

# Perception towards Electronic Exam Question Bank Record Keeping System

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**Abstract—** *Electronic Exam Questions Bank Record Keeping System (E-Exam Questions Bank Record Keeping System) is a web-based system with security features such as authentication. This system could be used by lecturers or teachers in any institution or school to produce or write standard questions with answer schemes and then save them into a question bank or database for future references, like writing final exam questions, quizzes, tutorials, and others. This system allows registered users to view existing questions by course, create new questions with answer schemes, update existing questions and answers, remove unused questions and answers, search questions by specific keyword, print selected questions into printed format (pdf files) and give feedback or comments to this system for improvement. The main objective of this research is to get perceptions from the users regarding the usage of the E-Exam Questions Bank Record Keeping System. A quantitative method, that is, the questionnaire used as a research method to know user perceptions when using this system. Google form questionnaires link shared to 15 respondents to collect data from the respondents regarding their perceptions when using the system. The respondents are consists of polytechnic lecturers and teachers from Kuching and Mukah in Sarawak, Sabah, and Peninsular Malaysia which are from Johor, Negeri Sembilan, and Melaka. The findings show positive feedback from the respondents where the targeted users such as educators can easily access exam questions bank record keeping through an online web-based system when creating exam questions and assessments. The result shows that the E-Exam Record Keeping System can ease the burden faced by educators when creating exam questions.*

**Keywords:** Assessment system, Automatic evaluation, a Question bank, Course outcome.

## I. INTRODUCTION

The Electronic Examination Question Bank Record Keeping System is a web-based system with security features such as authentication. It could be used by lecturers or teachers from any institution or school to produce or write questions or answer schemes and then stored in the database question bank that could be used as a reference in the future such as for writing final exam questions, quizzes, tutorials, and so on. This system also allows users to view existing questions according to the course or subject being taught, create new questions and answer schemes, update existing questions and answer schemes, delete questions and answers that are no longer used, search for questions from specific keywords and print selected questions into pdf form. Besides, users can also give feedback and comments on this system for improvement. The objective of this research is to see user perception towards the usage of the Electronic Examination Question Bank Record Keeping System and whether it can ease the burden faced by educators when creating exam questions.

## II. LITERATURE REVIEW

Before developing this system, research has been done by doing a literature review by reviewing a few papers. Some literature also highlights the importance of developing electronic questions bank record-keeping systems in education sectors. Referring the problems, that occur when

keeping records in hardcopy form where hardcopy documents easily get lost when the records are kept manually are also mentioned in the following literature. The importance of electronic record-keeping systems based on cloud repositories was pointed out by Millican in her 2020 study on universities in northwest Syria. Also given their accessibility from remote locations, Higher Education (HE) documents are retrieved by the students during times of conflict and forced displacement, facilitating HE 'transition' where hardcopies verifying completion of study have been lost [6].

Other studies also highlight the importance of Electronic Record Management Systems (ERMS) in contributing to an institution's competence, the evaluation of its performance, and, ultimately, its effectiveness [7]. The following literature also mentioned limited data storage when keeping records manually. ERMS also help to reduce storage space and data volume, secure online offsite archiving and rapid retrieval was offered, as well as an online backup, given the vulnerabilities of hardcopy systems in crises, making them generally more reliable [7]. An existing electronic record-keeping system has been found in the literature but is only limited to scanning hardcopy into PDF form and saving it on a computer.

The literature mentioned is as follows. At the time of the study, electronic systems were still limited to the scanning of hardcopy documents printed out to allow for official university stamps and signatures, which were then, saved as PDFs on local computers within relevant administrative

departments. Besides, some literature also emphasizes on now we are heading towards a centralized digitized record-keeping system where it can overcome a huge amount of data but some education institutions still do not follow it. The paper review is as a following. Education sectors across the world moving towards centralized digitized data management systems to allow them to deal effectively and efficiently with generating large quantities of data, such as providing rapid access to data to facilitate well-informed decision-making, and overcoming the limitations of traditional record management methods [4]. Universities in northern Syria did not follow the same way [2]. Here comes an E-Exam Questions Bank Record-Keeping System to overcome these problems.

