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Comparing the effects of computerized formative assessment vs. computerized dynamic assessment on developing EFL learners' reading motivation, reading self-concept, autonomy, and self-regulation

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Abstract

This research compared the impacts of computerized formative assessment (CFA) and computerized dynamic assessment (CDA) on students' motivation, reading self-concept, autonomy, and self-regulation. Out of a total of 123 Bangladeshi pupils, 87 participants were carefully chosen as the study's sample subject based on the Preliminary English Test (PET) results. Using the convenience sampling method, three equal groups—one control and two experimental ones (dynamic and formative) ($n = 29$)—were randomly selected. Pretests were then taken by each of the three groups to assess their reading motivation, reading self-concept, autonomy, and self-regulation. Then, various treatments were presented to the groups. The control group students underwent conventional assessment. C-DA was administered to students in the first experimental group participants, while CFA was run in the second experimental group. At the treatment finished, the groups completed reading motivation, reading self-concept, autonomy, and self-regulation posttests. The data were examined using the one-way ANOVA test as well as the post hoc Scheffe test. The one-way ANOVA analysis showed that the three groups' posttest outcomes varied. The C-DA group outperformed the computerized formative group in reading motivation, reading self-concept, autonomy, and self-regulation, according to the data analysis. It was found that C-DA helped EFL students improve their motivation in reading, reading self-concept, autonomy, and self-regulation. Finally, recommendations for further studies were offered along with the conclusions, implications, and limitations.

Keywords: Autonomy, Computerized dynamic assessment, Computerized formative assessment, Reading motivation, Reading self-concept, Self-regulation

Introduction

Assessments, as a crucial element of education, can serve to improve education by supporting teachers in evaluating the strong and weak points of their pupils (Baniabdelrahman, 2010). Also, it is asserted that assessments are viewed as impartial, effective, and morally sound tools for assessing a variety of student qualities (Mousavi, 2012). Assessment, which provides students with constructive feedback, is vital to the learning and teaching process regardless of the instructional methodologies utilized (Alias et al., 2015). Assessments can be used to advance the learning of different aspects of a foreign/second language because they place an emphasis on applying real-world contexts, identifying students' strengths and weaknesses, fostering human judgment, and applying rating standards (Brown & Abeywickrama, 2010).

Formative and DA are two different methods of evaluation. Formative assessment, according to Glazer (2014), consists of broadly outlined tasks that enable students to obtain feedback on their performance throughout the course. In addition, teachers can use exams to help students learn by spotting their misconceptions and closing any gaps in their knowledge with useful comments. Formative assessment is interpreted as encompassing all those activities undertaken by teachers, and/or by their students, which provide information to be used as feedback to modify the teaching and learning activities in which they are engaged. It is an ongoing process of gathering evidence by different methods, such as feedback and questioning (Zeng & Huang, 2023).

Formative exams are types of strategies designed to identify pupils' learning challenges and offer a corrective action plan to develop the majority of learners' performance. It is important to make use of the learner-provided information if the evaluation is to be justified as formative (Çetin Köroğlu, 2023). Defined by the Assessment Reform Group (ARG) (2002), formative assessment is the process of seeking out and interpreting the data so that instructors and their students may decide where the pupils fit in their learning, where to go, and how to arrive there. Additionally, Kathy (2013) suggested that formative assessments are intended to help learners improve their academic performance by analyzing their learning challenges.

On the other hand, DA is viewed as an interactive technique of testing that focuses on students' capacity to respond to assistance. DA has been thought to be able in integrating instruction and assessment since it is established on Vygotsky's socio-cultural theory and the zone of proximal development (ZPD) idea (Wang, 2015). The main component of DA is the assessors' active involvement and test-takers' reactions to that involvement which can significantly improve their performance (Smirni & Smirni, 2022).

DA provides new viewpoints on assessment and underlines the areas where the student might improve. According to Lumettu and Runtuwene (2018), DA is the interaction between a learner and an examiner that aims to determine the extent of the modifiability in learners and the approaches through which improved cognitive functioning can be brought about and continued. In DA, the teacher-student interaction provides predictions about the students' likely future progress (Ghonsooly & Hassanzadeh, 2019).

A DA distinguishing characteristic is the change in focus from students' performance to that learner's reactivity to the interventions offered (Ebadi & Saeedian, 2015). The DA's purpose is to support learners' improvement, and the student's development throughout instruction is used to gauge their progress and capacities. Because of this, it

is development-centered (Poehner, 2008). It is not the instrument that decides whether a procedure is static or dynamic; rather, it is depended on the intervention incorporation into the procedure, irrespective of where the intervention takes place in the process (Poehner & Yu, 2022).

According to Woods (2015), teachers should frequently use evaluation to help learners improve their self-regulation abilities. According to William (2014), self-regulation learning is a vital component of formative assessment when it comes to the methods for communicating, understanding, and ensuring that students achieve the instructional goals and take ownership of their own learning. To develop self-regulation skills, pupils must enthusiastically exercise their cognitive abilities; work towards their learning objectives; ask for help from their peers, parents, and teachers when needed; and take responsibility for their learning (Ozan & Kıncal, 2018).

Self-regulation are activities like setting learning objectives, paying attention to and focusing on instruction, using efficient time management techniques, organizing, coding, and practicing information to be remembered, having confidence in one's abilities, the importance of learning, the factors influencing learning, and the expected results of actions, as well as experiencing these activities (Zielińska et al., 2023). According to Butler et al. (2011), self-regulated L2 learning strategies are extensive, manageable actions that students select from a variety of options and employ for L2 learning goals like keeping, recovering, and applying information or carrying out short-term tasks. To achieve personally relevant goals, self-regulation also is referred to as the capability to adaptably activate, keep, and adjust own behavior, focus, feelings, and cognitive approaches in response to environmental stimuli, internal cues, and other feedback (Heo, 2014).

Additionally, the development of reading involves intricate, dynamic interactions between language, cognition, and affect. As most research in the field of reading has focused on cognitive and linguistic factors, the foundation of affective components of reading like self-concept is still unknown (Kasperski et al., 2016). The entire self-perception of a reader is referred to as the reading self-concept (Conradi et al., 2014). It has links to reading performance and motivation and these connections get stronger as people get older (Liu et al., 2023).

Although the link between reading self-concept and reading has been repeatedly shown, the processes behind this connection are still unclear. To develop academic self-concepts, Marsh (1990) suggested the internal/external frame of reference model (I/E model). Following this paradigm, students evaluate their academic proficiency using internal and external comparison processes, two dissimilar but related frames of reference. Internal evaluation of reading has to do with how one feels about the challenges or convenience of reading-related experiences and tasks. External points of reference are connected to experiences at home, comparisons to peers when completing reading assignments, or feedback from teachers (Katzir et al., 2009). Chapman et al. (2000) discovered evidence of dissimilarities in self-concept among average and poor pupils only a few weeks after the start of first grade, and these disparities were also connected to letter naming knowledge and phonological awareness, which is consistent with this theory.

Reading motivation is a second element that has been linked to reading abilities. It has been demonstrated that motivation, among other things, significantly affects second/foreign language learning (Etemadfar et al., 2019). Reading motivation is the substantial

encouragement children require to focus on their thoughts, whether they are positive or negative (Hairul et al., 2012). According to reports, beginning readers who enjoy reading are extremely motivated (Bakhshizadeh Gashti, 2018). This is consistent with the idea that motivation influences pupils' reading comprehension, and it means that all EFL learners have to raise their reading motivation to realize passages more successfully (Ibrahim et al., 2023). In a similar vein, Rosenfield et al. (2001) and Wang (2008) confirmed that reading motivation may help to comprehend written texts by EFL learners as it stimulates involvement in learning practices.

