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A Systematic Review of Literature

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Role of Formative Assessment in Improving Students' Motivation, Engagement, and Achievement: A Systematic Review of Literature

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Abstract: There is an increasing focus on formative assessment as education systems all over the world try to incorporate 21st-century skills in their curriculums. Formative assessment has been considered one of the best approaches to teaching and assessing 21st-century competencies, which are crucial in addressing the current economic challenges. This review of thirty-eight empirical studies was done to find out how the key strategies of formative assessment have been conceptualized and their effect on students' motivation, engagement, and achievement. The analysis revealed that some strategies like the use of discussion have not been studied empirically. Other strategies such as learning intentions, success criteria, and self-assessment have only been used to a lesser extent. The analysis showed a positive influence of formative assessment strategies on students' motivation, engagement, and achievement. The results of this analysis provide a roadmap in the advancement of the theory of formative assessment and direction for future inquiry.

Keywords: Formative Assessment Strategies, Motivation, Engagement, Achievement

Introduction

Formative assessment is an instructional process that involves continuous gathering, analyzing, and reflecting on evidence to make informed judgments and enhance student learning (Black and Wiliam 2009; Wiliam 2011). Formative assessment (assessment for learning) has gained prominence in the past few decades after the seminal work of Black and Wiliam (1998). However, the efficacy of formative assessment has been questioned by some researchers as it is reflected in several meta-analyses (e.g., Dunn and Mulvenon 2009; Kingston and Nash 2011; Briggs et al. 2012; Hendriks, Scheerens, and Slegers 2014).

The gains of formative assessment as delineated by Black and Wiliam (1998) were critiqued (Dunn and Mulvenon 2009) basing on the method applied and the study context. Some of the methodological issues cited included the application of insufficient measured variables, unrestricted prediction of the examiner, uncontrolled precision of treatment, and use of unsuitable statistical units of inquiry. The concept of formative assessment has also not been well appreciated by some researchers. There have been claims that formative assessment is restricted in breadth and its utilization and hence reduced to classroom tests used for monitoring students' progress (Swaffield 2011; Torrance 2012). The inconsistency in the description of formative assessment practices was also pointed out by Dann (2014). According to Bennett (2011), defining formative assessment as a tool or a process is an oversimplification. Despite the issues surrounding the concept and efficacy of formative assessment, significant studies have reported the benefits of formative assessment (e.g., Anderson and Palm 2017; Ozan and Kincal 2018).

Theoretical Background

Formative assessment in the learning process was visualized by Black and William (2009) in terms of five key strategies that are expected to be attained through three negotiators.

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The Three Negotiators (Agents)

The three negotiators are the teacher, peer, and the learner who collaborate in the process of learning. Among the three negotiators, the teacher takes the center stage in the learning process. The crucial responsibility of the teacher is to help learners breach the learning gap between their current state and where the teacher wants them to be (Black and Wiliam 2009). The teacher is thus continuously involved in identifying learning goals for the learners and identifying where they are concerning those goals. The purpose of closing the gap is attained through prompt, definite, and remedial feedback; adjustments to instruction; and a supportive peer engagement process (Hattie and Timperley 2007; Shute 2008).

Teachers' roles emphasize setting clear goals, ensuring explicit features of success, providing constructive feedback, and supporting peer and self-reflection (Boud and Falchikov 2007; Spiller 2012). The learners have to take responsibility by also reflecting on a series of questions that would enable them to close the learning gap. By so doing, learners develop self-assessment skills which are crucial for life-long learning (Taras 2010; Leach 2012). A peer as an agent in the process of learning plays a critical role in developing judgment skills through an effective feedback mechanism.