### **III. METHODOLOGY**

#### **3.1 Questionnaires (Quantitative)**

This study used a quantitative method, that is, a questionnaire as its research method to survey to know users' perceptions after developing E-Exam Questions Bank Record Keeping System. The respondents consist of Malaysia Polytechnic Lecturers and teachers. The questionnaires were distributed to the respondents after the system was developed and implemented. The questionnaires which comprised 10 questions mainly focusing on perceptions of the E-Exam Questions Bank Record Keeping System were distributed to 15 respondents including lecturers from Malaysia Polytechnic and school teachers who taught in various fields.

The sample size of this study is 15 which includes 15 respondents consisting of all educators in Malaysia. The research instrument used in this study surveys. The questionnaire was adopted from a research paper entitled Electronic Polytechnic Kuching Sarawak (PKS) Clinic Health Record And Its Importance. This paper was presented by Z.Nuredzan during the 10th Annual Symposium of the International Network for Postgraduate Students in the area of ICT4D (IPID), held on the 15th of May, 2015 at Nanyang Technological University, Singapore. However, the questionnaires have been modified appropriately to the system development title E-Exam Questions Bank Record Keeping System.

The questionnaires were distributed by sharing a google form link and the results can be collected immediately after the respondents filled in the questionnaires through a google form. After collecting the questionnaires then the data were automatically analyzed with google sheets. These surveys were carried out after the system was developed and has been implemented. Unified Modeling Language (UML) was chosen as a methodology to develop the system. To forge a common, semantically and syntactically rich visual modeling language for the architecture, design and implementation of complex software systems both structurally and behaviorally, Unified Modeling Language (UML) was created [3].

### **IV. RESULT AND DISCUSSION**

This section shows the results of the study including the demographics of respondents and views on the E-Exam Questions Bank Record Keeping System. The results show that most of the respondents who are the polytechnic lecturers and teachers agreed that E-Exam Questions Bank Record Keeping System could ease the burden faced by the educators when creating exam questions. There have also been several innovations aimed at the level of construction of evaluation questions electronically or through the website.

First is Test Questions Bank System, management software that integrates examination questions management and generates test papers [1]. Secondly is Adaptive Question Bank and Question Paper Generation Management System where the system uses C#.NET for user interface design. SQL server 2017 as database storage, SAP crystal report 2016 used as a question paper generation and the system consists of four modules namely administrator and login module, question input module, question retrieval module, and evaluation module [5]. Thirdly is Expert Automated Question Paper Generation System (ExpertQGen), a web-based application using Eclipse IDE, HTML, CSS, JavaScript, JSP, Bootstrap framework, SQL as a database, Apache Tomcat as a server application, and the back-end code written in Java Servlets [10].

This application consists of three modules namely, upload questions (create question repository), view question repository, and generate question paper [10].

The participants of the survey also expressed concerns about the existing manual paper-based system such as lack of storage space, prone to damage, inefficient document transportation, editing problems, limited collaboration, time-consuming, and bias [10].

Due to these constraints then come out many other innovations towards the development of online assessment questions including the development of the E-Exam Questions Bank Record Keeping System as discussed in this research paper. The system consists of the login page for registered users, course categories page, create new questions/answers page, search questions, list of saving questions page, and view questions in PDF format. This system also uses web-based technologies such as PHP as a scripting language, My SQL as a database, and Bootstrap open source web user interface. Within a Bootstrap template, working programs of Javascript and Cascading Style Sheets (CSS) are attached, to provide responsive and interactive user interfaces for dynamic web pages of the E-Exam Question Bank Record Keeping System.

