

# Higher education student responses to the use of online assessments on biology material

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**Abstract:** The integration of technology into learning assessment activities makes it easy for educators to carry out online assessments which provide convenience for students and an effective assessment. The purpose of this research is to find out the response of students in the Biology Education Study Program towards online assessment platforms for Biology materials and learning. This typed of researched was quantitative descriptive used a surveyed method which had been carried out in the odd semester of 2021/2022 with the researched subjects being active students of Biology Education Study Program, Faculty of Teacher Training and Education, University of Muhammadiyah Malang, a total of 114 students. The data collection technique used a surveyed method used Google Form and the data was analyzed descriptively. The results of the studied showed that of the 5 assessment platforms used in the researched, Quizizz and Google Form platforms was the preferred assessment platforms by students. The results of this study indicate that in the future we need a product that can meet the needs of the assessment and according to the needs of the respondents. This product corresponds to the advantages and disadvantages of each online assessment platform. Thus, creating a more effective and efficient online assessment platform.

**Keywords:** assessment higher education; assessment strategy; biology assessment; e-assessment; online assessment platform

## Introduction

Assessment is one of the important things in the learning component that is used as an effort to improve the quality of education and is very important because it aims to determine the achievement of a lesson (Wiliam, 2017). Through assessment activities an educator can obtain information about the progress of student learning (Carless & Winstone, 2023; Martin *et al.*, 2019) and information on the effectiveness of ongoing learning (Guerrero-Roldán & Noguera, 2018; Martin *et al.*, 2019). In addition to being used to find out information on student learning progress, the results of the assessment are used to see the stage of child-development, child-development needs, data collection to obtain information from the assessment, achievement of learning objectives, student understanding, feedback and concluding by

the school (Elmore, 2019; Göksün & Gürsoy, 2019).

Generally, assessment activities are carried out in a traditional way, traditional assessments are also faced with several problems. Some of the problems in traditional assessments such as the easy leak of questions to students, assessments in the form of tests requiring more costs in printing exam papers, and feedback in traditional assessments taking longer. As the number of students in higher education institutions increases, logistics is also an issue. Online assessment can be an alternative to this (Appiah & Tonder, 2018).

Online assessments have several advantages for students and academic programs. First, the use of online assessments provides an opportunity for rapid, even immediate, feedback. The use of technology for assessment offers educators additional flexibility when providing feedback (Onge *et al.*, 2021). Tests conducted online can help students to check their learning progress and find out their mastery of the topics they have studied (Göksün & Gürsoy, 2019; Peculea & Peculea, 2020). In addition to students, through online assessments educators can manage the process of assessing learning outcomes, assigning assignments, assignment deadlines, attendance and student data. The online assessment application supports educators and students in the assessment process which can be accessed anytime and anywhere (Andhani *et al.*, 2022; Loureiro & Gomes, 2023). Educators can use applications that are connected to the internet network to carry out assessments (Durrani *et al.*, 2022). Assessment activities can take the form of quizzes, online tests, individual assignments, or online assessment forms that utilize the internet. Although online assessment can be an alternative, not all types of assessment can be easily applied to online platforms. Assessment tasks that involve essay-type questions are a challenge for automated assessment systems. So as educators must know the characteristics of each platform in conducting online assessments (Miranda *et al.*, 2019).

Each assessment platform used by the teacher is selected based on certain considerations, one of which is in terms of convenience. Research result Joshi *et al.* (2021) teaching staff still experience various difficulties when carrying out online assessments, finding appropriate platforms and correcting student test results or assignments. The combination of using online platforms for the assessment process has also not been carried out much (Situmorang *et al.*, 2021). In addition, the implementation of assessments for students during the pandemic could not be carried out properly, constraints occurred due to time constraints, obstacles from the students themselves, and facilities (Mangundu, 2022)