The term "motivation" refers to a multifaceted idea that encompasses both integrative and instrumental components for achieving academic goals. Considering the motivation role in reading comprehension, Buendgens-Kosten (2014) claimed that motivating students to read is an essential component in developing reading comprehension skills. Additionally, Wigfield and Guthrie (1997) assert that reading motivation is the significant amount of motivation that pupils consider while evaluating their outlooks toward reading if they are negative or positive. For instance, pupils who read for pleasure are highly enthused readers who employ strategies to speed up their comprehension. These students have a higher chance of succeeding academically since they frequently view reading as an essential element of their daily lives.

Similarly, autonomy is crucial for language development. Learning autonomy (LA) in general and language learning/teaching, in particular, have recently attracted a lot of attention (Humphreys & Wyatt, 2014). According to Al-Araj (2015), language comprehension in EFL classrooms has proven to be difficult. Better comprehension occurs when students act autonomously over collaboration and social interaction in the class. Educators must give students opportunities to develop into autonomous people who are motivated and in charge of their learning.

In a similar vein, Sivasubramaniam (2011) argues that social constructivist ideas, which support active learning, now support autonomy, which was previously criticized for emphasizing the individual learner. Little (2012) argues that interdependence, which considers the synergy between whole and individual activities, rather than independence, produces learner autonomy. As a result, the fusion of social and introspective processes leads to an increase in autonomy.

Even though various assessment models have indicated their efficiency for enhancing L2 proficiency in various language skills and sub-skills, their implementation in reading has been limited and only a few studies can be referred to in this regard. Moreover, among this handful of studies, most of them have examined the effectiveness of DA and formative types in their generality on the production and rarely on the reading motivation, reading self-concept, autonomy, and self-regulation in Bangladeshi EFL context. Given that little research has been done on these variables in EFL contexts, this study aims to investigate the effects of CDA, computerized formative assessment and the conventional assessment on Bangladeshi EFL reading motivation, reading self-concept, autonomy, and self-regulation.

Review of literature

Theoretical background

In the field of learning and teaching, assessment is a scheduled process in which educators use data on learners' progress to modify their continuing teaching methods or

learners use it to modify their current instructional approaches. In other words, assessment is a technique used by teachers and pupils during teaching to offer the required feedback to change ongoing learning and instruction to advance learners' achievement of intended goals. Assessment seeks to enhance learning and bridges the gap amid learners' current learning environment and their desired learning purposes (Sherkuziyeva et al., 2023).

As the first type of assessment, formative assessment was defined as the examination of learners when they are forming their abilities and competencies to support their continued growth. It is also well-defined as including all of the activities carried out by tutors or pupils that offer data to be applied as feedback to modify the teaching and learning undertakings in which they took part (Fox et al., 2016).

The purpose of formative assessment is to obtain quick feedback on pupils' learning so that students' weaknesses and strengths can be identified. According to Wiliam (2011), practices in the classroom are formative as the information about pupils' achievement is drawn, interpreted, and applied by teachers, students, or peers to make decisions about the next stages in their learning that are likely to be more well-founded compared to those they made without the information that was elicited. Additionally, Popham (2008) saw formative assessment as a deliberate procedure through which tutors or pupils use data from the assessment to change what they are accomplishing right now.

So, formative assessment acts as a crucial tool for improving pupils' performance because it actively includes both teachers and students. The assessment for learning, which is focused on the purpose of use, involves evaluating learners' advancement. To improve pupils' learning and achievement, it is crucial to gather information about learners' performance to recognize their skills' development, requirements, and capabilities as well as their weaknesses and strengths throughout their educational courses (Zoul et al., 2023).

Cizek (2010) provided a list of formative evaluation criteria. According to him, formative assessment aims to determine whether a student is performing at a high or low level, to help teachers better design ensuing lessons, to make it easier for pupils to carry on their education, to evaluate their work, and to assess themselves. According to him, formative assessment is an adequate area for students and instructors to become proficient in the teaching and learning process. Overall, formative assessment is regarded as a procedure that is target-oriented regarding certain objectives.

In contrast, DA offers qualitatively diverse ways of conceptualizing assessment than how it was conventionally assumed by researchers and instructors. A dialectically complex set of activities known as DA (Poehner, 2008) includes teaching, learning, supporting learners' improvement, and the pedagogical approach of assessment. Making commendations according to learners' potential, which is not demonstrated in previous non-DA, is the great advantage of DA (Davin, 2011). The students in DA are trained on carrying out particular skills and given mediated support to become proficient in them. The development in their capacity to complete tasks of a similar nature is then evaluated. DA is described as cooperation among assessors acting as interveners and learners acting as active participants that aim to assess the students' level of modifiability and the approach that can be used to make and maintain positive changes in cognitive functioning (Kao & Kuo, 2023).

DA delivers appropriate forms of mediation by incorporating teaching and assessment into an interactive pedagogical approach (Cho et al., 2020). By gauging how well learners responded to particular interventions, DA intends to offer a more complete portrait of students' cognitive structures to improve the diagnosis of learners' learning challenges and to identify the developmental course (Ahn & Lee, 2016). By providing information about the ability of the learners to design the intervention programs, DA is possible to recognize pupils' accomplishments and probe latent capacities. DA improves individualized training that can adjust to individual needs and supports a fuller classification of students' latent and real talents (Rassaei, 2023).

The socio-cultural theory developed by Vygotsky, contending that cognitive growth is better understood in its social and cultural contexts, serves as the foundation for DA (Ajideh & Nourdad, 2012). It makes an effort to take into account the procedures in which learning and growth take place. Students require help from others to perform new tasks, but after they have gotten used to them, they can finish them on their own. Social connections, therefore, aid in learning. Therefore, sociocultural theory provides important insights to researchers looking into mental development, educational practices, and the mind. It is fundamental to socio-cultural theory to describe the dialogic feature of teaching/learning procedures in the ZPD and to plan researches that highlight this feature (Lavin, 2023).

Another possibility that helps explain our research is the ZPD. The ZPD is the difference between the degree of real development featured by autonomous problem-solving and the potential development level characterized by problem-solving supported by adults or in cooperation with more experienced peers (Vygotsky, 1978). According to this idea, children's cognitive growth occurs at real and unaided levels (past to present), as well as at assisted or prospective levels (present to future). The child can do the tasks on the real or independent level without any assistance, but on the potential level, the children require assistance from a mediator (Vygotsky, 1986). It is suggested that the scaffolding process results in abilities that are still in the process of evolving and increasing (not yet matured) and that this displays a child's hidden potential, which is important for both prognosis and diagnosis. ZPD addresses a collection of actions that a child may complete independently and without assistance, as well as those completed with assistance and guidance from more experienced peers and adults.

According to Vygotsky, the ZPD refers to the learners' current or real degrees of improvement as well as the future levels that can be reached with the help of mediating semiotic and environmental instruments and the facilitation of competent adults (Shabani et al., 2010). Accordingly, pupils learn better when they collaborate with other peers. It is believed these cooperative endeavors with smarter individuals help learners internalize new ideas and skills. The primary target of instruction from a Vygotskian standpoint is to hold students as much as possible in their ZPDs by involving them in problem-solving and learning activities that are more challenging than those they would complete on their own (Roosevelt, 2008). After completing the activities together, students will probably be capable of doing the same tasks autonomously, increasing their ZPD for that particular task in the process. Then, a greater level of task difficulty is introduced to meet the needs of learners' new ZPD (Azizi & Namaziandost, 2023).