Key Strategies of Formative Assessment

The five key strategies advanced by Black and William (2009) are described as follows:

1. Explicating and sharing learning targets and the basis for success. This strategy involves explicating, communicating, and comprehending intentions of learning and the criteria that define success (Brookhart 2011). Therefore, teachers are expected to clearly articulate the intended learning outcomes or lesson objectives so that learners get a better understanding of what is expected of them. Wiliam (2011) noted that teachers, learners, and peers should jointly break down this strategy into several standards for success.
2. Setting up constructive classroom discussions and other learning tasks. The focus of this strategy is on eliciting evidence of achievement which mostly takes the form of questioning. This strategy revolves around the teacher finding out where the learners are in their learning progress, so they can know the kind of evidence to collect (Wiliam 2011).
3. Providing feedback that moves learners forward. Research has shown that good feedback influences achievement in the most robust way (Hattie and Timperley 2007; Havis 2016). After researching formative assessment, Nicol and MacFarlane-Dick (2004) suggested seven concepts of quality feedback as involving reflection, dialogue, standards, learning opportunities, information to students, motivation, and information to teachers. Black and Wiliam (2009) noted that teachers could effectively provide feedback by the use of comments only as opposed to grading students.
4. Motivating students as teaching resources for one another. This strategy involves peer assessment, whereby students are involved in collaborative learning to improve performance. Wiliam (2011) noted that peer assessment geared towards improvement rather than evaluation could be more productive than when students interact directly with a teacher. Wiliam (2011) further noted that students benefit more because they work towards a common goal which enhances motivation and that thinking together enhances clarity of concepts. He (Wiliam 2011) suggested strategies of peer assessment like peer evaluation of homework using the rubric created by the teacher, student feedback on other students after instruction, and peers preparing and presenting their reviews to their group.
5. Motivating students to own their learning. This strategy appeals to students' motivation to learn. Wiliam (2011) observed that students are more likely to put effort into a task that they are interested in. Students will thus own their learning if they engage in self-regulatory processes like planning, monitoring, and evaluating which are also indicators of metacognitive skillfulness (Veenman 2011). The feedback that

enables students to move forward is crucial if students have to actively construct their knowledge. Wiliam (2011) noted that students could not be owners of their learning without incorporating other strategies of formative assessment like feedback and sharing of learning objectives and success standards.

Current Study

The meta-analysis and reviews on the effect of formative assessment have mainly focused on achievement outcomes. Other effects are yet to be fully exploited. Cauley and McMillan (2010) described formative assessment as having a great influence on student motivation and achievement because students can focus on progress through on-going assessment, get meaningful feedback, and concretely see how they can improve. Moss, Brookhart, and Long (2011) used the metaphor of a windmill to envision the process of formative assessment and its effects. They (Moss, Brookhart, and Long 2011) related the way a windmill deliberately exploits the power of moving air to produce energy to the way the formative assessment process helps students to deliberately exploit the workings of their minds to initiate motivation to learn. Formative assessment should, therefore, be seen as multidimensional, and a focus on only one aspect can be misleading.

The current review focuses on how the strategies of formative assessment (Black and Wiliam 2009) have been applied in the studies and the effects the strategies have on students' achievement, engagement, and motivation. The current review is done systematically so that every aspect of formative assessment is given undivided attention. Unlike the previous reviews which have looked at formative assessment generally, this review seeks to find out how each of the formative assessment strategies has been conceptualized and used in research. The main aim of the review is to find out the aspects of formative assessment that have been under-researched and form a basis for future research. Specifically, the following questions guided the review:

1. How frequently has the formative assessment strategies been studied?
2. How do formative assessment strategies affect students' motivation, engagement, and achievement?

Review Method

Procedure

The approach taken in this review was a stepwise process that entailed composing research questions, specifying search terms, choosing databases, searching the literature, composing inclusion criteria, and extracting data (Popay et al. 2006).

Databases and Search Terms

The current thematic review synthesized studies on how formative assessment improves students' motivation, engagement, and achievement in secondary schools. The studies in the context of high schools and the middle schools were considered under secondary schools. The students' age range was generally from 12 to 18 years. Three databases (ERIC, EBSCO, and ELSEVIER) were used to identify studies. Some more papers were hand-searched using the Google Scholar search engine. Search terms that were used included "formative assessment or assessment for learning or formative feedback" with "motivation," "engagement," "secondary schools," "high school," or "middle school."

Criteria for Study Inclusion

The following guidelines were used to gauge the studies that would be considered for review: (1) the study had to be described as formative assessment (FA) or assessment for learning (AfL); (2) the study had to include empirical data and contain at least one of the five strategies of formative assessment; (3) participants belonged to secondary education set up; (4) the study

must have been published between 2015 to 2019; (5) the study had to show the effect of formative assessment; (6) the study must have undergone a peer review and published in international journals; and (7) the study must be published in English. Unpublished work, such as master theses and conference papers, were not considered in this study.