#### **4.1 Demographic of respondents**

This section shows the results of the study including the demographics of respondents and the user perceptions of the E-Exam Questions Bank Record Keeping System. Results indicate that most of the respondents consist of the Malaysia

Polytechnic Lecturers and teachers who agreed that the system gives advantages to educators such as lecturers and teachers in creating and keeping assessment questions and answers.

1) Gender  
15 responses

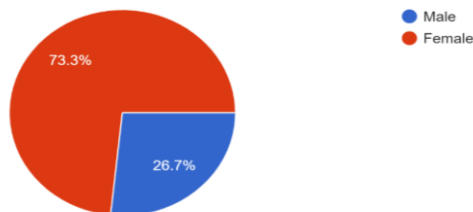


Figure 1 Respondents' gender

Figure 1 shows the percentage of respondents gender who involve in this survey where 26.7% is male while 73.3% are female. The result shows that female-dominated males in this survey.

2) Age  
15 responses

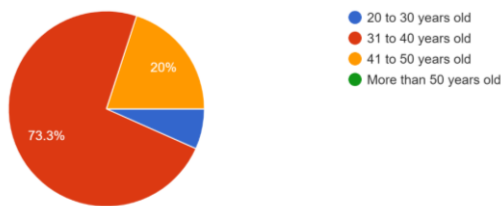


Figure 2 Respondents Age

Figure 2 shows the percentage of respondents' age who participate in this survey. From the survey, 6.7% of respondents were aged between 20 to 30 years old, 73.3% of respondents aged 31 to 40 years old, and 20% of respondents aged between 41 to 50 years old. Different generations of educators and senior educators show comprehensive and rich data made from the variety of age distribution is significant to the findings of this study [9].

3) Job status  
15 responses

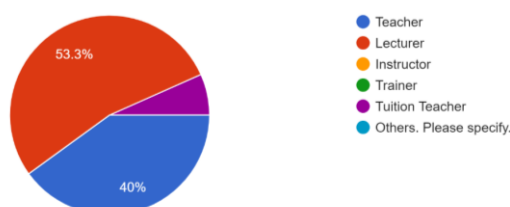


Figure 3 Job Status

For the percentage of respondents' job status, as shown in Figure 3, 40% of the respondents work as a teacher, 53.3% work as polytechnic lecturers and 6.7% of respondents are working as tuition teachers. All respondents although their

job statuses are different, but all of them, are educators and all of them involve in creating questions and assessments for their students. Various work backgrounds as educators prove that this system is suitably used by any educators who work in the education system.

4) Duration of teaching experience  
15 responses

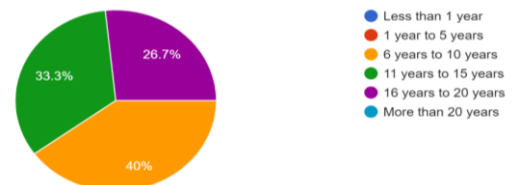
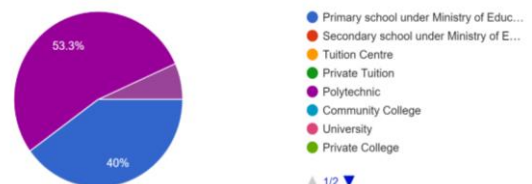


Figure 4 Duration of Teaching Experience

For the duration of teaching experiences, 26.7% of respondents had 16 years to 20 years of teaching experience, 33.3% of respondents had 11 to 15 years of teaching experience and 40% of respondents had six to 10 years of teaching experience. It shows that all the respondents have been teaching for more than 10 years and they had a long time of experience in creating questions assessment for their students. This is also supported by other literature that views of rich experience from respondents would enrich the findings of the study [9].

