in Universities: A Contextualized Perspective

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Abstract: Ubiquitous Information communication technologies (ICT) and dynamics in today's society (both disruptive and progressive changes) are increasingly driving adoption of e-learning models at all levels of education. Previous research has shown that the synergy between learner and assessment centered dimensions are antecedent to knowledge centeredness which is a key goal in higher education. This paper offers insights on how to address the key challenges facing Universities in implementation of competence-based learning through effective use of formative e-assessment in e-learning as a tool for fostering learner and assessment centeredness. The ultimate goal is to enhance understanding on effective integration of formative e-assessment in e-learning courses as a strategy for promoting competence-based education, while providing information that serve formative and summative purposes. It is also important to emphasize that use of formative e-assessment as a tool for *assessment for learning* (formative assessment) is an integral requirement for active and meaningful engagement particularly in e-learning settings. Formative assessment should be seamlessly integrated within teaching and learning processes; and it entails enabling adequate opportunities for continuous monitoring and assessment to inform formative feedback. However, such a focus has been lacking or inadequate based on what characterizes continuous assessment in many Universities e-learning settings. This implies that the validity of continuous assessment cannot be realized without purposeful focus on formative assessment and tailored feedback. This briefing paper therefore aims to offer better understanding on the role of formative e-assessment from a contextualized perspective as an important pedagogical strategy for enhancing e-learning. Contextualization implies paying attention to the unique needs of particular e-learning settings including ICT capacity, learners' needs and experiences. Drawing from related literature and practical experiences, this paper offers best practices that need to be emphasized in applying formative e-assessment to promote learner and assessment centeredness that are desirable for achievement of envisaged core competences.

Keywords: Assessment for learning; E-learning; Embedded assessment; Transferable learning; Online assessment; Higher education.

1. Introduction

Assessment is a key aspect in teaching and learning processes at all levels of education. Research and practice-based evidence elucidate assessment as one of the core elements of an effectively designed learning environments (Bransford et al., 2000; Kyei-Blankson et al., 2016). The other key elements include knowledge; learner and community centered learning experiences. Assessment centeredness implies providing learners with adequate opportunities to demonstrate their developing abilities, illuminate their learning needs, and opportunities to receive continuous formative feedback (Gikandi & morrow, 2016). Intertwined with assessment centeredness is learner centered perspectives which imply learning engagement that is congruent with individual learner's strengths, interests and real-life experiences (Bransford et al., 2000, pp. 129-154). Assessment is therefore one of the most influential factors that affect learning and teaching in formal educational settings (Bransford

et al., 2000; Gikandi et al., 2011; Peculea & Peculea, 2019). Empirical research has also shown that the synergy between learner and assessment centered dimensions are antecedent to knowledge centeredness which is a key goal in education (Rich et al., 2014; Gikandi, 2019; Vonderwell et al., 2007). Similarly, community centeredness is crucial in promoting the other three elements by fostering interactive collaborations among the learners, and between learners and the teacher (Dyer, 2018; Ladyshewsky, 2013).

A key component in the competence-based education is re-alignment of teaching, learning and assessment with a shift from high-stake examinations to application of knowledge and competence-oriented assessment. Various researchers emphasize that effective pedagogical approaches require that assessment is aligned and integrated to teaching and learning processes (Gaytan & McEwen, 2007; Vondewell et al., 2007). According to these researchers, productive higher education requires appropriate alignment among teaching, learning and assessment in order to adequately meet the rapidly evolving needs for professional learners in the knowledge society (Lara, et al., 2020). The ultimate goal is to nurture learners' potential and promote development of core competences and skills which include communication and collaboration; self-efficacy; critical thinking and problem solving; creativity and imagination; citizenship; digital literacy; and learning to learn. The pedagogical approach being advanced in this paper also emphasize on establishing congruent assessment strategies in e-learning settings that reinforce the current needs of digital society including computer-supported learning and digital literacy. E-learning in this context refers to a range of educational delivery modes including online learning, blended learning, and computer-supported distance learning. Facilitating embedded assessment through use of formative e-assessment implies leveraging ubiquitous ICT to integrate continuous assessment for both formative and summative purposes (Gikandi, 2019). This enables use of formative e-assessment to facilitate active learning and tailored teaching, thus actualizing the potential of formative e-assessment as a tool for competence-based education. More importantly, effective use of formative e-assessment in University education will also support progressively documentation of assessment processes and products thus enhancing learners' engagement and quality formative feedback. More importantly, effective use of formative e-assessment in University education will also support progressively documentation of assessment processes and products for enhanced quality, fairness and transparency; aspects that are critical in educational assessment.