Data Extraction, Analysis, and Coding

The initial search identified 832 records which were further narrowed down after going through a quality check. Some of the considerations for the quality check were as follows: the clarity of the research objective; clear research approach; clarity of the context of research; well-described methods and justifications; clear analysis procedure; clarity in the presentation of the results; and the relevance of the study. After assessing for eligibility, the final synthesis included thirty-eight studies. The studies were analyzed thematically based on the strategies of formative assessment. Key features from the articles were appropriately coded and used in the analysis. These key features include (1) authors and the year of publication; (2) study description; (3) sample characteristics; (4) research design and instruments used; and (5) main findings.

Findings and Discussion

The initial search of the databases identified 832 records, and thirteen more records were identified via the Google Scholar search engine. After eliminating duplicates, 544 studies were obtained. The second screening based on the level of the study left 105 studies. Further screening based on the quality check excluded fifty-nine studies from the records, leaving forty-six articles for eligibility assessment. Further examination of the full document led to the elimination of eight articles that did not fully focus on secondary education but included primary (elementary) and university levels. Finally, thirty-eight articles were deemed suitable for the final analysis. Out of the thirty-eight articles, two (5.3%) focused on learning intentions and/or success criteria; seven (18.4%) articles focused on feedback; eight (22.2%) articles focused on the peer and self-assessment, while twenty-one (56.3%) articles focused on formative assessment as a whole. In total, the literature review resulted in thirty-eight articles that were analyzed, and the results are presented in Tables 1 to 4.

Learning Intentions (LI) and Success Criteria (SC)

Two studies focusing on learning intentions and/or success criteria were obtained from the search process (see Table 1). Crichton and McDaid (2016) investigated teachers’ and students’ perceptions regarding the use of LI and SC within lessons. The second study by Krijgsman et al. (2019) focused on the importance of goal clarification and its relation to feedback. Crichton and McDaid (2016) observed that both teachers and students recognized the importance of LI and SC, especially during revisions. Students, however, felt that these strategies were rarely discussed in the classrooms, and teachers too expressed concerns about the implementation challenges. Therefore, the teachers felt the need for training on how to implement LI and SC in their lessons.

The study by Krijgsman et al. (2019) focused on goal clarification which is the same as clarifying LI and feedback. The study suggested the importance of goal clarification in feedback and need satisfaction. These two studies seem to suggest that the formative assessment strategy of sharing LI and SC has not been implemented in schools despite the suggested benefits.

Table 1: Studies on Learning Intentions (LI) and Success Criteria (SC) (N = 2)

	<i>Author</i>	<i>Study Description</i>	<i>Sample Characteristics</i>	<i>Design and Instruments</i>	<i>Main Findings</i>
1	Crichton and McDaid (2016)	Teachers and students’ perceptions	20 teachers and 20 students; Scotland	Qualitative	LI and SC strategies are not implemented
2	Krijgsman et al. (2019)	Teachers’ lesson variability	570 students; Netherlands	Quantitative	Goal clarification affects process feedback

Source: Wafubwa

Appropriate Feedback

A total of seven studies on feedback were reviewed (see Table 2). These studies were quantitative, and two used a quasi-experimental approach (Cutumisu and Schwartz 2018; Pinger et al. 2018a); two studies used a mixed design (Kyaruzi et al. 2018, 2019) while three only used a survey approach (Jónsson, Smith, and Geirsdóttir 2018; Van der Kleij 2019; Vattøy and Smith 2019).

While feedback is regarded as having the greatest influence on achievement (Hattie 2008), only two intervention studies examined the impact of feedback on students' achievement. Pinger et al. (2018a) studied the effectiveness of feedback which showed a positive influence on the students' achievement and their interest in mathematics. The intervention study by Cutumisu and Schwartz (2018) also revealed improved performance in students who engaged with critical feedback. Kyaruzi et al. (2019) focused on the impact of students' perceptions of their mathematics teachers, and the study revealed that feedback use predicted students' performance only to a small extent. Studies by Jónsson, Smith, and Geirsdóttir (2018) and Van der Kleij (2019) focused on the comparison between teachers' and students' perceptions regarding feedback. Both studies revealed differing perceptions between teachers and students with teachers having high perceptions as compared to students. Kyaruzi et al. (2018) indicated that the quality of feedback was positively predicted by teachers' perceptions of formative assessment while Vattøy and Smith's (2019) study revealed that students perceive their teachers' feedback to be more useful when they are informed of learning goals.

