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Research Article

The effect of implementing technology in formative assessments to ensure student learning in higher education English literature courses after COVID-19

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ABSTRACT

This study aims to show how formative assessment that is assisted by technology can improve student learning in English literature courses in higher education. Moreover, it explores how the use of technology could help implement formative assessment by the instructors to assure student learning in English literature courses in an efficient and timely manner. Formative assessment is somewhat new for higher education instructors, especially those who teach English literature. Applying this type of assessment is, unfortunately, not easy and the results are not always ideal. Nevertheless, to reach the goals of the study, a quantitative method is distributed to 50 English literature instructors from higher educational institutions that recently started implementing technology in their formative assessments. The significance of the study lies in the fact that the study is conducted in a region where formative assessment has recently been used in education, specifically in higher education English literature courses. The contribution also lies in how technology can help implement formative assessment, overcome any obstacles, and thus ensure student learning. The findings of the study show significant awareness of formative assessment in higher education, and especially among instructors of English literature. The findings also indicate that implementing technology with formative assessments enhances students' learning in English literature course in higher education after COVID-19.

Keywords: formative assessment, technology, higher education, English literature

INTRODUCTION

Because English is a foreign language taught in both private and public Jordanian schools, many students find it the language difficult to use, and therefore, difficult to freely express themselves. Indeed, using English is a challenge for students in Arabic-speaking countries like Jordan (Awajan, 2022a), and their difficulties in using the language usually accompany them to their higher education. This is especially true of those who choose English literature as their major. According to Alhababha et al. (2016), students who score the lowest on the IELTS exam are almost always those students from Arabic-speaking regions who have issues in listening, writing, and speaking in English. Meanwhile, these same students are encouraged to enroll in English language programs because of the local job market's need for graduates with English language communication skills. For this reason, university and college professors that teach English literature courses have a greater responsibility to improve both the English language skills and content knowledge of their students.

One chief way to improve student learning and achieve the learning outcomes and objectives of a program is to integrate and implement formative assessment into the teaching and learning process. When conducted correctly, formative assessment ensures the student achievement and measure the achieved learning of the students. Many studies have concluded that formative assessment positively influences student

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achievements (Black & Wiliam, 2009; Furtak et al., 2016). Such assessments have only recently been used in only a few higher education institutions. Still, not all instructors have used them. They fully regard such assessments as only for use by primary and secondary school teachers. The reason for this thinking is that in implementing formative assessment, instructors need to move away from traditional teaching and shift to more student-centered classes. Yorke (2015) states that this is because formative assessment is not "well understood across higher education" (p. 477).

Higher education instructors, and especially those who teach English literature, are used to holding lecture-based classes where the instructor spends much more time lecturing about subjects than the students do discussing these subjects. That being said, formative assessments will certainly decrease the number of lecturing instructors do in higher education classrooms. For now, however, these instructors are still using traditional strategies such as paper-and-pencil strategies in their assessments (Dong, 2021). Koka et al. (2017) states that formative assessments need to be used by instructors in higher education in order to decrease the lecturing style that these instructors espouse.

For the sake of improving the content knowledge and communicative, critical thinking, problems solving and other skills of their students, English lecturers, and especially English literature lecturers, need to apply formative assessment. This will allow lecturers to continuously work on the strengths and weaknesses of their students. Through the provision of rubrics, it also enables lecturers to provide students with thorough, directed, specific, and continuous feedback, whether orally or written, as English literature courses are based on critical, analytical, and creative thinking and can be challenging (Awajan, 2022a). Peskin et al. (2010) add that even most native English-speaking students find English literature difficult to tackle. Along those same lines, Salameh (2012) highlights the difficulty of studying English literature focusing mainly on poetry, saying that poetry is not easily analyzed and comprehended even by native speakers of English. Therefore, in the case of poetry, instructors start "[n]arrowing the distance between students and the text by relating the themes and characters of the literary work to the students' personal experiences," and "by making students read independently" (Hussein & Al-Emami, 2016, p. 125).

This brings us back to the use of formative assessment in assessing students in order to overcome all these difficulties. This can only happen when assessments are taken into consideration during course design, whether the course is face-to-face, blended, or online. Many factors such as the course itself, the mode of delivery, the provided resources, the physical environment, and the available facilities should be taken into consideration when choosing the strategies and tools for formative assessment in the process of planning. Indeed, all of these factors must be taken into consideration in the planning process (Baughan, 2020; Carless & Winstone, 2019; OfS, 2019a, 2019b).