5) Current job place  
15 responses



5) Current job place  
15 responses

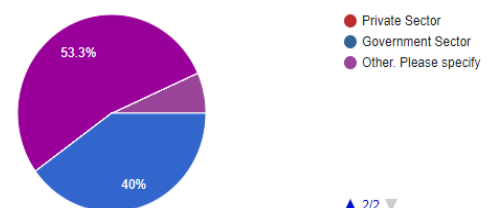


Figure 5 Current Job Place

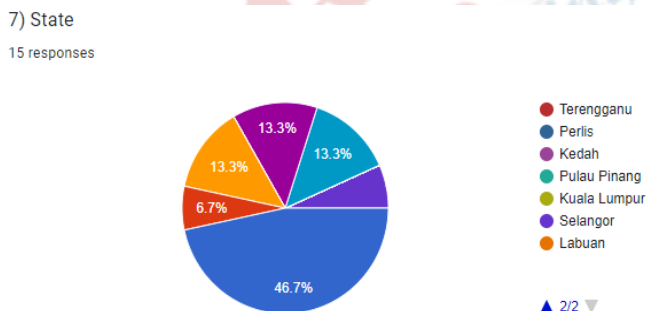
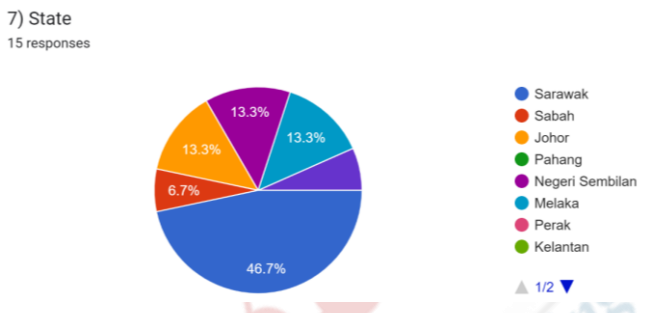
Figure 5 shows the percentage of the respondent's current job place who participate in this survey. 53.3% of the respondents are Malaysia Polytechnic Lecturers, 40% of the respondents are Ministry of Education Primary School teachers and 6.7% of respondents are from other sectors. The results show that any instructors who work at any institution in Malaysia can use this system. Respondents' current job places in various educational institutions from all around Malaysia strengthen the findings of this study.





**Figure 6** Name of Institutions

The respondents who participate in this survey were two of them from Politeknik Tun Syed Nasir (PTSN), two respondents were from Politeknik Kuching Sarawak, two respondents from Politeknik Merlimau, one respondent from Politeknik Mukah Sarawak, one respondent from Sekolah Jenis Kebangsaan Cina (SJKC) Chi Hwa, Seremban, one from SJKC Tung Hua Seremban, two respondents from Primary School Simunjan, Sarawak and one respondent work at Cyberjaya Selangor Primary School. Other respondents did not mentioned their name of institutions. Figure 6 shows the name of institutions where respondents were working at. This result shows that the involvement of respondents from various educational institutions across the country further strengthens the findings of this study and shows that this system is suitable for use by any educational institution across the country.



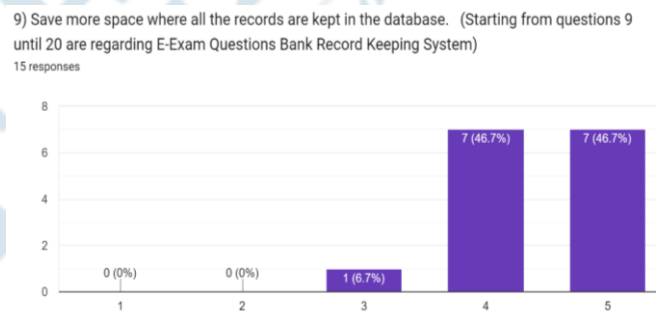
**Figure 7** State

Figure 7 shows the percentage of states where the respondents work. 46.7% of the respondents are working at Sarawak, 6.7% are working at Sabah, 13.3% are working at Johor, 13.3% are working at Negeri Sembilan, 13.3% work at Melaka, and 6.7% work at Selangor. Based on this result, shows that the respondents are coming from all around

Malaysia including educators from Peninsular Malaysia and Borneo. The involvement of respondents from various states across the country further supports the validity of the study's findings.