Analysis of studies on feedback has shown that effective feedback can improve students' motivation and achievement. It is worth noting that most studies focused on teacher and student perceptions. Only two studies, one in the USA (Cutumisu and Schwartz 2018) and one in Europe (Pinger et al. 2018a), used an experimental approach to investigate the effect of feedback on learning outcomes. A similar observation was realized in the meta-analysis by Van der Kleij, Feskens, and Eggen (2015); only six experimental studies done between 1968 to 2012 in secondary education settings met the criteria for inclusion in the analysis.

Table 2: Studies on Appropriate Feedback (N = 7)

	<i>Author</i>	<i>Study Description</i>	<i>Sample</i>	<i>Design</i>	<i>Main Findings</i>
1	Jónsson, Smith, and Geirsdóttir (2018)	Perception of teachers and students	56 teachers and 234 students; Iceland	Quantitative	Teachers had higher perceptions than students
2	Kyaruzi et al. (2018)	Effect of teachers' perceptions	54 mathematics teachers; Tanzania	Mixed Method	Feedback quality predicts perceptions
3	Van der Kleij (2019)	Perceptions of feedback	59 teachers, 186 students; Australia	Quantitative	Teachers were more positive
4	Vattøy and Smith (2019)	Students' perceptions of teachers' feedback	1137 students (13–16 years); Norway	Quantitative	Students perceived teachers' feedback as more useful.
5	Cutumisu and Schwartz (2018)	Impact of critical feedback choice	106 grade eight students; California	Quasi-experimental	Improved performance in students
6	Pinger et al. (2018a)	The effectiveness of feedback	17 teachers and 426 students; Germany	Quasi-experimental	Improves math, interest, and achievement
7	Kyaruzi et al. (2019)	Impact students' perceptions	2767 students; Tanzania	Mixed Method	Feedback predicted performance

Source: Wafubwa

Peer Assessment (PA) and Self-Assessment (SA)

A total number of seven studies focused on PA whereas only one focused on SA (see Table 3). Two studies were surveys on students' perceptions of PA (Rotsaert et al. 2017) and teachers' perceptions of PA (Rotsaert, Panadero, and Schellens 2018). One study used a qualitative approach to study the implementation of PA in teaching the speaking skill (Musfirah 2019). The remaining five studies were experimental and sought to find out the effect of PA and SA in

different learning conditions. For instance, Nikou and Economides (2016) looked at the impact of SA on student motivation and achievement in one high school in Europe. Rotsaert et al. (2018) examined how PA practice influences the quality of peer feedback; Tsivitanidou et al. (2017) examined reciprocal PA in modeling-based learning; Vanderhoven et al. (2015) investigated the effect of anonymity in PA; and Hsia, Huang, and Hwang (2016) examined the effects of a web-based PA approach. All the interventions in these experimental studies were postulated to have positive effects on the students’ learning outcomes.

Peer assessment involves students providing feedback to their peers, and the feedback can either be verbal or written. According to Boud and Falchikov (2007), PA involves feedback on a product based on the standards of high quality for that product. Self-assessment is defined as a formative assessment process that enables students to reflect, evaluate, and judge the quality of their work and their learning (Andrade and Du 2007; Grantz and Gruber 2014). Only one study (Nikou and Economides 2016) in this review directly addressed the SA strategy. The majority of studies focused specifically on PA. It is unsurprising that only one study met the inclusion criterion for this review because the focus was on formative SA, which goes beyond students just assigning themselves a grade. Furthermore, the interest of the study was on how SA influenced the achievement, engagement, and motivation of the students. Most studies were excluded because they did not carry out SA under the framework of formative assessment, and instead, most were geared towards self-regulated learning (Panadero and Alonso-Tapia 2013).