Continuous assessment for both formative and summative purposes is an important aspect in formal education as a way of establishing that learning goals and expected outcomes are being achieved (Khare & Lam, 2008; Fiock, 2020; Simon, 2019). Formative assessment is embedded within the concept of embedded assessment and is holistically defined as continuous assessment based on sustained engagement in learning activities within a supportive social context that expand teachable moments to scaffold learning (Gikandi, 2015; Kilis & Yildirim, 2019; Martin et al., 2019). This implies that the validity and reliability of continuous assessment cannot be realized without consideration of what formative assessment entails (Clark, 2010; Simon, 2019). However, this has been lacking in most cases based on what characterizes assessment in many educational settings particularly in e-learning settings. The concept of formative assessment is based on three core processes that are fundamental to assessment for learning as conceptualized by various authors (Black & Wiliam, 2009; Sadler, 1989; Glassmeyer et al., 2011; Peculea & Peculea, 2019; Vonderwell

& Boboc, 2013). These processes are: "establishing where the learners are in their learning; establishing where they are going; and establishing what needs to be done to get them there" (Black & Wiliam, 2009, p. 7). Correspondingly, it is the convergence of the concept of formative assessment and affordances of ICT that bring forth the concept of formative e-assessment. In this context, *formative assessment* in e-learning is conceptualized as embedded assessment that is used to support the iterative processes of establishing what, how much and how well students are learning. These processes aim to inform tailored formative feedback and scaffold learning in ways that recognize that all learners are capable and with respect to the learning goals and expected outcomes.

In light of the aforementioned viewpoints, it is important for our education system to go beyond the concept of '*assessment of learning*; that is characterized by summative assessment and actualized through examinations and instead, coherently incorporate innovative pedagogical approaches that emphasize assessment as an integral part of teaching and learning, thus a*ssessment for learning*; characterized by continuous formative assessment and continuum between formative and summative assessment. The convergence of continuous formative-oriented assessment and the affordances of ICT offers congruent basis for application of an integrated online continuous assessment tool (formative e-assessment). Formative e-assessment refers to ICT-supported pedagogical strategy towards development of core educational competencies; a sustained learner-centered process that involves purposeful monitoring and continuous assessment of learning processes and products, in order to inform tailored formative feedback. As being advanced here, use of formative e-assessment as innovative pedagogical approaches with a focus on learner and assessment centeredness are desirable to achieve envisaged educational outcomes in Universities. Use of formative e-assessment will greatly contribute towards effective pedagogical approaches especially in e-learning settings through stimulating active participation, sustained interactivity and meaningful engagement.

2. Statement of the problem

As Kenyan government continue to formulate strategies towards realization of Sustainable Development Goals (SDGs) and Vision 2030, it is now agreeable that inclusive and quality education for all is a fundamental goal. A key goal in adopting formative e-assessment as a pedagogical strategy is to facilitate re-alignment of teaching, learning and assessment with an aim to promote meaningful learning and shift emphasis from high-stake examinations to application of knowledge. In this way, the University educators will be able to nurture learners' potential and promote development of transferable knowledge and skills particularly the seven key competences: Communication and collaboration; self-efficacy; critical thinking and problem solving; creativity and imagination; citizenship; digital literacy; and learning to learn. Moreover, the Government of Kenya (GoK) through Sessional paper No. 2 of 2015 indicate that the current education system does not provide appropriate pedagogical approaches and sufficient resources to facilitate development of the envisioned core competences (GOK, 2015). In particular, three key problem areas are discernible within the context of online higher education in many developing nations including Kenya. Firstly, there has been more emphasis on summative examinations in Kenyan Universities while little attention is geared towards formative assessment to stimulate active learning, interactive collaboration, critical thinking, skills development and lifelong learning. In particular, it is