As a variable to be discussed, self-regulation, according to Posner and Rothbart (2000), is the single most crucial element in comprehending human growth. According to Shonkoff and Phillips (2000), self-regulation, which is defined as changing individual behaviors and moderating reactivity to the environment, is linked to all facets of adaptability in the academic, career, and social domains. According to research, the self-regulation process occurs both subconsciously and consciously. It is evident that self-regulation is a conscious, motivated, and purposeful effort.

Salehian and colleagues (2023), on the other hand, made the assumption that learners that self-regulate their own education are productively involved in a meaning-making procedure. They adjust their own ideas, emotions, and behaviors to influence their motivation and learning. The last assumption is that there is no direct relationship between accomplishment and environmental and personal factors; rather, accomplishment is moderated by the self-control behaviors that pupils employ to meet their objectives. Self-regulation is not something that happens to students; rather, it is something that they actively monitor, manage, and control to achieve their goals (Gose, 2023).

Achievers and underachievers differ in how they consciously self-regulate their own learning, despite the claim that most learners do so to some extent (Butler et al., 2014). As the knowledge necessary to instruct is rarely entirely acquired before or separate from practice, teachers must be able to learn in and from practice (Randi, 2004). They must constantly update their teaching techniques because they work in a setting that is changing quickly (Peeters et al., 2014).

In the meantime, motivation is a crucial element in enhancing reading comprehension. The definition of motivation, according to Dornyei (2001), is exceedingly convoluted and dependent on a variety of different models and ideas. According to Protacio (2012), reading problems arise in part as a result of people's initial lack of drive to read. According to Moley et al. (2011), motivation develops when pupils get interested in the connection with a subject that persists longer than the short term. Also, reading motivation is a person's personal goals, values, and perspectives on the topics, actions, and outcomes of reading.

Reading motivation among EFL students may affect their performance. When questioned about the traits that determine particular degrees of performance in any endeavor, a large number of responders unquestionably included motivation (Wigfield et al., 2016). More motivated pupils will outperform the less motivated ones (Gardner, 2006). Additionally, he believed that if someone was driven, they would exert more effort, persist in their endeavors, focus on their duties, have a desire to achieve, and take pleasure in their hobbies. Two significant results can be seen: The first is that reading motivation is created by combining various types of incentives into one intricate process. The second one is the degree of control individuals possess since they may control, coordinate, and change their reading motivation concerning its legitimacy, goals, and deservingness (Namaziandost et al., 2018). The motivation of kids to read has an impact on reading quantity, reading achievement, and students' understanding. Reading motivation and students' reading habits are related. Reading motivation is domain-centered since it necessitates emotional reactions particular to reading contents and fluctuates based on the diversity of actions (Wu et al., 2023).

The improvement of children's self-concepts is another significant educational objective, as self-concept was linked to academic performances, educational objectives, and later accomplishment. Self-concept is the sum of a multifaceted, organized, and active system of beliefs, outlooks, and ideas that individuals hold to be correct about their existence. Self-concept is people's perceptions of their own values and degree of self-satisfaction (Purkey, 1988; Kurniawati et al., 2023).

Reading self-concept is made of three interconnected components, according to Chapman and Tunmer (1997): (1) competence perceptions in carrying out reading tasks, (2) judgments of the general ease or difficulty of reading activities, and (3) approaches towards reading. The fundamental components of self-concept, reading motivation, and self-efficacy are all included in this understanding of reading self-concept. They also pointed out that as people get older and become better readers, the connection between these subcomponents alters. Quandt and Selznick (1984) also emphasized that although self-concept is considered as a construct, not as a conduct, it is nonetheless demonstrated by a variety of performances.

The development of reading self-concept is the function of reading abilities. Kids' reading is largely determined by reading rate rather than correctness. Specific dissimilarities in reading speed are exceedingly noticeable factors for young readers in the self-assessment of reading competency, more than reading accuracy, and may serve as reference points for the evaluation procedures via which reading self-concept are formed, based on their speed-appraisal model (Kasperski et al., 2016).

On the other side, although there is a wealth of literature on autonomy, more research may be done to comprehend the role the learner plays in the design of language courses. Even though there are numerous definitions of autonomy (Benson & Voller, 2014), academics agree that learner autonomy is a key objective in the acquisition of second languages (Little, 1991). The notion holding that autonomous learners are necessarily good learners and that learning is achieved when pupils have active roles in the process is used to generate predictions about language acquisition (Rubin, 1987).

Appropriate tactics promote lifetime learning at different levels and aid in subject learning more successfully and independently (Rausch, 2000). The students' capacity and willingness to oversee or control learning is referred to as learner autonomy (Yerukneh et al., 2023). The development of pupils' learning methods into independent learning makes autonomy possible in language learning (Dafei, 2007). The author of Oxford (1999) claims that learning approaches have a vital part in autonomy for this reason. When a learner uses strategies—defined as specific acts or behaviors—to try to better his or her language acquisition, this reflects the pupil's autonomy level and serves as a tool for furthering that autonomy.

To summarize, autonomy entails the learner's willingness to take and accept accountability for their learning. To improve learning skills, learners must adapt a conscious process that links learning skills to autonomous learning. A person must modify their learning method to fit their tastes or anything that piques their interest. The purpose of education is for students to be able to learn independently so that they may view everything in light of what they have learned, hence fostering personal progress in terms of learning new things (Raju & Dasai, 2020).

Empirical background

Here, some empirical research is reported. Alahmadi et al. (2019) sought to determine if learners' success on a formative speaking evaluation had any bearing on their performance on a summative examination. Additionally, they sought to observe students' learning and offer helpful feedback that educators might utilize to raise learners' achievement and help students identify their speaking skill's strengths and flaws. According to their findings, formative assessment assisted Saudi students in resolving issues they ran into during speaking assessments.

Imen (2020) looked into how formative evaluations affected the writing abilities of EFL students. This study's objective was to identify how Abdel Elhamid Ibn Badis university first-year master students' writing development was impacted by formative assessments. This study also aimed to shed light on a crucial problem, namely the absence of formative evaluations in writing classrooms. Two methods, the pupils' questionnaire, and the instructors' questionnaire were employed to gather the data. The study's conclusions showed that the university of Mostaganem did not frequently apply formative assessment when teaching and acquiring writing skills. Both questionnaires' results displayed that if the pupils were formatively assessed, their writing skills could have improved.

Ashdale (2020) also tried to investigate the effects of a specific formative assessment called Progress Trackers. The research showed that there was no significant difference between the control and experimental groups. Even though it was not statistically noteworthy, the experimental group had a greater percentage of pupils who improved their performance by at least 60%. The ineffectiveness of formative assessments or the failure to rule out other elements in the context of the classroom may be the cause of no substantial differences between the control and experimental groups.

Using a quantitative quasi-experimental methodology, Persaud Singh and Ewert (2021) examined the impacts of mock exams and quizzes as formative assessments on adult students' achievement. Quizzes and mock exams were given to one experimental group, mock exams to another, and neither was given to the control group. *T* tests and ANOVA were used to assess the data. There were observable differences among the accomplishment levels of the formative assessment group and the control applicants. The mock test and quizzes group outperformed the mock test group.