The current trend on studies related to PA in secondary schools is quite encouraging since most studies are increasingly focusing on intervention programs as opposed to surveys. Previously, studies were focused more on universities. For instance, Van Gennip, Segers, and Tillema (2010) conducted a literature review on the effects of PA on achievement since 1990, and only one study out of fifteen studies focused on secondary education. The current study reviewed seven studies on PA, out of which more than half were experimental. Although survey studies revealed differing perceptions of teachers and students regarding PA, experimental studies presumed that PA could improve students’ learning motivation and achievement. However, most of the studies (75%) were carried out in Europe, and only 25 percent of studies were done in Asia. Evidently, from this analysis, PA works best in online environments and when students complete it anonymously. These findings are supported by previous studies (e.g., Tenório et al. 2016; Fu, Lin, and Hwang 2019). These studies showed that PA improves learning achievements and students’ motivation.

Table 3: Peer Assessment (PA) and Self-Assessment Studies (SA) (N = 8)

	<i>Author</i>	<i>Description</i>	<i>Sample</i>	<i>Design</i>	<i>Main Findings</i>
1	Rotsaert et al. (2017)	Perceptions of PA by students	3680 students; Belgium	Quantitative	Perceptions predicted by trust
2	Nikou, and Economides (2016)	SA on student motivation and achievement	66 students; Europe	Quasi-experimental	Increased learning achievement and motivation.
3	Musfirah (2019)	PA in teaching speaking skill	1 high school; Indonesia	Qualitative	Use of PA motivates students
4	Rotsaert, Panadero, and Schellens (2018)	Use of PA among teachers	225 teachers; Belgium	Quantitative	PA predicts educational beliefs
5	Rotsaert et al. (2018)	Effects of PA practice	36 students; Belgium	Quasi-experimental	PA improves peer feedback
6	Tsivitanidou et al. (2017)	Reciprocal PA as a learning tool	22 students; Switzerland	Quasi-experimental	Facilitates students’ learning
7	Vanderhovn et al. (2015)	Effect of anonymity in PA	2 teachers and 69 students; Belgium	Quasi-experimental	Pupils felt more positive towards anonymity in PA
8	Hsia, Huang, and Hwang (2016)	Effects of web-based PA	163 junior high students; Taiwan	Quasi-experimental	Improved learning performance and motivation

Source: Wafubwa

Five Strategies Combined

After analyzing studies with specific strategies as discussed above, studies that involved a combination of formative assessment strategies, or at least examined the effect of formative assessment in general, were analyzed together as shown in Table 4. In total, twenty-one studies focused on a combination of strategies; five studies investigated either teachers' perceptions, students' perceptions, or both teachers' and students' perceptions (Burner 2016; Dobish, Griffiths, and Meyer 2017; Saito and Inoi 2017; Ozan and Kincal 2018; Kippers et al. 2018; Rakoczy et al. 2019; and Johnson, Sondergeld, and Walton 2019).

Five studies were experimental. Two quasi-experimental studies (Vogelzang and Admiraal 2017; Pinger et al. 2018b) investigated the effect of formative assessment on chemistry achievement and instructional quality, respectively. Two longitudinal experimental studies (Wylie and Lyon 2015; Furtak et al. 2016) determined the quality of formative assessment implementation after teachers' professional development, whereas Rakoczy et al. (2019) used a cluster randomized field trial with pre-tests and post-tests to find out the effect of formative assessment intervention on students' achievement and interest.

One study (Yin and Buck 2019) used collaborative action research to negotiate the conception of formative assessment by the teachers. Two qualitative studies (Van der Nest, Long, and Engelbrecht 2018; Beesley et al. 2018) focused on teachers' professional development while three studies (Brink and Bartz 2017; Cisterna and Gotwals 2018; Lyon, Oláh, and Wylie 2019) focused on the implementation of formative assessment. Other non-experimental but quantitative studies also focused on the implementation and use of formative assessment (Bulunuz et al. 2015; Saito and Inoi 2017; Choi, Kim, and Pak 2018; Xiao and Yang 2019).