The online assessment process in learning activities can be carried out using an assessment tool that has been built that is integrated into the Learning Management System (LMS) or using a separate assessment tool (Tang *et al.*, 2022). There are several popular web 2.0 applications that are used to teach and conduct assessments in learning activities such as Kahoot, Quizlet, Edupuzzle and Quizizz (Munuyandi *et al.*, 2021; Sinta *et al.*, 2019). Research results by Peculea and Peculea (2020) shows that platforms that can be used for online assessment include Clickers, Kahoot, Socrative, Quiz Sockets, Plickers, Recap, Ombea, Top Hat, Votapedia and Poll Everywhere. While Tang *et al.* (2022) said that Moodle can be used for summative and formative assessments, such as Google Forms, Quizizz, Menmeter, Powtoon, or Kahoot. Other assessment platforms that can be used, such as Google Form, Kahoot, Quizizz, Konten, Microsoft Teams, Moodle, Schoology, and Voxopop (Aswir *et al.*, 2020; Ramadhani *et al.*, 2020).

The integration of technology into learning assessment activities makes it easy for educators to carry out assessments on an ongoing basis and helps various agencies, schools and ministries to describe the quality of the learning carried out (Ramadhani *et al.*, 2020). Results of previous research by Joshi *et al.* (2021) the application of online assessment is one of the barriers faced by teachers when carrying out online learning. The type of platform to be used must be carefully considered, this is directly related to the condition of the students. According to Al-Hattami (2020) the use of online assessments carried out by educators must be adapted to the conditions of the students at that time, especially when this assessment activity is related to internet technology. In general, there are various kinds of online assessment platforms and students need to be trained so that they are familiar with the e-assessment used.

The impact of the COVID-19 pandemic on the field of education is felt, especially the need for the presence of technology in the field of learning evaluation. The assessment is not enough to be done offline considering that lectures have and can be done online. Even a combination of online and offline, known as blended learning, is starting to bloom. This shows that there is a need to prepare assessments offline and online. The fact is that online assessment has not been carried out according to the needs of learning. Research conducted by Çetin (2018) the implementation of Kahoot as a means of assessing elementary school students shows that Kahoot Students responded that the platform was fun and easy to use. Apart from Kahoot, research conducted by Darmawan *et al.* (2020) using Quizizz as an assessment platform shows positive results from students because this platform includes a platform that is easy to present and the teacher or lecturer can easily analyze the detailed results of answers in carrying out assessments. Apart from Kahoot & Quizizz, the Google Form can be used as an interactive self-assessment rubric (Baldwin *et al.*, 2018). Several previous studies regarding the use of assessment platforms have been carried out, but the use of platforms generally only uses one platform in research activities. There is still minimal research regarding the combination of several online assessment

platforms in one research activity or using more than 1 course or subject. This fact is in line with the recommendations in the research [Prieto et al. \(2019\)](#) further study is needed in the use of online assessment platforms to see comparisons of the Kahoot platform with other platforms or can be used between courses or fields of study. Similar research recommendations by [Neureiter et al. \(2020\)](#) further evaluation is needed in the use of the Kahoot platform as an online assessment platform in other fields of study or not only in one field of study. In line with [Hikmah et al. \(2021\)](#) It is hoped that there will be further studies that examine online assessment with the Quizizz platform other than physics subjects. Based on observations in the Biology Education Study Program at Muhammadiyah University, the assessment was carried out authentically using various types of assessment, both tests and non-tests. However, relatively few online assessments, are not widely used, online assessments that are often used are the Google Form platform which is relatively easy to use and easy to set up. Therefore, assessment innovation needs to be carried out given the rapid changes in educational technology and the challenges that are getting bigger and more complex. Likewise, it is also necessary to study student responses to online assessments as information material for the development of online assessments in subsequent assessment programs, so that assessments can be carried out in a modern way by utilizing technology other than conventional assessments. This survey research aims to describe the actual field conditions, namely to describe the use of assessment on Biology material in plant anatomy, plant physiology, plant morphology, microbiology, learning evaluation, and reproduction and embryology courses through student responses on each online assessment platform available. The results of this study can be used as benchmarks for future assessment platforms that are by the characteristics of students so that they can support online assessment activities.