Several investigations were accomplished to investigate the effects of DA on language learning. For instance, Ajideh and Nourdad (2012) made an effort to investigate DA's influence on reading comprehension in EFL learners at various competence levels. The MANOVA test results revealed that DA made positive immediate impacts on pupils' reading comprehension across all competency levels. Wang (2015) investigated whether DA might enhance the integration of listening comprehension assessment and teaching while also enhancing pupils' listening study. The evaluation used the cake format, in which candidates initially listened to a substantial amount of audio content before being required to respond to questions and explain their understanding progression. Then, the researcher got involved to mediate the situation. The listeners then listened to the audio once more and were required to retell. A review of the students' notes, the investigator's notes, reflective reports, and learners' oral reports showed that DA could provide a finer grasp of the challenge of listening to the

researcher and participants. The data also demonstrated that the participants' challenges were helped by the researcher's intervention and mediation, which made this experience enjoyable for them.

The DA effects on EFL students learning of grammar were inspected by Kamali et al. (2018). The pupils that received DA outdid those in the control group in substantial ways. They concluded that as they got proper feedback throughout the DA process, the pupils had internalized L2 grammar knowledge and got higher scores. Moreover, Suherman (2020) investigated the DA impacts on EFL learners' reading comprehension. The post-test results indicated that all five students had made overall progress, meaning that the applicants' reading performance was significantly influenced by DA. DA mediation seemed to benefit each student's learning in unique ways.

Sherkuziyeva et al. (2023) aimed to examine the impacts of computerized dynamic assessment (C-DA) and rater-mediated assessment on the test anxiety, writing performance, and oral proficiency of Iranian EFL learners. According to the one-way ANCOVA analysis, Iranian EFL learners were able to improve both their written and oral skills while experiencing less test anxiety thanks to C-DA.

Numerous models have examined the relationship between the development of language abilities and elements including self-concept, motivation, autonomy, and self-regulation (Byrne, 1996). After conducting a review of the pertinent literature, it was discovered that formative assessment as well as DA can make positive impacts on English language learning. Additionally, it was shown that while few studies have looked at the usefulness of the aforementioned tests on students' psychological characteristics, a large number of research have concentrated on their effects on skills and subskills. This research compared the impacts of formative assessment and C-DA on improving EFL learners' reading motivation, autonomy, self-concept, and self-regulation. The following questions were developed for this research based on the objectives:

RQ1. Is there any significant difference between the effectiveness of C-DA and formative assessment on Bangladeshi EFL learners' reading motivation?
RQ2. Is there any significant difference between the effectiveness of C-DA and formative assessment on Bangladeshi EFL learners' autonomy?
RQ3. Is there any significant difference between the effectiveness of C-DA and formative assessment on Bangladeshi EFL learners' reading self-concept?
RQ4. Is there any significant difference between the effectiveness of C-DA and formative assessment on Bangladeshi EFL learners' self-regulation?

Also, the null hypotheses were proposed in the study:

H01: There is not any significant difference between the effectiveness of C-DA and formative assessment on EFL learners' reading motivation.
H02: There is not any significant difference between the effectiveness of C-DA and formative assessment on EFL learners' autonomy.
H03: There is not any significant difference between the effectiveness of C-DA and formative assessment on EFL learners' reading self-concept.

H04: There is not any significant difference between the effectiveness of C-DA and formative assessment on EFL learners' self-regulation.

Methodology

Research design

Applying the convenience sampling method, three equal groups—one control and two experimental ones (dynamic and formative)—were randomly selected. Pre-tests, treatments, and post-tests were used to collect the data. The independent variables of the study were computerized formative assessment and computerized dynamic assessment and the dependent variables were reading motivation, reading self-concept, autonomy, and self-regulation.

Participants

Eighty-seven Bangladeshi EFL female students who have studied English since 2021 took part in this research. The Preliminary English Test (PET) was given to the EFL students, who were then chosen using the convenience sample method. The participants' average age was 19 years old, and their level of general English ability was intermediate. Three groups were formed for the participants: a control group for traditional assessment, a group for C-DA, and a group for CFA.

Instruments

Preliminary English Test (PET)

During the first session, participants were given the PET to homogenize the participants in terms of their general English proficiency. This test was administered to 123 learners, and the highest scores were removed after the results were analyzed to make sure that all the subjects were intermediate. Due to a few constraints, just vocabulary, reading, and grammar components of the PET were employed.

Self-Regulatory Strategies Scale (SRSS)

The Self-Regulatory Strategies Scale (SRSS), created by Kadıoğlu et al. (2011), was also employed in this study to measure the participants' self-regulation. The SRSS was a 6-point Likert scale that included never, rarely, occasionally, regularly, and constantly. The SRSS included 29 assertions across eight dimensions. Cronbach's alpha formula revealed that the SRSS had a reliability of 0.82.

Reading Self-Concept Scale

The competence subscale of the Reading Self-concept Scale (Chapman & Tunmer, 1995) was employed in this study. The competency subscale consists of ten items (for example, can you figure out what a tale means?). The researcher read each item aloud, and each question was scored on a scale of 1 (no, never) to 5 (yes, always), with higher scores indicating a more positive self-concept. Cronbach's alpha was 0.84.

Reading motivation scale

The next instrument was Wigfield and Guthrie's (1997) motivations for the reading questionnaire (MRQ). In this study, a translated version of MRQ was used. To validate the translated questionnaire, four processes were used: first, the researchers and two skilled translators converted the MRQ items into the participants' native language. Second, the questionnaire was rewritten in English by a competent translator. Finally, the instrument was pilot tested on a comparable group. Finally, the translated instrument reliability was measured to be 0.81. This 54-item questionnaire covered several facets of reading motivation, including efficacy belief and competence constructions, reading social reasons, and reading purpose. For this question, the Likert scale ranged from 1 (strongly disagree) to 5 (strongly agree). This survey was used both as a pre-test and post-test to assess the students' reading motivation.

Learner autonomy questionnaire

An altered version of the learners' autonomy questionnaire produced previously by Kashefian (Kashefian SN: An investigation into college EFL learners' beliefs demonstrating their predispositions towards learner autonomy, unpublished) was the next instrument to be used. The redesigned questionnaire contained 25 items graded on a five-point Likert scale. Applicants were asked to select a choice for each item based on a scale ranging from 1 to 5, indicating how autonomous they were. The alternatives were as follows: 1 means severely disagree, 2 means disagree, 3 means neutral, 4 means agree, and 5 means highly agree. The questionnaire's reported reliability, as determined by Cronbach's alpha, was 0.78, indicating acceptable internal consistency.

Procedure

First, a sum of 87 pupils was selected from a total of 123 participants to serve as the study's sample subject according to Preliminary English Test (PET) results. Using a convenience sample technique, three equal groups were chosen at random from among them (one control and two experimental groups ($n = 29$) designated computerized formative and C-DA). Following that, three groups took pre-tests to assess their reading self-concept, reading motivation, autonomy, and self-regulation. The groups were then given various treatments. The first experimental group of learners received C-DA, while the second experimental group was given CFA. Learners in the control group received a traditional evaluation.

These types of evaluation and instruction approaches were initially described to students in all groups before they were used. The computerized mediation was then supplied to the participants throughout the intervention period via the C-DA program. Following that, each applicant was given time during the intervention phase to record their reading tactic and considerations in their working portfolio. The passages for the pre-tests were taken from TOEFL samples from prior years. The pre-test had fourteen reading passages and 14 multiple-choice reading questions. The subjects worked freely with no mediation throughout the pre-tests. The pre-tests provided the subjects' current level of reading skills. The researchers created collections of mediations for the C-DA program to be employed in the mediational phase based on the faults the participants

made in their pretest. Learners worked on passages throughout every mediation session. There was an inferential question in each reading paragraph. Later, they took post-tests that included inferential questions and reading passages as the pre-tests. As the passages used in the pre-tests, mediation, and post-tests phase were derived from TOEFL samples that had previously been prepared and tested by a group of experienced language test-designers, their reliability and validity were acceptable.