apparent that the value of continuous assessment has been recognized from a narrow perspective. This is manifested by the nature of assessment whereby learners are offered continuous assessment tests and assignments which are more often not based on realistic scenarios and are inadequately embedded within teaching and learning processes. In the same vein, there are limited opportunities for sustained monitoring, formative assessment and tailored feedback. This situation is more critical in e-learning settings where opportunities for formative feedback are limited due to the nature of interactivity. The key focus of this briefing paper is to offer insights on effective use of formative e-assessment towards operationalizing integration of assessment into teaching and learning for achievement of desirable educational outcomes.

Secondly, as e-learning becomes widespread in Kenya, this call for congruent approaches to incorporate assessment for learning through use of formative e-assessment. However, strategies on effective integration of formative-oriented assessment are not adequately formulated to fit e-learning environments. While acknowledging that the concept of continuous assessment is embraced in the current e-learning approaches, most Universities especially in developing nations are yet to explore and validate how assessment will be operationalized to serve both formative ad summative purposes within the nexus of competence-based higher education. More visibly inadequate is empirical research on how assessment in the e-learning settings is going to become effective as Universities increasingly adopt e-learning approaches. Strategies for effective integration of continuous assessment are not yet adequately formulated particularly in the e-learning initiatives that are still evolving in many Kenyan Universities. The author offers insights that can inform effective e-learning approaches for competence-based learning and assessment through re-conceptualization of assessment as a continuous process that encompasses a balance between formative and summative assessment.

Thirdly, assessment in e-learning settings being an emerging pedagogical concern, it is pertinent to ground the new learning and assessment approaches on congruent educational theories and evidence-based research. As earlier articulated, validity of continuous assessment is founded on the concept of formative assessment and feedback with the ultimate goal to foster meaningful learner engagement and transferable learning. This implies the need to underpin assessment in e-learning settings on theoretical perspectives that promote authentic and experiential learning. Use of formative e-assessment guided by congruent theoretical perspectives can serve as a suitable pedagogical strategy to address the aforementioned problem areas towards realizing desirable educational outcomes.

3. Objectives

The overall objective of this paper was to establish how formative e-assessment can be re-purposed as a strategy to stimulate learners' active engagement within e-learning environments. The specific objectives are as follows:

i. To identify the key elements of formative e-assessment guided by congruent theoretical framework within e-learning contexts
ii. To establish an implementation framework for effective application of formative-oriented e-assessment in e-learning.

4. Literature Review

Application of formative e-assessment within congruent theoretical perspectives can create engaging environments in which engage learners in authentic assessment activities, and receive feedback in ways that promote core learning experiences especially desirable in e-learning contexts (Gikandi, in press. In line with the paper objectives, for key elements are instrumental in facilitating effective application of e-assessment. These include authenticity of assessment activities, effective formative feedback, multidimensional perspectives, and learner support.

Firstly, e-assessment entails integration of authentic assessment activities within teaching and learning processes. Appropriate authenticity facilitates a learning environment with adequate opportunities to develop knowledge and skills in diverse ill-structured contexts that characterize real-life situations (Gikandi, 2015). Providing authentic contexts through realistic classroom situations and activities stimulated the learners to develop knowledge and skills relevant to their professional domain (Lara et al., 2020; Simon, 2019). Such learning environments stimulate learners to engage in deep learning in ways that fosters self-regulation and transferability of knowledge (Gikandi, in press). It is also important to note that authenticity does not mean actual real- life settings; instead, authenticity may be facilitated through engaging learners with tools and/or activities that are authentic to a particular subject domain (Kilis & Yildirim, 2019; Martin et al., 2019).