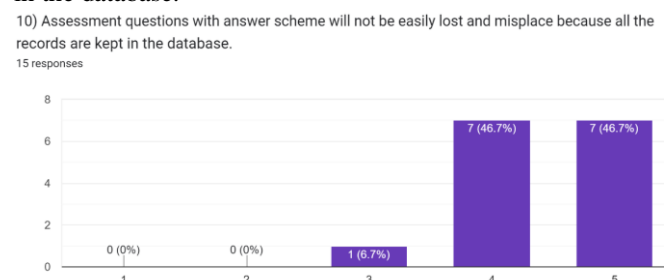
#### 4.1 Perceptions toward the system

After developing E-Exam Questions Bank Record Keeping System, a survey has been done by distributing questionnaires through a link of google form to respondents to know their perceptions regarding the system. All the questions are measured on a scale from 1 (unlikely) to 5 (extremely likely). Figure 8 shows the number of respondents and percentage of respondents according to their responses regarding using E-Exam Questions Bank Record Keeping System can save more space where all the records are kept in the database. The result shows that 46.7% of the respondents strongly agreed by answering extremely likely (5), 46.7% of the respondents also agreed by giving a scale of 4 and 6.7% choose a scale of 3 which was in the middle between agree and disagree. Based on the result, shows that all the respondents agreed that the system could save more space where all the records are kept in the database.



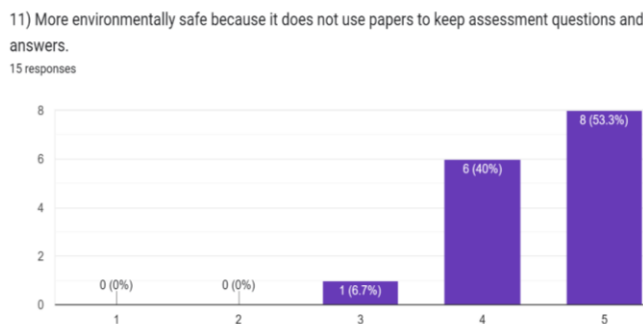
**Figure 8** Save more space

Figure 9 shows the percentage of respondents' perception of assessment questions with an answer scheme that will not be easily lost and misplaced because all the records are kept in the database. Results from the survey show that 46.7% of respondents strongly agreed by answering extremely likely (5), 46.7% of the respondents also agreed by giving a scale of 4, and 6.7% of respondents choose scale 3 which was in the middle between strongly agree and disagree. From the results, it shows that all the respondents agreed that the system could save more space where all the records are kept in the database.



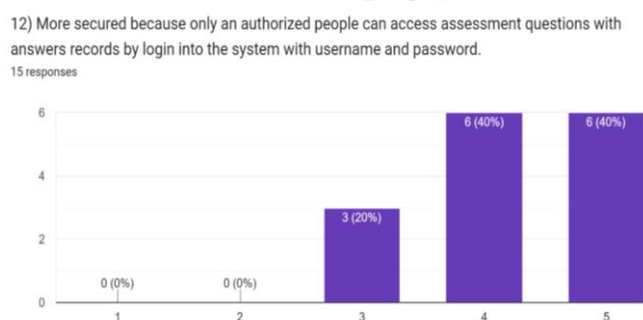
**Figure 9** Assessment not easily lost or misplaced

The next question is about whether using this system, is more environmentally safe because it does not use papers to keep assessment questions and answers. Based on the feedback received by the respondents, it shows that 53.5% of respondents strongly agreed (extremely likely (scale 5)), 40% of the respondents agreed (scale 4) and 6.7% of the respondents choose scale 3 which is between agree and not agree. From the results, it shows that most of the respondents agree that using E-Exam Questions Bank Record Keeping System, is more environmentally safe because it does not use papers to keep assessment questions and answers as shown in Figure 10. These results are also supported by other literature that quote sentence about hard copy systems not providing ease of access to either students or staff, including institutional decision-makers, furthermore it also increase institutions' administrative burden, as well as delays access to key transition documents.