During the COVID-19 pandemic, all educational institutions moved to online or remote learning (Awajan, 2022b). This move was sudden, pressing, and constrained by special and crucial settings and circumstances. Higher education instructors certainly faced many challenges since online learning was not a main means of course delivery in many regions (Al-Hyari, 2020; Haffar et al., 2023; Müller et al., 2021). Instructors of higher education institutions, and especially those who teach English literature courses, had to move to new kinds of assessments and strategies to ensure that students not only remain honest, but that they are also treated equitably. According to Lancho et al. (2018), quizzes or exams were the main summative assessment tools that were used before the COVID-19 pandemic–summative assessment tools that also lack personalizing the students' problems and issues.

According to Hattie (2003), formative and summative assessments are both used in the learning and teaching process to measure the students' achievements. Shepard et al. (2018) shows the differences between them stating that formative assessment is more related to defining and highlighting students' needs. On the other hand, summative assessment is related to measuring students' objectives assigned for the whole course (National Council of Teachers of Mathematics [NCTM], 2014). Formative assessments may help in improving students' achievements in summative assessments practices (Box et al., 2015; Gezer et al., 2021; Govender, 2019).

As a result of being unprepared for online or remote teaching, instructors were forced to search out new strategies for assessment, these strategies mainly called for the implementation and use of technology to perform student assessment. Unfortunately, only a very small number of instructors in higher education

institutions had implemented and applied this new form of technological student assessment, let alone the number of teachers of English literature. This was due to many factors such as lack of awareness of education technology and resisting online or remote learning (Awajan, 2022b; Cifuentes-Faura, 2020; Maican & Cocoradă, 2021).

Even after the COVID-19 pandemic, instructors nowadays are still advised to integrate technology with formative assessment as a practical and efficient way to add entertainment and student's interests to the lesson plan that motivates them to perform these assessments. When students take these assessments seriously, it helps instructors identify their strengths and weaknesses. Additionally, it also helps instructors identify whether or not they have achieved the course outcomes and to what extent while also providing students with better and more significant feedback. Likewise, this also helps students improve their communicative English language skills and content knowledge, which helps them successfully complete their English literature programs with better results.

As a result of the previously mentioned points, the researcher decided to conduct the current study with the aim of concluding that using formative assessment with technology positively enhances the performance of English literature students. To reach the goals of the study, a quantitative method is distributed to 50 English literature instructors who have recently started implementing technology in formative assessments. The significance of the study lies in the fact that the study is conducted in a region where formative assessment has recently been used in education, and specifically in higher education English literature courses. There is shortage in the number of studies conducted on formative assessment in general (Bhagat & Spector, 2017), formative assessment in Arabic regions, and especially on formative assessments conducted without the integration of technology (Bhagat & Spector, 2017). The contribution also lies in how technology could help implement formative assessment to overcome any obstacles to ensure students learning.

LITERATURE REVIEW

Formative Assessment

Formative assessment has been defined and discussed by many scholars who have discussed its importance in following-up on and monitoring student learning. For example, Popham (2011) defines formative assessment as "a planned process in which assessment-elicited evidence of students' status is used by teachers to adjust their ongoing instructional procedure or by students to adjust their current learning tactics" (p. 270). Elmahdi at al. (2018) discuss the importance of formative assessments and what they indicate. They also discuss the importance of feedback that accompanies these assessments, saying that they provide "students with just in time specific and no evaluative feedback that improve their performance" (p. 182). They add that teachers at every educational level and institution find it a challenge to be able to engage their students in formative assessments to measure their understanding and modify their learning. Formative assessment to them also allows the teachers and instructors to reflect and modify their teaching and assessment strategies - in other words, "formative assessment informs instruction" (p. 183). Ramsey and Duffy (2016) add that formative assessments support instruction by providing continuous feedback to both students and instructors.