Secondly, the effectiveness of formative feedback is a key component in enhancing formative e-assessment. As previous studies indicated, this means that feedback should be immediate, continuous, formatively useful and easy to understand (Gikandi & Morrow, 2016; Rensburg, 2018; Simon, 2019). The findings from these studies illustrated that for formative feedback to be effective, it must be prompt and offer provision for the learners to revise the unsatisfactorily attempted tasks. Similarly, Gikandi and Morrow (2016) underscored the immediacy of teacher's feedback in asynchronous learning environments as a requisite for sustained engagement. As literature indicate, clear, timely, ongoing and adequately detailed feedback is important in online environments due to physical interaction barriers among online participants, which may discourage or limit some learners to seek clarity. If well purposed and designed, there are opportunities to achieve effective feedback because e-learning settings offer ample opportunities to enhance immediacy and clarity of feedback in ways that promote learners' satisfaction and encourage active participation. Learner satisfaction and perceptions on feedback is important because, the more the learners perceive feedback as useful, the more they are likely to utilize the feedback and improve their learning (Gikandi, in press).

As recent empirical studies further illustrated, indirect feedback, such as offering references and hints, as well as asking leading questions, facilitates student's development and achievement by encouraging the student to self-correct and to engage in reflective inquiry. These aspects manifest effective formative feedback that promotes student motivation towards self-regulatory processes and confidence to demonstrate their capabilities ((Elbasri et al., 2018); Gikandi & Morrow, 2016). Effectiveness of feedback is also fostered by enabling opportunities for sustained and meaningful interactions which promotes shared purpose and meaning of learning goals and expected outcomes (Gikandi & Morrow, 2016; Martin et al., 2019). This further implies that the level and quality of interactivity among online participants

influence the effectiveness and efficiency of formative feedback. Martin et al. (2019) also identified that use of exemplars where applicable is crucial in making feedback easily understandable and clarifying rubrics and expected outcomes. Moreover, online environments offer flexible opportunities to share and review learning goals and expected outcomes.

Multi- dimensionality is the third characteristic that relates to effectiveness of formative assessment particularly in online settings. It requires online educators to adopt multidimensional approaches through offering multiple learning and assessment activities. Multi- dimensional approach if well applied can stimulate autonomy and flexibility in ways that facilitate diverse opportunities for learners to demonstrate their capabilities (Elbasri et al., 2018). As a means to facilitate multidimensional approaches, effective online assessment calls for a wide variety of clearly explained assessment activities on a regular basis. This implies that the nature of evidence in embedded assessment should encompass multifaceted contexts (Lara et al., 2020; Martin et al., 2019; Simon, 2019), and emphasize both processes and products of learning (Gikandi 2015, Gikandi et al., 2011). Such opportunities provide equal opportunity to learners with diverse needs, skills and abilities, giving them diverse opportunities to demonstrate their capabilities and voice their needs and in turn, thus stimulating meaningful learning.

As illustrated by previous studies, providing flexible and open-ended authentic assessment activities can foster learner autonomy and motivation (Kilis & Yildirim, 2019). This in turn, stimulates learners to take primary responsibility for their learning which an important disposition in e-learning settings. It is important to note that online settings enhance multidimensional perspectives by affording learners dynamic technological resources and tools that support learners to utilize variety of approaches in accomplishing the learning and assessment activities. However, it is important for the teacher to consider appropriate levels of flexibility in relation to the nature of knowledge domain being assessed (Gikandi, in press).

Fourthly, adequate learner support is also an important component in achieving effective e-assessment especially within the context of assessment for learning. Various studies have demonstrated the usefulness of learner support in online settings (Simon, 2019). These studies indicate the relevance of teachers' responsiveness to the diversity needs of individual learners through offering adequate support and mentorship. In turn this supports learners to develop confidence and engage meaningfully within the asynchronous environments.