**Figure 10** Environmental safe because not use papers

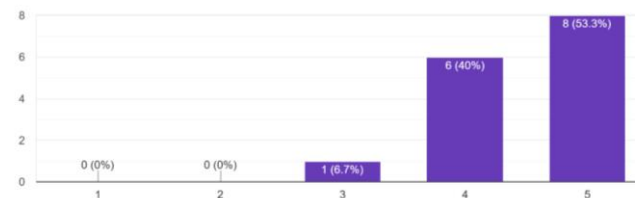
Question 12 is about the security of the system. For this question, the respondents were asked whether E-Exam Questions Bank Record Keeping System is more secure because only authorized people can access assessment questions with answers by login into the system with a username and password. The result from the survey shows that 40% of the respondents strongly agree (where the respondents choose extremely likely on a scale of 5), while 40% of the respondents agree (where the respondents choose a scale of 4) and 20% of the respondents choose scale 3, which is in the middle, between agree and disagree as shown in Figure 11.



**Figure 11** More secure with only authorized people can access the system

Next, question 13 is about searching. The questions ask the respondents whether less time is needed to search specific questions because specific assessment questions could be searched by using keyword topic, sub-topic, course, and so on. The results show that 53.5% of the respondents choose the option extremely likely which means they strongly agree that less time is needed to search specific questions, 40% choose option scale 4 which means they agree with the question and 6.7% of the respondents choose option scale 3 which is in the middle between agreeing and disagree. From the results, it shows that most of the respondents agree that less time is needed to search specific questions.

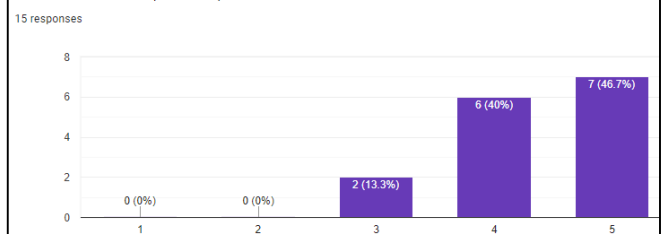
13) Less time is needed to search specific question because specific assessment question could be search by using keyword topic, sub topic, course and so on.  
15 responses



**Figure 12** Less time is needed to search for specific questions

Next for question 14 respondents were asked whether assessment questions and answers are easily added, edited, and deleted by the user and faster by clicking the button add, update and delete by using this system. 46.7% of the respondents strongly agree by choosing the answer for option scale 5 (extremely likely), 40% agree and 13.3% choose option scale 3. The result shows that most of the respondents agree that assessment questions with answers are easily added, updated, and deleted by using this system because specific assessment questions could be searched by using keyword topic, sub-topic, course, and so on.

14) Assessment questions and answers are easily added, edited and deleted by the user and faster by clicking the button add, update and delete. User doesn't need to create new questions and answers for new assessment or if any changes are made from old records like previous questions.  
15 responses



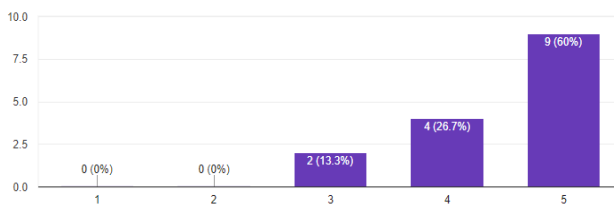
**Figure 13** Assessment questions with answers are easily added, update and delete

Regarding question 15, the respondents were asked whether less time is needed to generate assessment questions. 60% of the respondents choose option extremely likely (scale 5) which means they agree with the question, 26.7% choose option scale 4 and 13.3% choose scale 3 as shown in Figure 14. From the results, it shows that most of the respondents agree that less time is needed to generate assessment

questions because assessment questions will be automatically generated from the database in PDF form. If the user uses other platforms such as Microsoft Teams, the assessment questions can be uploaded through Microsoft Teams, Telegram, Whatsapp, and other social media platforms in PDF format.