According to Swan (2005), for instructors to obtain effective formative assessments, learning intentions, objectives, aims, and the aligned outcomes, along with grade criteria need to be shared with students for each formative assessment. Instructors also need to keep this in mind their as their goal for student learning and achievement. Swan (2005) also adds that instructors need to vary their use of assessment strategies and tools that are able to elicit evidence about student learning and to help the students overcome their challenges. Looney (2010) adds that formative assessments need to be followed by effective feedback, which aims at monitoring student progress. Lancho et al. (2018) concur that feedback is the way to reach to effective formative assessments. Formative assessment could be applied by peer assessment, and self-assessment (Swan, 2005).

Black and Wiliam (2009) discuss formative assessment by stating that "the teaching practice is formative when evidence about student achievement is elicited, interpreted, and used by teachers, learners, or their peers, to make decisions about the next steps in instruction that are likely to be better, or better founded,

than the decisions they would have taken in the absence of the evidence that was elicited" (p. 7). Ozan and Kincal (2018) explore the impact of "formative assessment practices on the students' academic achievement, attitudes toward lessons, and self-regulation skills" (p. 1). They used a mixed method to reach to the aim of their study.

Technology and Education

Many studies have been conducted to prove the contribution of technology in education and instruction and how it can positively affect students learning. This is especially true in the 21st century, where students, whatever their age, are totally immersed in technology, social media applications, and digital tools. These studies have highlighted the role of technological instruction in changing the way the students perceive the teaching and learning process and how they might interact with it (Ali & Elmahdi, 2001; Baylor & Ritchie, 2002; Caldwell, 2007; Damick, 2015; Danielson, 2011; Fawzi, 2010; Irving, 2015).

Because digital technology has offered many methods of communication and social interaction, the technological revolution and integration of technology has greatly improved education (Yang, 2012). Despite this fact, some scholars still think that instructors in some regions are still struggling with how to integrate technology in higher education classrooms (Fullan & Donnelly, 2013; Hennessy et al., 2005; Livingstone, 2012; OECD, 2008; Yang, 2012). Livingstone (2012) adds that it is still unclear to instructors of higher education on how they can integrate technology into their classrooms. Jamieson and Musumeci (2017) add that technology has been applied in education to facilitate learning and teaching. They add that it has specifically been integrated in assessments, mainly formative, to save time, to add accuracy to results, and to collecting evidence for learning.

Integrating Technology With Formative Assessment

Some studies have been conducted on the role of implementing technology with formative assessment to ensure student learning. Beginning with a study by Sarah et al. (2019), they state that instructors need to design formative assessments that aim to engage students in their learning while at the same time, help prepare them for summative assessments. Their findings also include how, when used for formative assessment, technology could save time and effort. They have used an independent samples t-test to reach their questions. They conclude that technological tools can be beneficial. Additionally, they found an unimportant dissimilarity between paper and formative assessments such as the use of quizzes, questions and reflection questions. They conclude that when preparing students for summative assessment, Web 2.0 can be just as helpful as paper or Socrative assessments. Moreover, a smart selection of these tools can affect how often students participate, how long they have to wait for feedback, and how long it takes teachers to evaluate them.

Robertson et al. (2019) state that using technology with formative assessment has many advantages: it attracts the students' attention to the content itself and motivates them in learning. It also helps the instructors give immediate feedback that can be saved for future records. According to Bhagat and Spector (2017), this can help provide timely feedback that, instead of being late (which does not support student learning), is constructive and useful. Technology can also help in collecting and analyzing data, which results from formative assessments. Dakka (2015) also adds that this data collection and analysis are very useful because they give teachers indications about the progress of the students and what outcomes they have achieved.

In their study, Elmahdi et al. (2018) explore the effect of applying Plickers, a technological tool used for formative assessments, to students learning. The results of their study show that students are aware of the importance of formative assessment and the feedback accompanied with it. They show that the tool has enhanced the learning process in their integration, creating equal opportunity and saving students and instructors both time and effort. They recommend that instructors integrate technical tools in formative assessments.

Irving (2015) declares that technology with formative assessments helps in "supporting classroom environments that allow students and teachers to assess learning and providing mechanisms to present information about student learning during instructional sequences" (p. 380). Beatty and Gerace (2009) comment on the role of technology that is integrated in formative assessment by saying that "[t]eachers have

limited time to assess students' performances and provide feedback, but new advances in technology can help solve this problem" (p. 142).