Table 4: Studies on a Combination of Formative Assessment (FA) Aspects (N = 21)

	<i>Study</i>	<i>Description</i>	<i>Sample</i>	<i>Design</i>	<i>Main Findings</i>
1	Dobish, Griffiths, and Meyer (2017)	Teachers' perceptions	305 teachers; USA	Mixed Method	Improved teachers' practice and students' learning
2	Bulunuz et al. (2015)	Use of FA probes	61 students; Turkey	Quantitative	Improved students' performance.
3	Choi et al. (2018)	Automatic Item Generation (AIG)	57 students and teachers; Korea	Mixed-Method	AIG can be utilized for students and teachers
4	Burner (2016)	FA in English as a foreign language	4 teachers 100 students; Norway	Quantitative	Differing teachers' and students' perceptions
5	Pinger et al. (2018b)	Effects of FA on instruction	35 teachers, 859 students; Germany	Experimental	Improves achievement and safe on instructional time.
6	Ozan and Kincal (2018)	Effects of FA on achievement	45 students; Turkey	Mixed Method	Increased achievement and better attitudes
7	Vogelzang and Admiraal (2017)	Effects of FA on achievement	69 students; Netherlands	Experimental	Positive effect on students' achievement
8	Kippers et al. (2018)	Teachers' view on AfL	479 teachers; Netherlands	Mixed Method	AfL lacking in teacher practice
9	Furtak et al. (2016)	Teachers' FA abilities	9 teachers; USA	Experimental	Increase in teachers use FA strategies
10	Cisterna and Gotwals (2018).	Teachers' enactment of FA	4 teachers; USA	Qualitative	Teachers struggled with integrating FA
11	Yin and Buck (2019)	Collaborative action research	2 chemistry teachers; USA	Experimental	Teachers need support to use action research in FA
12	Lyon, Oláh, and Wylie (2019)	An integrated approach, FA	6 teachers; USA	Qualitative	FA determines Implementation

	<i>Study</i>	<i>Description</i>	<i>Sample</i>	<i>Design</i>	<i>Main Findings</i>
13	Wylie and Lyon (2015)	Breadth and quality of FA	202 teachers; USA	Experimental	Significant improvements in FA
14	Xiao (2017)	Formative tests	3 classes; China	Qualitative	Tests used to a certain degree
15	Xiao and Yang (2019)	FA and students' self-regulation	2 teachers; China	Qualitative	Enhance students' self-regulation
16	Saito and Inoi (2017)	FA, English Teachers	727 teachers; Japan	Quantitative	Varying degrees of FA use
17	Brink and Bartz (2017)	Perceptions of FA by teachers	3 teachers; USA	Mixed Method	Positive impact on the use of FA
18	Van der Nest, Long, and Engelbrecht (2018)	Impact of FA activities on	Math teachers; S. Africa	Qualitative	Need for multiple dimensions in math
19	Beesley et al. (2018)	FA professional development	7 schools, 47 teachers; USA	Qualitative	Improved teachers' practice of FA.
20	Rakoczy et al. (2019)	FA, interest, and achievement	26 teachers; Germany	Experimental	The indirect effect on interest
21	Johnson, Sondergeld, and Walton (2019)	FA in public school districts	1,097 teachers; USA	Mixed Method	Less use of FA strategies

Source: Wafubwa

Although this study aimed to find out how specific strategies of formative assessment have been applied in research, twenty-one studies did not focus on a single strategy but focused on formative assessment as a whole. The analysis of these studies has revealed that the impact of formative assessment is more pronounced when the implementation is done within the context of teachers' professional development (e.g., Wylie and Lyon 2015; Brink and Bartz 2017; Dobish, Griffiths, and Meyer 2017; Beesley et al. 2018). Generally, formative assessment is seen to have a positive effect on learning outcomes when well implemented. One outstanding fact is that most studies focused on teachers' and students' attitudes. However, the sample sizes in the experimental studies were small, limiting the generalization of results. A summary of all the studies based on different strategies is presented in Table 5.

Table 5: Summary of Studies on the Five Aspects of Formative Assessment

<i>Aspect</i>	<i>n</i>	<i>%</i>	<i>Design</i>	<i>Purpose</i>	<i>Results</i>
Learning Intention (LI) and Success criteria (SC)	2	5.4	Qualitative and quantitative	Teachers and students' perceptions	Difficulties in implementing the strategies by teachers
Appropriate feedback	7	18.9	Qualitative, quantitative, and experimental	Effect of feedback use	Increase in motivation and achievement
Peer assessment (PA) and Self-Assessment (SA)	8	18.9	Qualitative, quantitative, and experimental	Teachers and students' perceptions	Increased motivation, differing perceptions of teachers and students
All five strategies (combined)	21	56.8	Qualitative, quantitative, and experimental	Teachers and students' perceptions	Enhances motivation, engagement, and achievement