## Method

This researched used descriptive quantitative researched with surveyed methods. Quantitative researched was researched that aims to describe the universal truth of a variable or phenomenon. While the surveyed method was a quantitative researched method used to obtain data that occurred in the past or present, regarding beliefs, opinions, characteristics, and behavior of variable relationships and to test several hypotheses about variables and researched results that tended have been generated ([Sugiyono, 2018](#)). The researched was carried out in the odd semester of 2021/2022 at the Biology Education Study Program, Faculty of Teacher Training and Education, University of Muhammadiyah Malang.

The subjects of this studied was active students of the Biology Education Study Program, Faculty of Teacher Training and Education who was registered at the Academic Administration Bureau of the University of Muhammadiyah Malang in the odd semester of the 2021/2022 academic year as many as 114 students.

The data collection technique in this studied was carried out used the surveyed method, namely the used of online questionnaires used Google Forms as a platform for filling out questionnaires. The student response questionnaire was divided into five main aspects ([Table 1](#)) regarding the use of online assessment platforms, namely Google Form, Kahoot, Konten, Quizizz, and Quiz Creator ([Table 2](#)). Questionnaires was given to students via the Google Form link in the WhatsApp group

Table 1. Aspects of the research questionnaire

No	Aspects
1	Write down what are the advantages of working on questions using this program (Google Form, Kahoot, Konten, Quizizz, and Quiz Creator)?
2	Explain what are the weaknesses of working on questions using this program (Google Form, Kahoot, Konten, Quizizz, and Quiz Creator)?
3	If working on questions or assignments using this program, what are your suggestions for using the program (Google Form, Kahoot, Konten, Quizizz, and Quiz Creator) to be more effective?
4	If using this program (Google Form, Kahoot, Konten, Quizizz, and Quiz Creator)? does it allow test takers to cheat?
5	In your opinion, do online assessments use this platform (Google Form, Kahoot, Konten, Quizizz, and Quiz Creator)?

Measuring methods questionnaires are designed to collect the required information from respondents for research purposes. For measuring the questionnaire scale, questions were made by adopting a Likert scale of 5 points ([Table 3](#)). According to [Sugiyono \(2018\)](#) that the Likert scale is used as a tool to measure attitudes, opinions, and perceptions of individuals or groups of people toward social phenomena. The measurement results with a Likert scale will be presented in the form of pie charts and bars to determine the percentage of assessment criteria given by respondents and described in a narrative form.

**Table 2. Types of online assessment platforms**

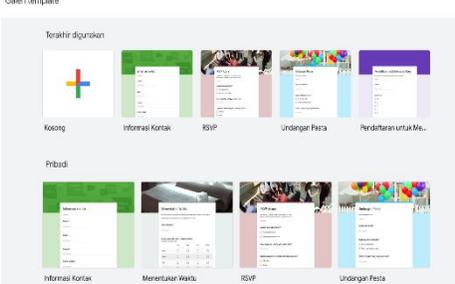
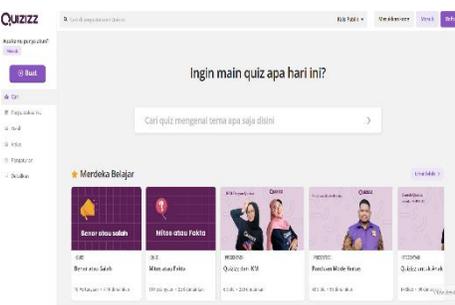
No	Assessment Platform Name	Display of the Online Assessment Platform	Link
1	Google Form		<a href="https://docs.google.com/forms/u/0/?fv=1&amp;folder=1yVhr6cFKM2K7KiF00wZEaY2sFdWI5pjE">https://docs.google.com/forms/u/0/?fv=1&amp;folder=1yVhr6cFKM2K7KiF00wZEaY2sFdWI5pjE</a>
2	Kahoot		<a href="https://Kahoot.com/schools-u/">https://Kahoot.com/schools-u/</a>
3	Konten (fryrebox)		<a href="https://www.fyrebox.com/id">https://www.fyrebox.com/id</a>
4	Quizizz		<a href="https://quizizz.com/?lng=id">https://quizizz.com/?lng=id</a>
5	Quiz creator		<a href="https://www.onlinequizcreator.com/">https://www.onlinequizcreator.com/</a>