Gikandi and Morrow (2016) have further demonstrated the value of learner support where both the teacher and peers are equally important actors in facilitating or modelling learner support. This is to suggest that learners benefited more from peer interactions and collaboration within feedback processes. Various authors have also underscored the need to support learners technologically within the context of online learning formative assessment (Kyei-Blankson et al., 2016; Simon, 2019). In the same vein recent studies identified the need to guide learners on productive engagement and meaningful reflectivity (Nortvig et al., 2018; Peculea & Peculea, 2019).

A congruent theoretical framework was also identified. This paper is based on authentic learning framework that is grounded on situated learning theory by Brown, Collins and Duguid (1989). Situated and authentic learning perspectives are core to achieving the goals of 21st century e-learning (Lara et al., 2020; Peculea & Peculea, 2019). This was used to inform an implementation framework that is summarized in Figure 1. Informed by review of

existing research and practices, four key elements were identified as important in online courses as way of facilitating an effective assessment in e-learning. Figure 1 summarizes the key characteristics of formative-oriented assessment that need to be integrated in designing an effective learning environment towards achievement of desirable outcomes. Drawing from critical review of related literature Figure 1 depicts the key characteristics underlying effectiveness of online formative assessment founded on formative e-assessment approach for effective assessment for learning (Gikandi, 2015; Peculea & Peculea, 2019; Vonderwell & Boboc, 2013). The emerging key characteristics are highlighted in bolded italics. The circular shape of the figure indicates that these characteristics were iterative and interrelated. These key characteristics were identified with an aim to provide insights that may guide practice in design and implementation of online formative assessment. In addition to these guidelines, it is important for practitioners and researchers to take into account specific contextual needs which implies the need to conduct empirical studies in varying settings that represent diverse situationality and complexity (institutional context, external factors and specific models of e-learning in developing countries) with the aim to increase opportunities to learn more about best practices.

5. Methodology

This paper adopted a systematic review approach within which relevant literature was identified and reviewed. The review was therefore guided by well defined objectives and sought to obtain in-depth evidence from relevant literature in order to inform the inferences offered in this paper (Creswell, 2013; Rossella, 2015). Explicit criteria to search, select, analyze, and synthesize the literature was employed. This review mainly adopts a qualitative interpretive approach which was aligned to the problem context in line with the review purpose.

Selection of the reviewed literature was informed by the targeted themes towards addressing the two review objectives. In the process of searching for the relevant literature, published articles focusing e-learning and embedded assessment in higher education were sought. Keywords were identified to guide the search. The search terms and phrases that were used included e-assessment, online assessment, online formative assessment, Embedded assessment, assessment for learning, assessment in online learning, integrated assessment in higher education, effective assessment in e-learning; Online learning and assessment; Meaningful online learning. A detailed search was carried using these keywords between within authoritative electronic databases including the Educational Resource Information Center (ERIC), Education Research Complete, ProQuest, Science Direct and Google Scholar.

The search criteria was also bound within higher education e-learning contexts and the main literature that was given priority is papers published from 2008, the period within which ICT use in education has grown rapidly in higher education. To ensure quality, peer-reviewed Journal articles were the key source of the reviewed literature. In addition, selected doctoral thesis and peer-reviewed book chapters were carefully considered as relevant sources. In addition, literature search also entailed backward referencing. The search process was terminated after the search results could not reveal any new relevant themes. In the end, 34 published articles were identified as relevant although the extent of their relevance varied. These entailed 26 journal articles, 3 book chapters and 1 doctoral thesis. The selected articles were categorized based on degree of relevance to enable a systematic review.

In reviewing the selected articles, skimming was carried out, organizing the articles according to their date of publication and the relevant themes captured. Selected articles were further categorized as primary (empirical) studies and secondary sources, giving preference to peer reviewed articles published between years 2011 to 2020. To enhance the depth and breadth of the review, other relevant studies selectively considered based on the richness of the themes they revealed.