Burke et al. (2009) have integrated technology to promote formative assessment practices in science and mathematics classes. Dalby and Swan (2018) explore the use of iPads by six mathematics teachers when applying formative assessments to their classes in two secondary comprehensive schools in the Midlands of England. The study concluded with a variety of ways that iPads can provide effective formative assessments that can improve student learning. Haßler et al. (2015) states that tablet use by students in their classes could make the assessment for learning process easier and more flexible.

Olsher et al. (2016) studied the effect of using technology in applying formative assessment to monitor student learning in mathematics. Their study concluded that using technology in teaching and assessment strategies has an impact of on student interaction and improvement. Dalby and Swan (2018) have used formative assessment in science and mathematics education (FASMEd) to show how six mathematics teachers used iPads in their classes for formative assessments in two secondary comprehensive schools in the Midlands of England. The use of formative assessments with iPad was planned and systemized.

From the previously mentioned literature review, it can be noticed that technology has recently been implemented in formative assessment. Indeed, there have been many studies conducted on the use of technology in formative assessment, but there is a gap in the studies that tackle the use of these two elements together in English literature courses. As a result, the study tries to answer the following questions:

1. What is the importance of formative assessment from the point of view of English literature instructors in higher education?
2. What is the effect of implementing technology with formative assessments on students' learning in higher education English literature courses?

METHODOLOGY

To answer the questions of the study, the quantitative method is used. A questionnaire, with four sections is distributed to 50 English literature instructors from higher educational institutions, who have recently started implementing technology with formative assessments. Instructors are asked to respond to the points of each section on a 5-point Likert scale, though the first section is used for collecting the demographic data of the respondents. The second section is where respondents answer the first question about the importance of formative assessment, by responding to 13 points according to their own opinions. The third and fourth sections consist of 12 points each. However, the third section reflects the opinions of instructors regarding the application of formative assessments without the implementation of technology while the fourth reflects their opinions about applying formative assessments with the implementation of technology.

The validity of the questionnaire is measured by the use of both factor analysis and exploratory factor analysis. A reliability test is also carried out for all variables using Cronbach's alpha. The researcher uses the mean, standard deviation, item importance, and importance level to answer the first question. To answer the second question, a t-test is used for two correlated samples. Known as the paired sample t-test, it shows the difference in the results before and after implementing technology with formative assessments.

RESULTS

Table 1 shows the results of the exploratory factor analysis of the study tool, specifically the section related to the importance of formative assessment.

Table 1. Loadings matrix for the items on the dimensions of the study tool (formative assessment)

No	Item	Correlations
1	It is essential in the learning process	0.708
2	It helps put the students on the right track	0.656
3	It helps identify the students' strength	0.640
4	It helps identify the students' areas of development	0.688
5	It helps identify the students' problems in acquiring certain skills	0.534
6	Its results help in modifying the learning process	0.902

Table 1 (Continued). Loadings matrix for the items on the dimensions of the study tool (formative assessment)

No	Item	Correlations
7	It helps the students respond to achieving the course learning outcomes	0.882
8	It helps the instructor in reflecting on him/her professional practices	0.902
9	It helps in improving the students' communication skills	0.901
10	It enhances students' own learning	0.872
11	It enhances the students' use of rubrics	0.913
12	It enhances the students' self-assessment	0.638
13	It enables the students to reflect on their own way of learning	0.882
KMO		0.695
Bartlett's test of sphericity–Chi-square		3,448.80
df		78
Eigenvalue		2.359
Significance		0.00**

Note. **Statistically significant at α=0.05

Table 2. Loadings matrix for the items on the dimensions of the study tool

No	Item	Correlations
1	It saves the instructor's time in paperwork	0.679
2	It saves the instructor's time in writing assessments	0.761
3	It helps in taking into consideration all students' ways of expression and action	0.673
4	It helps in including various applications that help attract the students and fit their needs	0.516
5	It helps in using accessible applications for the students to use.	0.921
6	It is easy to use in classrooms	0.884
7	It helps in saving the students' responses.	0.909
8	It helps in showing the statistics of the students' responses	0.923
9	The students enjoy using technology in formative assessments	0.875
10	It helps in decreasing mistakes in preparing assessments	0.913
11	It helps in giving immediate feedback for the student	0.654
12	It helps in creating rubrics that are accessible and easy to use	0.733
KMO		0.741
Bartlett's test of sphericity–Chi-square		3,236.106
df		66
Eigenvalue		2.296
Significance		0.00**

Note. **Statistically significant at α=0.05

Table 3. The reliability of the study tool

No	Scale	No	Cronbach's alpha (alpha value [α])
1	Formative assessment	13	*0.820*
2	Technology with formative assessment	12	*0.853*

Table 4. Scales

Grade	1	2	3	4	5
Scale	Strongly disagree	Disagree	Neutral	Agree	Strongly agree

Table 2 shows the results of the exploratory factor analysis of the study, specifically the section of points answered before and after implementing technology with formative assessment.