The subjects were free to do the exercises at their own speed during or after class time. Aside from reading passages and responding to questions delivered on the C-DA program, they were required to write their ideas on the mediations offered by the C-DA program, record their reading procedure and application of reading tactics, and provide real self-chosen proof of their changing/growing reading capabilities for all mediated sessions.

The researchers demonstrated how to record their reflections and give comments in their portfolios. However, no precise criteria were provided to participants regarding what to write down or what evidence to submit. They were required to explain why they thought the evidence they delivered aided them in their reading skills. The applicants were completely free for critical analysis, reflection, and the identification of new reading strategies.

The C-DA program was created by the researchers utilizing the Viewlet Quiz software to merge evaluation and mediation. The software employed Adobe Flash technology. The C-DA program also saved the pupils' responses and documented the number of erroneous ones as well as the mediations that they activated. This program enabled students to interact with and respond to pre-planned computerized interventions.

The C-DA technique had four degrees of mediation, which progressed from implicit to explicit. Completed a text, learners were offered inferential inquiries, and later on, five multiple-choice options were presented. They were asked to choose one accurate response from a list of options. When learners erroneously answered questions, the computerized mediations were displayed with more explicitness. When the pupils identified the right responses, the computerized mediation terminated immediately. The section that follows describes the types of support in each stage of mediation:

Mediation level 1:

- Including the greatest amount of implicit mediation
- Focusing on defining inferential reading
- Asking broad questions
- Defining keywords in passages
- Identifying the main concept

Mediation Level 2:

- Offering more explicit mediation than Level 1
- Limiting hints to direct students' attention to certain parts
- Explaining the context's general significance

Mediation level 3:

- Offering fairly explicit mediation
- Focusing on a single statement, word, or phrase
- Text-specific explanations

Mediation level 4:

- Presenting the right answers
- Explaining how the solution is reached
- Following the directions to justify the correct response

On the other side, in the formative assessment group, the researchers deliver feedback to each student depending on their test results. They guided the pupils in the formative group to evaluate their learning through peer and self-assessment. Furthermore, in formative class, the instructor's descriptive and extensive elicitation and feedback regarding learners' learning were crucial. In reality, the instructor was accommodating to the pupils' faults and offered helpful feedback such as meta-linguistic cues, repletion, adjustment, elicitation, clarification request, and recast. As a result, in addition to their course contents, this experimental group got formative quizzes and exams, understanding summaries, multiple-choice answers, homework activities, and fill-in-the-blanks. Researchers assessed learners' development and offered feedback on their strengths and weaknesses throughout the teaching process. Feedback is a critical factor because it allows students to fix their mistakes and motivates teachers to alter educational activities based on their efficacy. As a result, all forms of formative assessment used during the experiment received feedback (self-assessment, peers, or instructor).

Each participant's performance was recorded and contrasted in pairs. As a result, the researchers learned about the pupils' growth. Participants were examined regularly, and this procedure enlightened them about the relationship between learning and assessment.

Throughout the study, the teacher followed the aforementioned structure in the group and assessed the participants' progress at each session. The class was given the chance to benefit from peer, self, and instructor assessments. In addition, participants received helpful feedback. The teacher identified and clarified the students' errors, and the pupils paid attention to the information provided by the instructor. Occasionally they were given a clear right format, and other times they were given hints to allow them to rectify themselves. Teacher, peer, and self-corrections were employed to correct the inaccuracies. The faults were corrected both individually and collectively by the teacher. The teacher was in charge of supervising the task during the self-correction and peer-correction processes to prevent future difficulties.

Finally, the control groups got the standard individual reading. Readers in the control group continued to read the text personally many times and dealt with the post-reading assignments following their learning methods. Consequently, the students were unable to participate in group-oriented activities. The instructor introduced the subject before delving deeper to capitalize on the students' prior knowledge. After students finished the text, the instructor checked for any pronunciation errors before asking them what the new words meant, suggesting antonyms and synonyms, and

Table 1 Descriptive statistics of self-regulation pre-test

Scores								
	N	Mean	Std. deviation	Std. error	95% Confidence interval for mean		Minimum	Maximum
					Lower bound	Upper bound		
CG	29	45.72	7.54	1.40	42.85	48.59	30.00	61.00
CFA	29	48.20	5.79	1.07	46.00	50.40	39.00	61.00
CDA	29	47.89	5.94	1.10	45.63	50.15	39.00	61.00
Total	87	47.27	6.49	.69	45.89	48.66	30.00	61.00

Table 2 Inferential statistics of self-regulation pre-test

	Sum of squares	df	Mean square	*F*	Sig
Between groups	106.13	2	53.06	1.26	.28
Within groups	3521.24	84	41.92		
Total	3627.37	86			

enquiring about any comprehension problems. No opportunity was offered for interpersonal connection in this group. Finally, as a post-test, both groups received a reading comprehension test.

Reading motivation, reading self-concept, learner autonomy, and self-regulation post-tests were administered after 14 sessions. SPSS software, version 22, was used to examine the data. ANOVA was used to evaluate the influence of the aforementioned factors.

Results

The results of the statistical analysis are reported in the tables in the following section. Before discussing the results, it should be noted that the normality of the data was probed by Kolmogorov–Smirnov test.

The descriptive data for the three groups are shown in Table 1. All groups' means are nearly equal. The control group's mean score is 45.72, 48.20 for the formative group, and 47.89 for the C-DA. This suggests that all groups are somewhat similar because they were homogeneous at the start of the treatment.

A one-way ANOVA test was used in Table 2 to uncover any potentially significant differences between the three groups' pre-test results. Because the significance level (0.287) is more than 0.05, the difference in averages between the sample groups is not statistically significant at (p0.05). On the self-regulation pre-test, both the experimental and control groups fared equally well.

Table 3 shows the descriptive data for the three control groups' performance on the self-regulation post-test, as well as formative and DA. Indeed, the mean scores for the control, formative, and C-DA groups were 46.86, 69.62, and 70.13, respectively. This means that the three groups mentioned above fared differently on the post-test.

Table 3 Descriptive statistics of self-regulation post-test

	N	Mean	Std. deviation	Std. error	95% Confidence interval for mean		Minimum	Maximum
					Lower bound	Upper bound		
CG	29	46.86	6.96	1.29	44.21	49.51	33.00	61.00
CFA	29	69.62	5.91	1.09	67.37	71.86	60.00	80.00
CDA	29	70.13	6.08	1.13	67.82	72.45	60.00	86.00
Total	87	62.20	12.58	1.34	59.52	64.88	33.00	86.00

Table 4 Inferential statistics of self-regulation post-test

	Sum of squares	df	Mean square	*F*	Sig
Between groups	10,246.55	2	5123.27	127.56	.00
Within groups	3373.72	84	40.16		
Total	13,620.27	86			

Table 5 Post hoc Scheffe test (multiple comparison of self-regulation post-test)

(I) groups	(J) groups	Mean difference (I-J)	Std. error	Sig	95% Confidence interval	
					Lower bound	Upper bound
CG	CFA	−22.75	1.66	.00	−26.90	−18.61
	CDA	−23.27	1.66	.00	−27.42	−19.12
CFA	CG	22.75	1.66	.00	18.61	26.90
	CDA	−.51	1.66	.95	−4.66	3.63
CDA	CG	23.27	1.66	.00	19.12	27.42
	CFA	.51	1.66	.95	−3.63	4.66

Table 6 Descriptive statistics of self-concept pre-test

	N	Mean	Std. deviation	Std. error	95% Confidence interval for mean		Minimum	Maximum
					Lower bound	Upper bound		
CG	29	17.89	3.98	.74	16.38	19.41	11.00	25.00
CFA	29	19.17	3.24	.60	17.93	20.40	13.00	25.00
CDA	29	18.68	3.26	.60	17.44	19.93	13.00	25.00
Total	87	18.58	3.51	.37	17.83	19.33	11.00	25.00

Table 4 indicates that the difference between the experimental and control groups is significant at $p < 0.05$ with the Sig 0.00 which is less than 0.05. In fact, the experimental groups outperformed the control group on the self-regulation post-test.