Table 1. Likert scale assessment criteria

Assessment criteria	Assessment scale
Strongly dislike	1
Dislike	2
Enough like	3
Like	4
Strongly like	5

## Results and Discussion

E-assessment or online assessment can be defined as the use of computers as part of any activity related to assessment and has become a common practice in the higher education sector, in the 21st century (Rolim & Isaias, 2018; Suleiman *et al.*, 2020). Online assessment is an assessment procedure that is carried out from start to finish by involving electronic devices (Alruwais *et al.*, 2018). Online assessment can be presented in two forms, namely web-based delivery and download delivery. Web-based delivery is an assessment that utilizes the internet to access assignments used for assessment. Meanwhile, sending downloads means that assignments or tests used for assessment are downloaded according to a predetermined date or time and released when students arrive to carry out the assessment (Appiah & Tonder, 2018).

### Student response to the Quizizz assessment platform

Quizizz game is a game-based educational application as a learning medium that is integrated with material or evaluation questions to make learning more interesting and fun (Degirmenci, 2021; Namara & Murphy, 2017; Zhao, 2019). The results of research on student responses to the use of Quizizz platform as an assessment tool in biology learning showed that 5% liked it, 43% liked it, 41% quite liked it and 11% didn't like the use of Quizizz as an assessment platform (Figure 1). The majority of students who filled out the questionnaire stated that students quite liked and liked using Quizizz assessment platform. The results of the questionnaire show that the majority of students like and quite like the use of the Quizizz platform as a means of assessment by lecturers. The use of the Quizizz platform on postgraduate students provides quite positive, motivational, and competitive feedback. Apart from that, this application has an attractive appearance such as the use of avatars, leaderboards, and funny memes which are one of the special characteristics of this platform (Mohamad, 2020). In line with this the results of research by Handoko *et al.* (2021) regarding the use of Quizizz games in learning to increase students' intrinsic and extrinsic motivation. This improvement has to do with elements or menus that vary in the use of the Quizizz game. Apart from the aesthetic value of this platform, research results show that by using Quizizz students can self-evaluate through answers that are less wrong (Zuhriyah & Pratolo, 2020). According to Cohen and Sasson (2016) students get a better learning experience through online assessment applications, because they can compete with their classmates. Students can find out their place among other players in the ranking list in real time. In line Permana and Permatawati (2020) Quizizz can foster student interest and participation in learning and Quizizz is very suitable to be used as a formative test tool as teachers can download test reports and evaluate student performance after running Quizizz. Apart from students, using the Quizizz platform as an evaluation platform makes it easier for lecturers to monitor the process and download reports when quizzes are finished to evaluate student performance (Zhao, 2019).

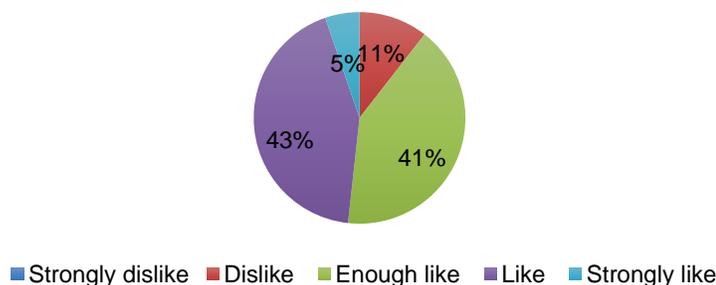


Figure 1. Student response to the Quizizz assessment platform

The results of the study showed that there were several problems faced by students in working on questions through Quizizz. Students feel that using the platform is more suitable for use via a laptop or computer and the use of this platform through mobile phones makes the menus displayed on this platform quite limited. In addition, the use of this platform is very dependent on the network which must be stable.