The selected articles were critically reviewed guided by the objective of this review. The key emerging themes related to formative e-assessment as aforementioned were: authenticity of learning and assessment activities, formative feedback, multi-dimensionality and learner support within online learning contexts. The author was also interested in articles that are grounded on fundamental learning theories and congruent conceptual perspectives.

6. Results

The key purpose of this briefing paper that is based on review of existing practices is to offer insights on how formative e-assessment can be re-purposed as a strategy to stimulate learners' active engagement within e-learning environments. Through addressing the objectives of this paper the researcher aims to contribute towards solutions to the three key problem areas identified as issues of concern that are affecting e-learning in developing nations including Kenya have been identified. Use of formative e-assessment guided by congruent theoretical perspectives can serve as a suitable pedagogical strategy to address the issues articulated in the statement of the problem.

Based on review of the literature guided by the study objectives, the following key elements were identified as core requirements for effective formatively-oriented e-assessment in online learning settings: (1) authenticity of assessment activities, (2) effective formative feedback, (3) multidimensional perspectives, and (4) learner support. These elements also entails other important characteristics such as overlap between formative and summative assessment; ongoing documentation of formative feedback processes; multiple orientation, shared role and sustaining a supportive learning community.

In e-learning environments, these elements can be achieved through use of diverse tools and techniques including topical and open asynchronous discussion forums, sustained documentation of evidence of learning, and adequate opportunities for interactions within the learning and formative feedback processes. Purposeful use of web 3.0 tools can also promote these strategies in way that means need of diverse learners. Such opportunities enhance the immediacy, interactivity and adequacy of formative feedback and learner support. As reviewed literature indicates, this implies that educators in e-learning contexts can utilize affordances of modern ICT for synchronous and asynchronous interactivity among learners and between learner and the online educators (Gikandi & Morrow, 2016; Nortvig et al., 2018; Peculea & Peculea, 2019).

The reviewed literature indicates that formative e-assessment requires well-purposed formative feedback processes. It is important to facilitate opportunities for teacher feedback and peer-peer formative feedback in ways that foster interactivity, multi-dimensionality and timeliness of feedback (Gikandi & Morrow, 2016). For instance, use of asynchronous discussion forums offers a collaborative context for learners to share and articulate their understandings in ways that enrich peer formative feedback (Martin et al., 2019). Various

studies show that peer formative feedback and assessment is effective in promoting collaborative learning because students can interactively construct new meaning as they share their diverse understandings (Kilis & Yildirim, 2019). If well facilitated, formative feedback can foster self-regulation reflective learning. Feedback characterized by immediacy and interactivity is a key aspect in enabling self-regulated learning and sustained engagement (Elbasri et al., 2018).

The findings of the reviewed studies also reveal a link between multidimensional perspective and meaningful engagement with assessment activities. This is to suggest that provision of authentic assessment activities coupled with learner autonomy can encourage learners to engage and interact meaningfully. Such opportunities can be embedded within topical discussion forums where learners can engage in diverse topics. It can also be embedded in open ended activities that stimulate divergent strategies and range of products, thus facilitating multi-dimensional perspectives and multiple sources of evidence of learning. This confirms the findings of various studies which demonstrated that learner autonomy within authentic tasks can offer students opportunities to meaningfully engage and develop knowledge as they make decisions/choices, compare their understandings, and self-assess their learning products and processes, that the relevance of multi-dimensionality (Gikandi &Morrow, 2015; Lara et al., 2020; Martin et al., 2019; Simon, 2019).

Moreover, learner support is core in enabling sustained learner engagement and addressing issues of low motivation and self-efficacy. The online educators have a leading role to play in offering learner support through sustained expert guidance and modelling. This was especially in relation to modelling the learning processes towards the expected learning and assessments outcomes. As previous studies illustrate, the teacher or online educators must purpose and design for opportunities to assess learners' interest, strengths and weaknesses in order to inform tailored learner support (Gikandi, in press). The educators should also encourage learners to be part of learning resources in terms of empowering students to actively engage in shared role within learning and assessment processes. Learners' active engagement in offering peer feedback and support stimulates them to self-regulate and become responsible for their own progress and achievements. As they get deeply engaged, students are also able to reflect on their learning strategies in ways that support them to enhance their achievements over time.