Reliability of Questionnaire Sections

Table 3 shows the reliability test with the use of Cronbach's alpha for all variables.

The items of the questionnaire distributed to the participants are graded according to the five scales, as shown in **Table 4**.

Table 5 shows how to assess the relative importance of items.

Table 5. Relative importance of items

Class	5.00-3.68	3.67-2.34	2.33-1.00
Relative importance	High	Medium	Low

Table 6. Means, standard deviation (SD), item importance, & importance level (IL) of formative assessment

No	Items	Mean	SD	Rank	IL
1	It is essential in the learning process	4.32	0.54	4	High
2	It helps put the students on the right track	4.21	0.56	7	High
3	It helps identify the student's strengths	4.26	0.51	5	High
4	It helps identify the student's areas of development	4.42	0.49	3	High
5	It helps identify the student's problems in acquiring certain skills	4.46	0.56	2	High
6	Its results help in modifying the learning process	4.18	0.70	8	High
7	It helps the students respond to achieving the course learning outcomes	4.42	0.49	3	High
8	It helps the instructor in reflecting on him/her professional practices	4.14	0.44	10	High
9	It helps in improving the student's communication skills	4.15	0.68	9	High
10	It enhances student's own learning	4.46	0.50	2	High
11	It enhances the student's use of rubrics	4.11	0.41	11	High
12	It enhances the student's self-assessment	4.49	0.50	1	High
13	It enables the students to reflect on their own way of learning	4.22	0.62	6	High
Overall		4.30	0.16		High

Note. **Statistically significant at α=0.05

Table 7. Results of the paired sample t-test

Performance	n	Mean	Standard deviation	t- value	df	Sig.
Before	350	1.33	0.21	117.68	349	0.00**
After		4.20	0.41			

Note. **Statistically significant at α=0.05

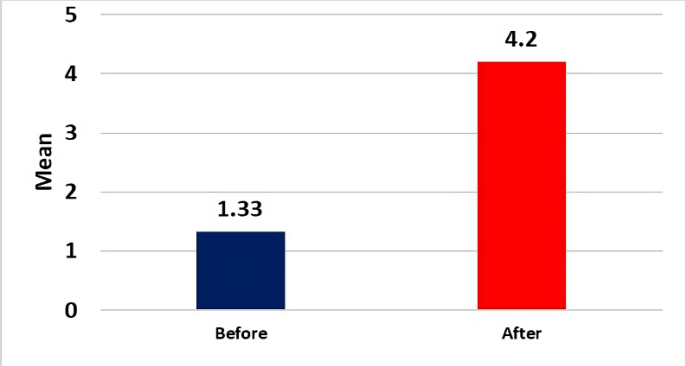

Figure 1. The performance before and after implementing technology with formative assessment (Source: Author)

For the sake of answering the first question–What is the importance of formative assessment from the point of view of the English literature instructors in higher education?–the researcher uses the mean, standard deviation, item importance and importance level, as shown in **Table 6**.

To answer the second question of the study–What is the effect of implementing technology in formative assessments on student learning in higher education in English literature courses?–a t-test known as the paired sample t-test was used for two correlated samples.

Table 7 shows the results of the analysis, and **Figure 1** shows the values of the means for student performance before and after the implementation of technology with formative assessments.

DISCUSSION

Table 1 shows the results of the exploratory factor analysis of the study tool (formative assessment). It is noted from the results of **Table 1** that all Eigenvalue values are greater than one. All KMO values are greater than 0.50 (Hair et al., 2010). All values of Bartlett's test of sphericity are statistically significant at the level of

statistical significance (α=0.05). Finally, all values of the factors are loaded on one factor and their values exceeded 0.40. The results of the exploratory factor analysis indicate that the study tool (formative assessment) has a high degree of construct validity.