This is in line with the statement that the use of Quizizz is very dependent on a good internet network (Zuhriyah & Pratolo, 2020). Therefore, a weak internet connection will be a problem for students in solving the questions or quizzes that are presented.

### Student response to the Google Form assessment platform

Google Form is an application in the form of a form template or worksheet that can be used independently or together for the purpose of obtaining user information through questionnaires and registration (Iqbal *et al.*, 2018; Nurmahmudah & Nuryuniarti, 2020). The results of research on student responses to the use of the Google Form platform as an assessment tool in biology learning showed that 21% really liked, 60% liked, 10% quite liked and 9% did not like the use of Google Form as an assessment platform (Figure 2). These results indicate that students respond well to the use of this assessment platform. This is in line with the results of the study Alharbi *et al.* (2021) that Google Form is a suitable platform for making online assessment. Through the Google Form, everyone can provide responses or answers to quizzes quickly wherever they are by using a computer or cellphone internet application. The Google Form provides facilities in the form of answers/responses that can be saved as spreadsheets and are useful for anonymous formative or summative assessment materials. In addition, the Google Form can be integrated with a learning platform so that students can use it easily in filling out quizzes. In using the Google Form, students can easily find out the results of completing the quiz and allow educators to overcome any problems related to the material being tested (Serrano *et al.*, 2019).

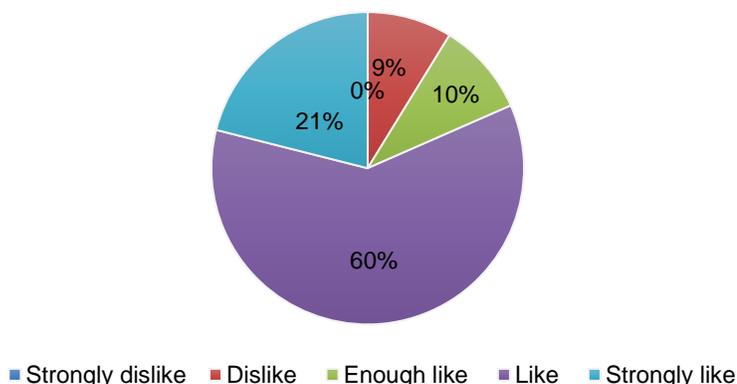


Figure 2. Student response to the Google Form assessment platform

Apart from the positive responses given by students, students who filled out the questionnaire wrote that the google assessment platform was a platform that was well-known and easy for students to use. The ease of using the Google Form is included in the menus presented in the Google Form, one of which is in the activity of working on questions or quizzes. The results of research conducted by Latip and Sutantri (2021) shows that Google Forms as a platform for online assessment activities because this platform is common and easy to use for teachers and students, so teachers and students have no difficulty in utilizing Google Forms. Google Form is also a lightweight platform and doesn't make cellphones or laptops heavy so teachers and students don't experience many technical problems. The advantages of this Google Form are that there are various templates for making quizzes, can use various types of tests that are made according to the wishes of the teacher (short answer, essay, checkbox, dropdown, linear scale, and multiple choice), adding videos and also pictures, as well as the results of responses from students can be directly stored automatically (Abdurumman, 2021). The data obtained from the Google Form is displayed in detail and makes it easier for the teacher to make an assessment. Apart from teachers, the Google Form also helps students to monitor independent progress in the learning process by knowing their average score after taking the quizzes given (Scheef & Johnson, 2017).