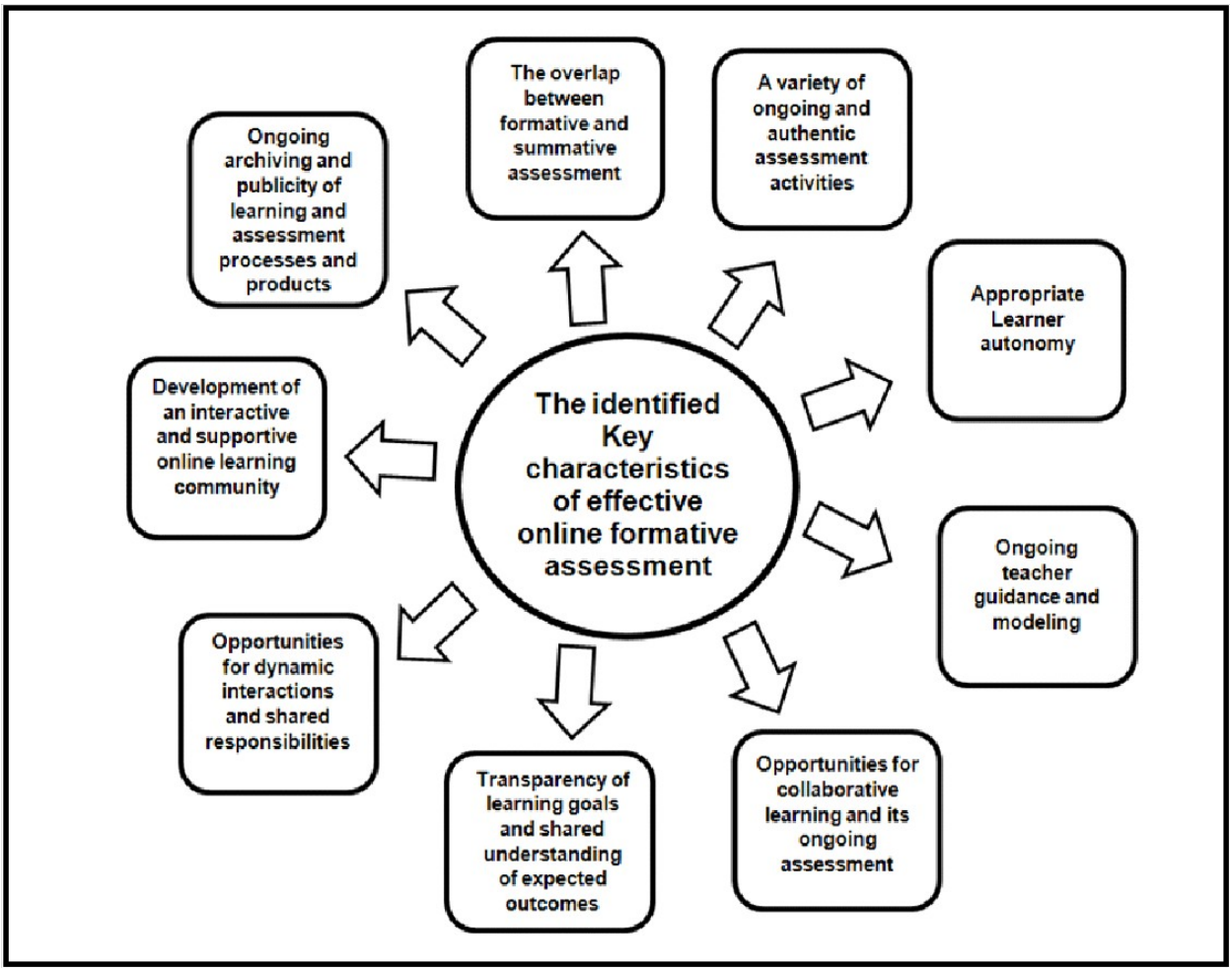

Figure 1: Overview of the nine key characteristics of formative-oriented formative e-assessment for effective assessment for assessment