Source: Wafubwa

Conclusion

The present study focused on peer-reviewed empirical studies that have been done within a period of five years (2015–2019). The review was limited to international peer-reviewed studies done in English and within secondary school education settings. The term secondary school has been used

to generally include studies also done in middle schools and high schools. The aim of carrying out this review was to find out the extent to which formative assessment aspects have been addressed in studies. The review was carried out systematically, and analysis was done thematically based on the strategies of formative assessment described by Black and Wiliam (2009). An overview of the analysis revealed that most of the studies were done in Europe (seventeen studies), followed by the USA (eleven studies), Asia (six studies), Africa (three studies), and Australia (one study).

The analysis revealed that feedback and PA strategies have significantly been studied in the past five years by the education researchers, especially between 2018 and 2019. Only two studies addressed LI and SC, making it a potential strategy for future inquiry. Although there is evidence from the past studies that SA can improve students' performance (Brown and Harris 2013), only one study in this review met the criteria for inclusion in the review. The focus of most studies on SA has been its relationship with students' self-regulation (Panadero, Jonsson, and Botella 2017). There is a need for more clarity in the concept of SA, especially in the context of formative assessment. Seemingly, most studies have used the term SA in studies without a solid theoretical framework. These sentiments are also echoed in the study by Panadero, Brown, and Strijbos (2016), who argued that there are different conceptions of SA components, yet they have been treated uniformly in educational studies. Self-assessment in this current study was conceptualized as an instructional strategy in which students get involved with their work (Panadero and Alonso-Tapia 2013) and how the strategy will impact students' achievement, engagement, and motivation.

There was no specific study focusing on the use of classroom discussions and questions, which are also the main strategies of formative assessment. Though all studies were quantitative, most used questionnaires to get the perceptions of teachers and students regarding formative assessment. There is a need for more focus on experimental research so that more realistic conclusions regarding the role of formative assessment can be obtained. In the current review, only eleven studies out of thirty-eight were experimental. The results of these experimental studies pointed out a varying degree of the use of formative assessment strategies by teachers after undergoing professional development and a positive educational outcome for students in the treatment groups. There is a need for more research to focus on intervention studies. Studies have suggested that the key elements of formative assessment can increase students' learning outcomes (motivation, engagement, and achievement) if well implemented. An important observation in this review is an increase in the use of mixed methods, unlike before where studies on formative assessment were characterized as flawed due to methodological issues (Dunn and Mulvenon 2009; Kingston and Nash 2011).

Limitations

The analysis in this review focused on articles that have been published in internationally recognized peer-reviewed journals between 2015 and 2019. There is a possibility that some unpublished studies and those published in journals with a limited audience may have been left out. The second limitation regards the inclusion of only articles published in the English language. Other relevant articles that were not published in English may have been left out. The results of this review should, therefore, be interpreted cautiously. Third, the analysis only included studies within secondary education. The effects of formative assessment in these studies cannot be generalized to other educational levels like elementary schools or universities.

Theoretical Implications and Recommendations for Further Research

This study was carried out under the theoretical framework of formative assessment as defined by Black and Wiliam (2009). For the future advancement of this theory, all the five key strategies defining the formative assessment process must be put into perspective. From the

analysis of thirty-eight selected studies, it was noted that some strategies have not been tested empirically. A case in point is the use of classroom discussions that help in eliciting evidence of student understanding. Other strategies that have been least used are LI, SC, and the use of SA as an instruction process. There is a need for future researchers to utilize these strategies for the formative assessment theory to remain meaningful. Another important finding was on where these studies have been implemented. The analysis revealed that most studies have been carried out in Europe and the USA with a few studies in Asia, but there were only three in Africa and one in Australia. This implies that formative assessment has not been well embraced globally, and therefore, researchers in the affected continents can take up the challenge and spearhead the implementation of formative assessment.

Practical Implications

The findings of this review have shown that the process of formative assessment can improve the learning outcomes, especially when teachers go through professional development. Schools should embrace the in-service training of teachers on how to effectively implement formative assessment strategies. Teachers should also be motivated, so they can willingly apply formative assessment strategies for better learning outcomes.

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