In addition to the advantages and positive responses, students wrote down the weaknesses and shortcomings of this assessment platform in the questionnaires that were distributed. The results of the study show that the problem with using this platform lies in the monotonous Google Form design and the high level of cheating in using this assessment platform. The results of the study show that the use of google still has limitations such as non-varied designs, limited export options, cannot be used for discussion and it is difficult to enter certain symbols (Ngafifah, 2020).

### Student response to the Kahoot assessment platform

Kahoot is a web quiz that is quite popular and can be developed as a means of presenting quizzes in a game-show format (Aswir *et al.*, 2020; Sartini, 2020). The results of research on student responses to the use of the Kahoot platform as an assessment tool in biology learning showed that 7% really liked,

23% liked, 50% quite liked, 18% didn't like and 2% really didn't like the use of Kahoot as an assessment tool (Figure 3). This result is in line with the results of the study Tan *et al.* (2018) Kahoot is able to facilitate teachers along with students in classroom settings to interact through competitive knowledge games using existing infrastructure. In addition, Kahoot is not only used in teaching, making quizzes, discussions and surveys in an interesting way. In education, Kahoot can be used in the classroom to make learning more interesting and fun. In this case the teacher can take advantage of technology that is developing in the 4.0 revolution era (Asniza *et al.*, 2021). In using Kahoot media, you need to prepare an LCD, projector, mobile phone, and a strong internet connection.

Game-based learning provides a sensation that is not present in traditional teaching and everyday life. The use of game-based assessment can provide instant feedback to students. This feedback includes scores, awards, rankings, and game prizes that encourage students to be involved in the learning environment so that students can achieve targets (Göksün & Gürsoy, 2019). Kahoot allows students to enjoy and continue doing the tasks they are doing. Kahoot enables educators to be creative and students motivated, intrinsically and extrinsically (Tan *et al.*, 2018). In addition, the Kahoot device can include media in the form of images or videos in quizzes which are designed to add variety to quizzes for students and stimulate quiz participants to play an active role (Aswir *et al.*, 2020). Research conducted by Chaiyo and Nokham (2017) Kahoot provides tools for creating quizzes including adding images and youtube videos to questions.

The use of this platform also provides a challenge for students, besides being less familiar with this platform, it is also heavily influenced by the existence of the internet network. In line with the results of the study students also assessed the level of difficulty in covering difficulty in reaching the website, problems regarding internet connection, difficulty reading the board, difficulty in choosing answers, and application termination due to connection timeout (Çetin, 2018). The Kahoot platform has weaknesses, including the need for supporting devices such as projectors and laptops to present quiz questions in front of the class. In addition, the use of real-time quizzes requires a stable internet connection so you don't experience problems when used. In addition, the accuracy and high speed of the quiz participants in answering questions are also a very significant factor (Aswir *et al.*, 2020).

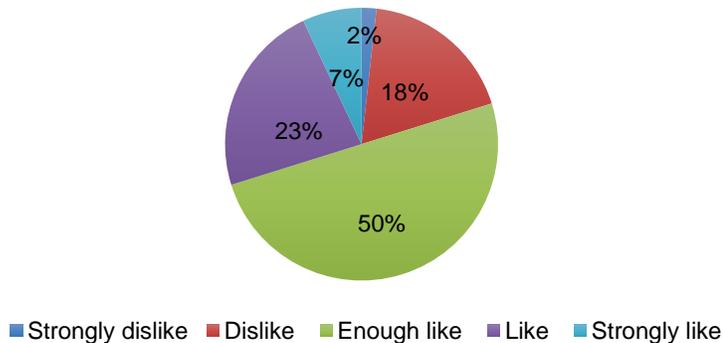


Figure 3. Student response to the Kahoot assessment platform

### Student response to the Konten assessment platform

Konten or Fyrebox is a web quiz that can be used to make quizzes easily. This web quiz can present quizzes in the form of multiple choice one correct answer, multiple choice several correct answers, essay questions, short yes/no questions, and scenario quizzes. Through this web quiz, users such as teachers, lecturers, or students can change the font, change the web quiz design to make it more attractive, add image Quizzes (only for paid users), display the score at the end of the quiz and add an explanation of each question. Through this web quiz students can work on their quiz independently in their respective places. The results of research on student responses to the use of Konten platforms as an assessment tool in biology learning showed that 1% liked, 17% liked, 36% quite liked, 38% didn't like and 8% didn't like the use of Konten as an assessment tool (Figure 4).