Table 5 compares the mean self-regulation post-test scores of all groups. The results of the examination of the data in the table above revealed a significant variation among conditions, *P* 0.05. That is, there is a difference (p0.05) between the post-tests of both the experimental groups and the control group.

Table 7 Inferential statistics of self-concept pre-test

	Sum of Squares	df	Mean Square	F	Sig
Between Groups	24.06	2	12.03	.97	.38
Within Groups	1037.03	84	12.34		
Total	1061.10	86			

Table 6 displays the descriptive statistics for the three groups. All groups' means are nearly equal. The mean score for the control group is 17.89, 19.17 for the formative group, and 18.68 for the C-DA group. This suggests that all groups are somewhat similar because they were homogeneous at the start of the treatment.

In Table 7, a One-way ANOVA test was used to identify any potentially significant differences between the three groups' pre-test scores. Because the significance threshold (0.38) is more than 0.05 as the yardstick for putting means to the test, the difference in means between the sample groups is not statistically significant at (p 0.05). On the self-concept pre-test, both the experimental and control groups fared equally well.

Table 8 shows the descriptive statistics for the self-concept post-test performance of the three groups: the control group, the formative group, and the C-DA group. In practice, the mean scores for the control, formative, and DA groups were 25.03, 32.79, and 33.68, respectively. This means that the three groups mentioned above fared differently on the post-test.

Table 9 shows that the difference between the experimental and control groups is significant at (p 0.05) with Sig (0.000) less than 0.05. On the post-test, the experimental groups outperformed the control group.

Table 10 compares the mean self-concept post-test scores of all groups. The results of the examination of the data in the table above revealed a significant variation among conditions, P 0.05. That is, there is a statistically significant difference between the post-test results of both experimental groups and the control group (p 0.05).

Table 11 displays descriptive statistics from the motivation pre-test for each of the three groups. The mean scores for each of the three groups were 95.55, 97.10, and 97.13,

Table 8 Descriptive statistics of self-concept post-test

	N	Mean	Std. deviation	Std. error	95% Confidence interval for mean		Minimum	Maximum
					Lower bound	Upper bound		
CG	29	25.03	4.13	.76	23.46	26.60	20.00	33.00
CFA	29	32.79	3.70	.68	31.38	34.20	28.00	42.00
CDA	29	33.68	3.73	.69	32.26	35.10	28.00	42.00
Total	87	30.50	5.46	.58	29.34	31.67	20.00	42.00

Table 9 Inferential statistics of self-concept post-test

	Sum of squares	df	Mean square	*F*	Sig
Between groups	1313.81	2	656.90	44.00	.00
Within groups	1253.93	84	14.92		
Total	2567.74	86			

Table 10 Post hoc Scheffe test (multiple comparison of self-concept post-test)

(I) groups	(J) groups	Mean difference (I-J)	Std. error	Sig	95% Confidence interval	
					Lower bound	Upper bound
CG	CFA	− 7.75	1.01	.000	− 10.28	− 5.23
	CDA	− 8.65	1.01	.000	− 11.18	− 6.12
CFA	CG	7.75	1.01	.000	5.23	10.28
	CDA	− .89	1.01	.678	− 3.42	1.63
CDA	CG	8.65	1.01	.000	6.12	11.18
	CFA	.89	1.01	.678	− 1.63	3.42

Table 11 Descriptive statistics of motivation pre-test

	N	Mean	Std. deviation	Std. error	95% Confidence interval for mean		Minimum	Maximum
					Lower bound	Upper bound		
CG	29	95.55	4.68	.87	93.76	97.33	81.00	103.00
CFA	29	97.10	4.70	.87	95.31	98.89	90.00	109.00
CDA	29	97.13	4.39	.81	95.46	98.81	90.00	109.00
Total	87	96.59	4.60	.49	95.61	97.57	81.00	109.00

Table 12 Inferential statistics of motivation pre-test

	Sum of squares	df	Mean square	*F*	Sig
Between groups	47.60	2	23.80	1.12	.32
Within groups	1775.31	84	21.13		
Total	1822.92	86			

Table 13 Descriptive statistics of motivation post-test

	N	Mean	Std. deviation	Std. error	95% Confidence interval for mean		Minimum	Maximum
					Lower bound	Upper bound		
CG	29	143.72	19.27	3.57	136.39	151.05	100.00	167.00
CFA	29	153.41	5.65	1.04	151.26	155.56	140.00	167.00
CDA	29	153.89	6.15	1.14	151.55	156.23	140.00	169.00
Total	87	150.34	12.88	1.38	147.59	153.09	100.00	169.00

respectively. This implies that the three means of all groups performed nearly equally on the motivation pre-test.

Table 12 shows that Sig (0.32) is greater than 0.05; therefore, the difference between the groups is not significant at ($p < 0.05$). In fact, all three groups performed the same on the motivation pre-test. In other words, the selected participants were homogenous in terms of motivation.

Table 14 Inferential statistics of motivation post-test

	Sum of squares	df	Mean square	*F*	Sig
Between groups	1910.13	2	955.06	6.49	.00
Within groups	12,357.51	84	147.11		
Total	14,267.65	86			

Table 13 displays the motivation post-test descriptive statistics for all groups. The mean score for the control group is 143.72, for the formative group is 153.41, and for the C-DA group is 153.89. This suggests that the groups performed differently on the motivation post-test.

Table 14 shows that Sig (0.00) is less than 0.05, indicating that the difference between groups is significant at (p 0.05). On the motivation post-test, the experimental groups outperformed the control group.

Table 15 compares the mean motivation post-test scores of all groups. According to the above data, there is a difference (p 0.05) between the post-tests of the experimental and control groups. Based on the table, there is not significant differences between the motivation post-tests of the two experimental groups; both assessments were equally efficient on students' motivation.

The descriptive data of the autonomy pre-test for all three groups are shown in Table 16. The mean scores for the control, formative, and C-DA groups were 37.55, 38.93, and 38.89, respectively. This implies that the three means of all groups performed nearly equally on the pre-test of autonomy.