Moving to **Table 2**, the results show that all Eigenvalue values are greater than one, and all KMO values were greater than 0.50 (Hair et al., 2010). All values of Bartlett's test of sphericity were statistically significant at the level of statistical significance (α=0.05). Finally, all values of the factors were loaded on one factor and their values exceeded 0.40. The results of the exploratory factor analysis indicate that the study tool (technology with formative assessment) has a high degree of construct validity. It is noted from **Table 3** that all values of reliability coefficients are high. The percentages are acceptable because they are higher than the permissible limit of 0.70 (Pallant, 2005). Thus, the study tool is suitable for the application to achieve the purposes of the study.

It is noted from **Table 6** that the mean values range between 4.11 and 4.49 with standard deviations between 0.41 and 0.70. The overall mean is 4.30 with a standard deviation of 0.16 and with a high degree of estimate. As could be noticed from the responses of the instructors in **Table 6**, which shows how importance they think formative assessments are. It shows that they all believe and are aware of the importance of such assessments. This is very important since formative assessments have just recently been introduced and used among instructors in higher education institutions. This takes us back to Yorke (2015) who states that formative assessment is not "well understood across higher education" (p. 477). As can be noticed from **Table 6**, Item 12, which states that "it enhances the student's self-assessment", ranks first with a mean of 4.49 and a standard deviation of 0.50 and with a high degree of appreciation. The item that ranks second in **Table 6**, which is item 5, is the one that states that "it helps identify the student's problems in acquiring certain skills") with a mean of 4.46 and a standard deviation of 0.56, and with a high degree of appreciation. On the other hand, Item 11, which states that "it enhances the student's use of rubrics", ranks last with a mean of 4.11 and a standard deviation of 0.41, and with a high degree of appreciation. Although the last point comes in the last rank, but still it has a high mean and a high degree of appreciation. The findings related to the first question resemble what Black and Wiliam (2009), Lancho et al. (2018), and Swan (2005) state. They all agree with the idea that formative assessment introduces and enhances the use of self- and peer-assessments. The item related to formative assessment that helps in identifying the student's problems in acquiring certain skills, resembles what Ozan and Kincal (2018) state in their experimental study.

Moving to the second question of the study, a t-test known as the paired sample t-test is used for two correlated samples. **Table 7** shows the results of the same items analysis that are given to the English literature course instructors before and after implementing technology with formative assessments. It is noted from **Table 7** that there are statistically significant differences (α=0.05) in favor of the post-performance after implementing technology with formative assessments where the mean was higher (4.20 with standard deviation of 0.41) compared to the pre-performance (1.33 with standard deviation of 0.21). **Figure 1** shows the values of the means for the student performance before and after the implementation of technology with formative assessments as mentioned before. The results of the study resemble the results of Beatty and Gerace (2009), Bhagat and Spector (2017), Burke et al. (2009), Dakka (2015), Irving (2015), Robertson et al. (2019), and others. The contribution of the current study lies in the fact that it tries to fill the gap from the previous studies that have been conducted on the use of technology with formative assessments in English language courses, and specifically in English literature courses in higher education institutions.

CONCLUSION

The use of the mean, standard deviation, item importance and importance level is used to answer the first question, and a t-test is used for two correlated samples to answer the second question. After reaching to the findings of the questions of the study with the use of the quantitative method, it could be noticed that the awareness of formative assessment in higher education, and especially among instructors of English literature, has increased and that they believe in the importance and benefits of assessing students for learning. Their application and implementation of formative assessments are enhanced with the use of technology. This appears in the results of the second question, when a test is done before and after these instructors have used technology with formative assessment.

Limitations

The results of the study are limited to the sample of the study, which consists of 50 English literature instructors from higher educational institutions.

Recommendations

1. More studies need to be conducted on strategies used in formative assessment in higher education English language courses.
2. More studies could be done on a larger sample.
3. More studies need to be conducted on strategies used in formative assessment in higher education English literature courses.
4. More studies need to be conducted on how to use technology with formative assessment in higher education English literature courses.
5. More studies need to be conducted on the use of specific technological applications with formative assessment in higher education English literature courses.
6. More studies need to be conducted to explore and identify the challenges that may face the instructors while using technology in formative assessments and provide solutions of how to overcome them.

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