15) Less time is needed to generate assessment questions because assessment questions will be automatically generated from database into PDF form. If user use other platform such as Ms Teams, the assessment questions can be uploaded through Ms Teams into pdf format.

15 responses

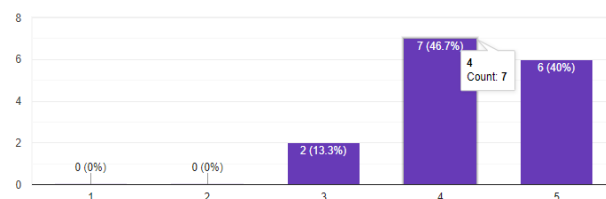


**Figure 14** Less time is needed to generate assessment questions

For question 16, the respondents had been asked whether the assessment questions such as quizzes, tutorials, assignments, end of the chapter, case study, tests, and so on will not be easily exposed to other people. The result shows that 40% of the respondents choose the option extremely likely (scale 5) which means they agree with the question, 46.7% choose option scale 4 and 13.3% choose scale 3 as shown in Figure 15. From the result, it shows that most of the respondents agree that the assessment questions such as quizzes, tutorials, assignments, end of the chapter, case studies, tests, and so on would not be easily exposed to other people. It is because only authorized people can access assessment questions and answers and all the records are kept in the database where it is hard for an unauthorized person to access the database without knowing the username and password of the administrator.

16) Assessment questions such as Quizzes, Tutorial, Assignment, End of Chapter, Case Study, Test and so on will not be easily exposed to other people, because only authorized people can access assessment questions and answers because all the records are kept in the database.

15 responses



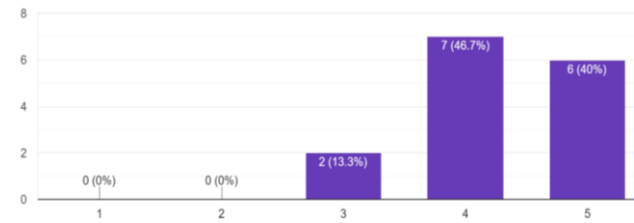
**Figure 15** Assessment questions not easily exposed to unauthorized people

Next question, 17 respondents were asked whether E-Exam Questions Bank Record Keeping System is an alternative platform if another E-Learning platform has a problem such as lagging (slow) due to server down and other matters. 40% of the respondents strongly agree by choosing

the answer for option scale 5 (extremely likely), 46.7% agree and 13.3% choose option scale 3. The result shows that most of the respondents agree that E-Exam Questions Bank Record Keeping System is an alternative platform if another E-Learning platform has a problem such as lagging (slow) due to server down and other matters.

17) Electronic-Exam Questions Bank Record Keeping System is an alternative platform if other E-Learning platform has problem such as lagging (slow) due to server down and other matters.

15 responses

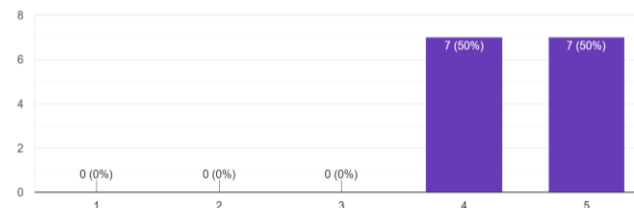


**Figure 16** E-Exam Questions Bank Record Keeping System is an alternative platform

For question 18, respondents were asked whether they can access assessment questions from any place and through any gadget as long as it has an internet connection. Most of the respondents strongly agree where 50% of the respondents choose option scale 5 (extremely likely) and another 50% of the respondents choose answer scale 4 where they also agree that they can access assessment questions from any place and through any gadget if there is an internet connection. This can overcome the problem of limited accessibility. By developing this system, assessment questions that are created through this system can be retrieved from any place and through any gadget.