Table 17 reveals that Sig (0.207) is bigger than 0.05, indicating that the difference between groups is not statistically significant at (p 0.05). They performed similarly on

Table 15 Post-hoc Scheffe test (multiple comparison of motivation post-test)

(I) groups	(J) groups	Mean difference (I-J)	Std. error	Sig	95% Confidence interval	
					Lower bound	Upper bound
CG	CFA	− 9.68	3.18	.01	− 17.62	− 1.75
	CDA	− 10.17	3.18	.00	− 18.11	− 2.23
CFA	CG	9.68	3.18	.01	1.75	17.62
	CDA	− .48	3.18	.98	− 8.42	7.45
CDA	CG	10.17	3.18	.00	2.23	18.11
	CFA	.48	3.18	.98	− 7.45	8.42

Table 16 Descriptive statistics of autonomy pre-test

	N	Mean	Std. deviation	Std. error	95% Confidence interval for mean		Minimum	Maximum
					Lower bound	Upper bound		
CG	29	37.55	4.12	.76	35.98	39.12	28.00	43.00
CFA	29	38.93	2.91	.54	37.82	40.03	33.00	43.00
CDA	29	38.89	2.83	.52	37.81	39.97	33.00	43.00
Total	87	38.45	3.36	.36	37.74	39.17	28.00	43.00

Table 17 Inferential statistics of autonomy pre-test

	Sum of squares	df	Mean square	*F*	Sig
Between groups	35.88	2	17.94	1.60	.20
Within groups	939.72	84	11.18		
Total	975.60	86			

Table 18 Descriptive statistics of autonomy post-test

	N	Mean	Std. deviation	Std. error	95% Confidence interval for mean		Minimum	Maximum
					Lower bound	Upper bound		
CG	29	45.10	4.88690	.90	43.24	46.96	34.00	52.00
CFA	29	54.96	6.84253	1.27	52.36	57.56	42.00	67.00
CDA	29	55.79	6.21852	1.15	53.42	58.15	42.00	67.00
Total	87	51.95	7.71122	.82673	50.31	53.59	34.00	67.00

Table 19 Inferential statistics of autonomy post-test

	Sum of squares	df	Mean square	*F*	Sig
Between groups	2051.40	2	1025.70	28.13	.00
Within groups	3062.41	84	36.45		
Total	5113.81	86			

Table 20 Post hoc Scheffe test (multiple comparison of autonomy post-test)

(I) groups	(J) groups	Mean difference (I-J)	Std. error	Sig	95% Confidence interval	
					Lower bound	Upper bound
CG	Form	− 9.86	1.58	.00	− 13.81	− 5.91
	Dy	− 10.68	1.58	.00	− 14.64	− 6.73
CFA	Con	9.86	1.58	.00	5.91	13.81
	Dy	− .82	1.58	.87	− 4.77	3.12
CDA	Con	10.68	1.58	.00	6.73	14.64
	Form	.82	1.58	.87	− 3.12	4.77

the autonomy pre-test. In fact, all three groups had similar performance on the autonomy pre-test. In other words, the independent learning of selected participants was the same.

Table 18 displays the autonomy post-test descriptive statistics for all groups. The mean score for the control group is 45.10, 54.96 for the formative group, and 55.79 for the C-DA group. This suggests that the groups performed differently on the post-test of autonomy.

Table 19 shows that Sig (0.000) is less than 0.05, indicating that the difference between the groups is significant at (p 0.05). In fact, the experimental groups outperformed the control group on the autonomy post-test.

Table 20 compares the mean scores of all groups on the autonomy post-test. According to the above table, there is a significant difference between the post-tests of the experimental and control groups (p 0.05).

To sum up, the one-way ANOVA analysis showed that the three groups' posttest outcomes varied. The C-DA group outperformed the computerized formative group in reading motivation, reading self-concept, autonomy, and self-regulation, according to the data analysis. It was found that C-DA helped EFL students improve their motivation in reading, reading self-concept, autonomy, and self-regulation.

Discussion

This study sought to figure out how C-DA and formative assessment affected EFL learners' reading motivation, autonomy, self-regulation, and reading self-concept. Both have proven to be highly significant in enhancing learners' reading motivation, self-concept, autonomy, and self-regulation. The C-DA group outperformed the formative and control groups in general. The study's findings suggested that employing C-DA could boost students' reading motivation, self-concept, autonomy, and self-regulation greatly.

Our findings are consistent with those of Kazemi and Tavassoli (2020). They investigated the impact of DA and diagnostic assessment on the development of EFL learners' speaking skills. Their findings revealed that both diagnosis and DA created a change in the subjects' speech kill. Furthermore, our findings are consistent with Suherman's (2020), investigation of the effects of DA on EFL students' reading skills and discovered that DA assisted applicants in improving their reading ability. Moreover, the findings are also in line with those of Heshmat Ghahderijani et al. (2021), who investigated the effect of two DA models on speaking CAF. As the data were analyzed using ANOVA, it was shown that both G-DA and C-DA could significantly improve speaking CAF, compared to typical non-DA teaching, with C-DA being meaningfully more effective than G-DA.

Also, these results agree with Malmir's (2020) findings, in which he studied the impact of two DA models on the accuracy and speed of perception of speech acts and consequences. The findings indicated that, as compared to non-DA instruction, both interventionist and interactionist DA models could significantly improve the pragmatic comprehension accuracy of Iranian EFL students. Furthermore, this study supports Chen et al. (2022) study, which investigated the impacts of DA on pupils' speaking abilities. They revealed that DA improved the students' speaking skills. Furthermore, our findings are consistent with those of Safdari and Fathi (2020), who validated the constructive impacts of DA on the development of speaking fluency and accuracy in Iranian pre-intermediate students.

The findings also support Ahmadi Safa et al. (2015) study results, which found that an interactionist model of DA had a statistically positive effect on the speaking abilities of Iranian EFL pupils. The study's findings also confirm those of Talati-Baghsiahi and Khoshsima (2016), who examined the impact of a DA strategy on the linguistic and pragmatic knowledge of modal auxiliaries as hedging strategies among Iranian EFL students. They reasoned that the use of DA in EFL lessons enhanced pragmatic L2 language features like the provided hedges in writing activities.

One reasonable explanation for this observation could be envisaged from the perspective of cognitive psychology, according to which mediation, which has occurred

in the CDA group, could have contributed to the development of the participants' comprehension through thinking abilities, believed to be central to success in learning. The decisive role of mediation in CDA gains more importance when one considers the fact that test takers or examinees may be differentially affected by computer technology and, therefore, perform differentially on a computer-mediated task. This serves as the reason why the mediation provided could be optimally adapted to different examinees through computers, engaging them differentially in language use (Ghenaat et al., 2022).

The findings also could be linked to unique C-DA properties. The most significant component of DA models is the strong contact between the learners and the interveners, which places them at the center of all educational practices. Because of the extensive use of interactions in DA lessons with a focus on the learners' learning capacity, pupils were capable of activating their present knowledge and attempting to get to advanced levels by scaffolding and support from the instructors or other proficient individuals (Lantolf & Poehner, 2011). More importantly, ZPD, which entails a combined teaching and assessing methodology, is the primary reason for DA's overall efficiency. ZPD was important since it is the DA's cornerstone. The contact between pupils and instructors/evaluators occurred via DA and with ZPD, so stimulated the students' learning capacity.

Moreover, as Lantolf and Poehner (2011) pointed out, the DA group efficacy can be attributed to learners' greater contact with and applying the language in DA-oriented instructions. There was a link between the amount of language input and better learning (Kasper & Rose, 2002). Furthermore, as Poehner (2008) pointed out, any DA-centered connection assisted students in improving their performance and social participation. This can stand as another reason for students' progress. Such findings also illustrated that mediated support attuned to learners' ZPD resulted in significant changes in students' ability and that they were able to transfer what they had learned to an unfamiliar and more difficult stages, verifying but those of lower proficiency needed more mediation to make progress.