7. Recommendations and Areas for Further Study

Use of formative e-assessment as a pedagogical strategy requires policy makers to consider a shift from examinations (summative assessment) to continuous and formative-oriented assessment. This can provide a framework for departure from passive learning to active and scenario-based learning. This is particularly essential in e-learning settings to support learners hone digital literacy skills and core competences including creativity, decision-making and problem-solving. Facilitating these competences imply that educators focus on designing scenario-based and contextualized learning environments in ways that support learners to engage meaningfully with authentic activities that are appropriately complex and have real-world relevance. Engaging learners within such authentic learning environments promotes experiential and transferable learning. These outcomes align with the goals and objectives of the sustainable development goals (SDGs), Constitution of Kenya 2010 and Kenya Vision 2030.

Effective use of formative e-assessment can foster active learning and shared responsibility and facilitate e-learning environments that move beyond expanding access to higher education to improving the quality of learning. Indeed, it is in this way that educators can be encouraged and supported to promote use of ICT in way that increase the quality of online higher education as it gains momentum in developing countries. This calls for in-depth empirical research in assessing the role of formative e-assessment in promoting competence-based e-learning in Universities. Such studies need to focus on critical understanding of

various aspects such as assessing the faculty perceptions towards assessing students in e-learning settings; establishing the key elements of formative e-assessment that influences competence-based learning and assessment; analysis of related issues of concern in formative e-assessment assessment in order to inform development of a holistic framework for effective implementation of formative e-assessment within e-learning settings in Universities.

Conclusions

This paper seeks to stimulate engagement in empirical studies and training in education towards improving operationalization of the competence-oriented assessment in e-learning contexts in Kenyan Universities, and could also inform other developing nations with similar educational goals. The paper offers insights on how formative e-assessment can be re-purposed as a strategy to stimulate learners' active engagement within e-learning environments. The ultimate goal is to address the key challenges facing Universities in implementation of competence-based learning especially in the context of online education. Three key problem areas that are affecting e-learning in developing nations including Kenya have been identified. Use of formative e-assessment guided by congruent theoretical perspectives can serve as a suitable pedagogical strategy to address the aforementioned problem areas. Such a strategy will facilitate realization of desirable educational outcomes.

More importantly, in considering the expected continuum and balance between continuous (formative) assessment and summative assessment through use of formative e-assessment, such an approach can promote quality, fairness and transparency in assessment. This is mainly because, formative e-assessment can efficiently and effectively support progressively documentation and monitoring of learner's progress, enable unlimited and cumulative sources of formative feedback and facilitate multiple assessors.

Additionally, emphasis on continuous assessment while leveraging on ubiquitous ICT tools as enabler for e-learning can promote digital literacy which imply increased use of ICT to search for, analyze, integrate, manage and evaluate information. Digital literacy is a fundamental core competence in the modern information-based society and instrumental to efficient and effective communication. More importantly, it is precursor to interactive collaborations between the teacher and learners and among learners. These in turn, increase opportunities for active learning and formative feedback. In these ways, online continuous assessment can synergetically promote digital literacy and stimulate meaningful learning experiences in ways that nurtures learners' capabilities and stimulate them to progressively focus on mastery of knowledge and valuable skills, hence competence-based education. However, these opportunities have not been fully explored in Kenya.

Synergetically, as literature suggest, ICT should be cross-cutting in all subjects; and not taught and examined independent of its functionality, compellingly therefore, use of formative e-assessment will provide an authentic way to operationalize the goal of promoting digital literacy. This implies that ICT will naturally become an essential tool for facilitating teaching and 'continuous assessment for learning'.

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