The results of the study show the characteristics of Konten as an assessment platform, namely 1) web quizzes include free web quizzes, but to improve web quizzes performance users must subscribe; 2) web quizzes can be in the form of multiple choice questions with one correct answer, multiple choice with two correct answers, essay questions, yes/no quizzes, scenario quizzes, 3) multiple choice questions with only 4 choices; 4) the appearance of the quiz game can be changed according to the template that was scanned; 5) the use of words in quizzes for both questions and answers is limited, making it a bit difficult for the user if the questions or answers are long enough; 6) users can add discussions and scores after working on the questions; 7) to add pictures on the quiz must change to a paid account.

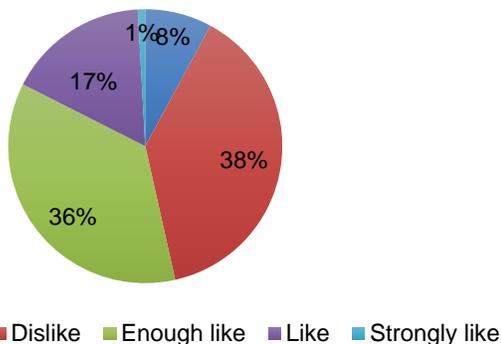


Figure 4. Student response to the Konten assessment platform

### Student response to the Quiz Creator assessment platform

Quiz Creator online exam builder is a web quiz that can be used to create quizzes for online assessment activities. Quiz on this web quiz can be in the form of essay questions, multiple choice, fill-in-the-blanks, images, video, and audio. The results of the study regarding student responses to using quiz creator platform as an assessment tool in biology learning showed that 6% liked, 18% liked, 58% quite liked, 25% didn't like and 6% didn't like the use of quiz creator as an assessment tool (Figure 5). The use of quiz creator in learning will help teachers in compiling questions and this quiz provides interesting features so that students are not monotonous in doing quizzes (Purnanto & Mahardika, 2017). Despite the results showing a positive response to this platform, the percentage of dislikes for this platform is quite high. The results of the study show that this quiz platform is still not widely used, so students are still not familiar with using this platform and this platform is considered complicated by students.

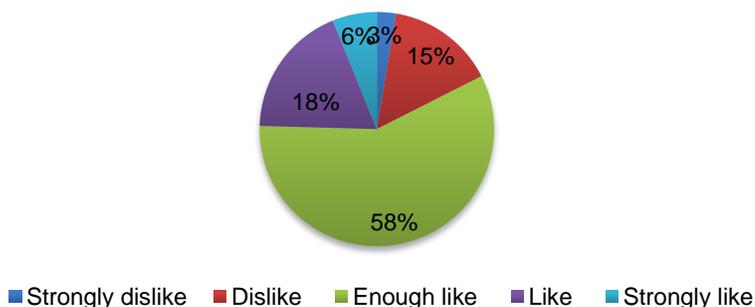


Figure 5. Student response to the Quiz Creator assessment platform

Regardless of the COVID-19 pandemic that has passed and learned that has returned to offline learning, the integration of technology into learning remains a necessity in today's era (Goh & Sandars, 2020). Online learning assessment activities make it easy for educators to carry out assessments on an ongoing basis and help various agencies, schools and ministries to describe the quality of learning carried out (Ramadhani *et al.*, 2020). In line with the research results summarized in Figure 6. students gave a positive response to the use of an online assessment platform. Broadly speaking, the survey results in Figure 6 show that of the 5 online assessment platforms, the Quizizz and Google Form platforms are the assessment platforms most interested in by students with quite high responses, quite like, like, and really like. The platforms with the least number of enthusiasts are Konten and Kahoot. The tendency of students to choose this platform is adjusted to the characteristics and convenience of each platform. In addition, each assessment platform has different characteristics and is adjusted according to the needs of the assessment in class (Bicen & Kocakoyun, 2018). This is in line with opinion Buckley & Doyle (2016) that educators are required to design various types of learning, one of which is assessment. In compiling assessments, including online assessments, educators must ensure that nothing is harmed in the online assessment mechanism, either students or teachers.