In addition, the fascinating and inspiring features of C-DA can be used to describe how pupils progress in language production (Taguchi, 2019). This can hasten instruction by motivating pupils, kindling their interest and inventiveness, eliminating a load of outdated classrooms from their connections, blending outside and inside learning, and ultimately improving performance (González-Lloret, 2018). Furthermore, C-DA grew gradually and provided students with opportunities to enhance their skills. The C-DA model's good impacts on language proficiency can also be linked to the intricacy of cognitive procedures that underpin brain neurological responses. These neurological mental processes result in receptive and productive skills (Taguchi, 2019).

Moreover, the C-DA structure allowed teachers control over how effectively their pupils read in good way by providing learning chances that can aid them to be better communicators. This research also highlights the importance of inventive learning settings in assisting students in regulating the learning techniques over self-modification and C-DA throughout the intervention period, allowing students to learn more competently in a difficult and motivating setting (Lee, 2010). Furthermore, the fact

that DA created an environment to emphasize students' constant growth and learning while considering their ZPD may lend validity to the current results.

C-DA also provided a comprehensive assessment of the abilities required for learners and mediators in ZPD to keenly mediate. The emphasis of this technique shifted from the final result of earlier teaching to the mechanisms by which students' abilities can be developed. C-DA assists in the identification of learners' unknown learning challenges by providing particular preplanned prompts and cues, also supporting language teachers to project future performance. As a result, DA may be able to produce a more accurate model of genuine capabilities and their evolution (Hidri & Roud, 2020).

Furthermore, the inclusion of C-DA makes the learning atmosphere more student-centered. As a result, by displaying mastery of intervention supports, C-DA reduces pupils' concerns of failure, enhances students' passion and drive, and offers self-assurance they want to advance to higher levels (Ebadi & Saeedian, 2015). C-DA processes, in particular, lay considerable stress on both assessing and developing pupils' skills, as opposed to traditional psychometric assessments, which exclusively emphasized evaluating learners' abilities. C-DA incorporates assessment and instruction in this way, requiring consciousness of learners' ZPD (Zangoei et al., 2019).

C-DA gave the pupils the freedom to learn tips at their own pace, eliminated biases and error rates caused by human emotions, decreased the stress of being observed during the test and removed time, location, and accessibility barriers that a teacher might pose. These findings reinforce Tzuriel and Shamir (2002) comparison of the gains made by students who received computerized mediation vs. those who only received human assistance. They found that learners who received C-DA types of mediation benefited the most. It also supported the theory that using computers rather than teachers to deliver the mediation levels is a good idea since it eliminates the need for a qualified teacher. Mediation levels eliminated the need for lecturers to undergo significant training to carry out dynamic assessments fairly and transparently.

Persaud Singh and Ewert's (2021) findings backed up the results of formative group development. They found that there were significant disparities in language achievement between formative and control participants, favoring the formative individuals. Besides, Alahmadi et al. (2019) supported our research findings by investigating the influence of formative assessments on EFL students' performance in speaking examinations. They demonstrated that formative assessment helped EFL students address difficulties in speaking assessments.

To add more, these findings are consistent with those of Mahshanian et al. (2019), claiming that combining formative and summative assessments can lead to improved language learning achievement. Also, the findings reflect Buyukkarci and Sahinkarakas' (2021), indicating the constructive impacts of formative assessment on language accomplishment. Likewise, our results support those of Imen (2020), revealing the effects of formative assessment on EFL pupils' writing skills. His findings suggested that adopting formative assessment helped subjects improve their writing competence.

One justification for the formative group's improved performance could be that they received significantly more input. They received various feedback and several examinations during the course. These kinds of assessments and feedback could have contributed to their success in learning. This is consistent with Krashen's (1985) input theory, which states that exposing pupils to more material allows them to learn more. Another possible reason for our findings is that formative assessments are not evaluated; therefore, they relieve the assessee of worry. They also let go of the idea that they have to do everything right. Instead, they are used as a practice for pupils to receive help along the road before the exams.

Formative assessment is compatible with the constructivist approach; another significant contribution of formative assessment is that the researcher could compare the performances of the participants throughout the process. Unlike traditional assessment, formative assessment provides chances to teachers to compare student's performances. When pupils struggle during a lesson, teachers usually check for understanding. Instead of waiting until the unit end to analyze these concerns, instructors address them early on. Teachers must conduct less re-teaching at the end because many mastery issues are addressed before final exams. The benefits indicated above could be the explanation for the findings (Ismail et al., 2022). Furthermore, the formative assessment makes teaching more efficient by directing pupils to reach learning objectives, determining learning needs and regulating teaching accordingly, and increasing instructor awareness of effective teaching approaches (Harrison, 2005). According to the results gotten from formative assessment projects, Black et al. (2003) specified that instructors were beginning to accept teaching as support for learners' learning rather than as simply complementing the educational curriculum.

To sum up, the formative assessment occurred regularly and allowed feedback. When classroom activities are implemented to assess language learners' performance, these draw participants' attention, increased their motivation, supported their metacognitive skills, and critical thinking (Facione, 2011). This assessment used classroom-like activities on a digital platform for assessment purposes. Due to its continuous nature, language learners stick to the learning process, as Harrison (2005) asserted the heart of assessment is a continuing process in which the teacher, in collaboration with the student, uses the information to guide the next steps in learning.

Conclusions, implications and limitations

This research aimed to compare the influence of CFA and C-DA on EFL learners' reading motivation, self-concept, autonomy, and self-regulation. The results showed that employing these two types of evaluations improved EFL learners' performance; however, the C-DA group improved more than the formative assessment group on post-tests.

The outcomes of this study can help teachers apply DA in their classrooms, recognize pupils' shortcomings, and give mediation whenever and wherever it is required. More ZPD-centered activities in EFL lessons can create possibilities for meaningful interaction between instructors and pupils. DA is not solely valuable for teachers in providing visions into pupils' capacities (Harding et al., 2015), but it is also useful in assisting them to categorize pupils according to their genuine levels of skills by observing disparities

in their performances. As a result, instructors are advised to employ DA to improve pupils' talents and motivation. Learners can benefit from the findings of this study as well because utilizing DA can improve their self-concept, motivation, and self-regulation. Furthermore, it can increase their independence and autonomy. DA also allows for collaborative learning, in which both assessors and assessees collaborate to overcome learning challenges (Poehner & Lantolf, 2013).

This study, like other studies, had limitations and could not address all of the concerns surrounding the topic. These are their names:

1. One restriction is that the study only included participants within a certain age range. As a result, the findings cannot be administered to other age groups.
2. There were just 87 learners in this research. As a result, this cannot be generalized.
3. The time allotted for the lesson was limited. This study implies that more research is needed in light of the findings and limitations. For starters, it may be repeated at other schools with a bigger number of participants. Students from higher or lower levels could also be included to gain a better vision of the DA or formative assessment effects on English language learning. A future study could look into the impacts of DA or formative treatments by expanding the period of administration and the number of sessions. Also, several qualitative research approaches like open-ended questionnaire items and interviews can be done to learn what teachers and students think about the DA or formative assessment. Following that, researchers are encouraged to investigate the impacts of DA and formative assessment on additional language abilities and subskills, as well as the effects of the above evaluations on other psychological factors such as self-confidence and attitude.

Abbreviations

ARG	Assessment reform group
EFL	English as a foreign language
PET	Preliminary English Test
ANOVA	Analysis of variance
SCT	Socio-cultural theory
DA	Dynamic assessment
ZPD	Zone of proximal development
CDA	Computerized dynamic assessment
TOEFL	Test of English as a foreign language
CFA	Computerized formative assessment
CG	Control group

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