18) Users (Teachers, Lecturers etc) can access assessment questions from any place and through any gadgets as long as it has an internet connection.

14 responses



**Figure 17** Users can access assessment questions from any place, any gadgets with an internet connection

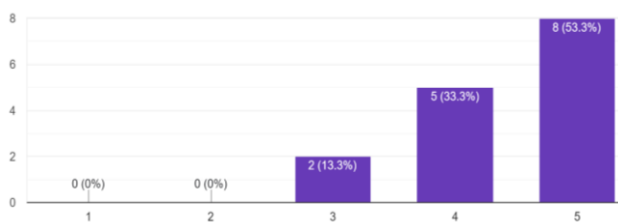
For question 19, respondents were asked whether assessment question bank records are kept safe and can be retrieved from anywhere although there are disasters such as floods and so on. Most of the respondents agree where 53.3% strongly agree by choosing a scale of 5 (extremely likely), 33.3% also agree by choosing a scale of 4 and 3.3% of the respondents choose a scale of 3. From the results, it shows that more than 50% of the respondents agree that assessment question bank records are kept safe and can be retrieved from anywhere although there are disasters such as floods and so on because all the records are kept in the database as shown in



figure 18. This statement is also supported by the following literature, where records management has taken a new dimension with the advent of computer technology [9]. Educational institutions now prefer the electronic system of records management to the manual system. It is because the manual system continues to rely on the traditional paper and filling approach while computer technology is used for entering, storing, and retrieving data by the electronic system [9].

19) Assessment question bank records are kept safe and can be retrieve anywhere although there are disasters such as flood and so on because all the records are kept in the database.

15 responses

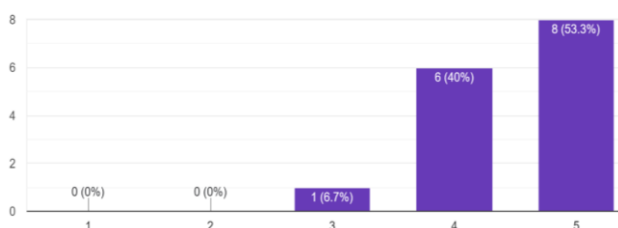


**Figure 18** Assessment questions records are kept safe and can be retrieve anywhere

For question 20, respondents had been asked whether they can view the previous questions create under my saved questions through this system. 53.3% of the respondents strongly agree or choose answer option scale 5 (extremely highly), 40% of the respondents choose answer option scale 4 (agree) and 6.7% of the respondents choose option scale 3. The result shows that more than 50% of the respondents agree that they can view the previous questions created under my saved questions through this system as shown in Figure 19. All the assessment questions that were created through this system could be viewed later under the menu saved questions.

20) Users can view the previous questions created under my saved questions through this system.

15 responses



**Figure 19** Users can view the past questions under saved questions

## V. SUMMARY

From the survey done, the result shows that the e-exam questions bank record-keeping system to some extent can help educators in creating assessment questions together with answers and keep the assessment questions bank in a database securely with the authentication process and could be easily accessed from any platform and any place. Besides,

by using this system, less time is needed to search questions in a database. Teachers and lecturers also can add, update and remove questions from the system easily. The e-exam questions bank record keeping system also has security features such as an authentication process that can protect the assessment questions from being accessed by an unauthorized user. The assessment questions also can be generated in PDF form and can be uploaded through other platforms such as telegram, Microsoft teams, google classroom, CIDOS, and others. Results from the survey also show that this system can overcome the problems that occur when keeping assessment questions manually such as limited storage, limited accessibility, can be accessed by unauthorized people, natural disasters such as floods, not being environmentally safe when using papers, and others. Developing this system, indirectly can ease the burden of educators when creating assessment questions.

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