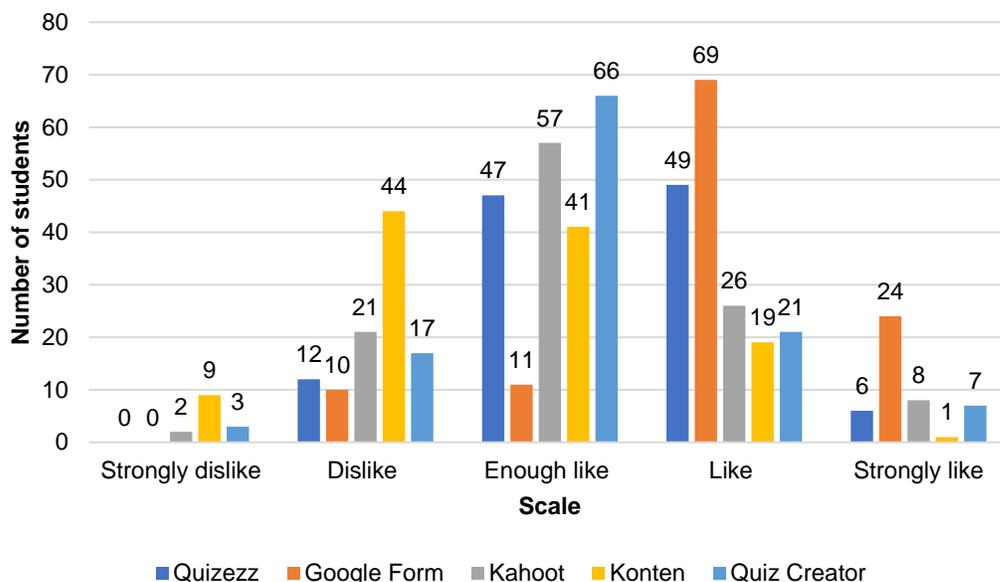


Figure 1. Student interest in online assessment platforms

The results of this study provide quite meaningful results regarding the use of online assessment platforms in biology education lectures. However, this study has limitations that can be explored further in future studies. First, this study involved 104 students as respondents from a university in Malang. So that for further research, you can consider involving more respondents in Malang City, so that the results can be generalized more broadly. Both of these studies explore student suggestions or input on the use of each platform, but in-depth information is needed regarding the use of each platform with views from various aspects. In addition, the results of this study can be used as a consideration for realizing a product that can meet the wants and needs of an assessment that fulfils the advantages of each online assessment platform.

## Conclusion

The results showed that students gave positive responses to the use of online assessment platforms. Of the 5 assessment platforms used in the study, namely Google Form, Kahoot, Konten, Quizizz, and quiz creator. Quizizz and Google Form platforms are the assessment platforms preferred by students. The platforms I really disliked were Konten assessment platforms and Kahoot. Students have a good response with each online assessment platform adjusted to the ease of use of the platform by students and vice versa.

Furthermore, the research results can be used by future researchers to develop platforms for more effective and efficient online assessments. In addition, the research results can be used by educators to enrich sources regarding online assessment platforms.

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## Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper.

## Author Contributions

**Y. Pantiwati:** Conceptualization; supervision; Writing – original draft; Writing – review and editing. **T. N. I. Sari:** Design; Writing – original draft. **R. F. Aldya:** Data analysis. **A. S. Arifin:** Writing – review and editing.

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