Performance Measurement of Online Quiz/Assesment/Testing Tools

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Abstract—**Performance measurement is done to collect, analyze, or report information regarding the performance of any institute, organization, system or component. It requires a thorough study of processes or strategies within that institute, organization, system or component to check whether the output is the one that should have been achieved. After careful literature study, it is found that limited work is done on the performance measurement and comparison of the online quiz tools. This research is a guideline for those users, who find difficulty in choosing a quiz tool online according to his/her requirements. In this work we have analyzed the performance of eight online quiz testing tools based on a certain set of parameters.**

Keywords—*performance measurement, online quiz tools, requirements, parameters, testing strategies.*

I. INTRODUCTION

Performance testing is done to monitor and record the system's performance under expected and peak load conditions. It is also done to ensure the quality characteristics of any application such as performance, functionality, usability etc. It is probably done for quality assurance. However, it also makes sure that the system works properly under expected workload. Furthermore, it also helps in eliminating performance bottlenecks.

Online assessment/testing tools helps the users to take and create quizzes, ask and answer queries, take and make test online on internet. It allows the user to evaluate and analyse themselves and provides the opportunity to correct themselves. Moreover, it helps in enhancing different learning techniques i.e, MCQs, fill in the blanks, true or false, etc.

The study of online assessment tools is important because one must know how the tools develop, deliver and collect information for assessment. Moreover, user must know whether the tools provide proper required service and the pricing structure of the provided service. It is also important to know what kind of technicality is required for the users to work on these tools. Most of time quite minimal technical ability is required.

This study presents the performance comparison of eight widely used online assessment tools. Section II of paper outlines brief overview of the tools. Section III highlights related work. Section IV details the methodology of the research work. Section V confers comparison results and finally section VI presents conclusion.

II. OVERVIEW OF TOOLS

1.Socrative: Socrative [1] is a student response system, classroom fun app, quite effective for classroom engagement activities. The following are the question types in Socrative:

1. True/ False
2. Multiple Choice Questions
3. Short answers
4. Open Ended Short Answers

2. Google Forms: Google form [2] is a web-based app/tool that is used to create forms or quizzes for the purpose of data collection. Users that includes students, teachers and others can create surveys, quizzes, tests etc. It allows collection of data easily and more efficiently.

3. Testmoz: Testmoz [3] is an online quiz tool that is a test or quiz generator. It generates grading automatically and provides detailed reports.

The four types of questions that are supported here are
- True and false
- Multiple choices
- Multiple response
- Fill in the blanks

4.ThatQuiz: ThatQuiz [4] is useful tool that provides immediate learning to the students to check their score and lets the users to know where they were wrong and what the correct answer is. Also, it provides the teachers, to regenerate the test and a new test occurs for the students with the same concepts of the previous test.
The following types of questions that are included

- Multiple choice
- Matching the answers
- Short answers

5. Gnowledge: Gnowledge [5] is a free to use education platform where everyone can create, publish, share and take tests, exercises and assignments. It can be used by teachers, parents and students.

Users can create test defining their own name, subject, and whether it is a test material or not. Following types of the questions are available:

1. True/False
2. Multiple Choice Questions
3. Fill in the blanks
4. Matching the answers.

6. Proprofs: Proprofs [6] is a freemium (provides most of the services and features free of cost but premium is charged for additional services and features) and subscription basis. This includes quizzes, surveys, online course creation tools, knowledge base software, trainings, projects, polls, brain games. Proprofs is also used for business, education, e-learning and other industries.

7. ExamTimeQuiz: ExamTimeQuiz [7] is purely used for aptitude tests and exam quizzes. Various topics and subjects are covered which provides a clear guideline to the users. These topics and subjects are of day to day life. No login or registration is needed.

8. PollEverywhere: Polleverywhere [8] is an online assessment tool for classroom response and audience response. It provides live activities for teammates, students and friends. Question types which are encouraged here are MCQs, open-ended questions. It also helps in getting instant and different feedback from the audience. Basically, used for education moreover it also works for businesses and remote work.

III. RELATED WORK

In this section, work related with online assessment tools is presented. In [9], the author had generated reports based on the primary and secondary research to evaluate the effectiveness of Socrative(free). Furthermore, he had compared traditional learning method with this Student Response System (SRS). This report also covers students' feedback and experience.

In [10], it is highlighted that how technology has changed the learning process and how students are finding it hard to cope up that. However, the author has compared two online assessment tools i.e., TurningPoint and PollEverywhere. The results show how the users are more satisfied using PollEverywhere.

In [11], the author discusses student's perception on the usage of online assessment tools. he surveyed more the 300 students of undergraduate business class. Students in the large classes found online assessment tools less useful than the student of medium-sized classes. Mostly students said that these tools helped them in preparation of exams.

Although some students gave negative as well as mixed reviews.

In [12] the German author describes how COVID-19 made educational organisations to jump from traditional learning methods to online tools. In Europe, how institutions still lack behind Information and Communications Technology. This paper mainly emphasis on how teachers faced challenges in this sudden transition. Moreover, how teachers coped up with those challenges.

In [13] the author has worked on the tool Quizzizz, which is a game based educational application. This multiplayer class activity helps in learning process and enhances student's communication skills. In [14], the author describes the learning potentials and limitations of students using objective online assessment tools. It heavily relies on objective based test questions. He describes two main methods of learning i.e., formative learning and summative learning. While shifting to e-learning, educator focuses on authentic, reliable and ethical methodologies.

In [15], the author focuses on the importance of Smartphones in education. Users can share their knowledge and experience just by a single click on Smartphone. Users find it easy but on other hand there are several disadvantages of Smartphones in e-learning. It also focuses on the lack of training, time constraints, and technological constraints.

IV. METHODOLOGY

The steps involved in the methodology of this research are shown in figure 1.

Step 1: Selecting or identifying widely used online assessment/testing tools.

Internet provides a enormous option for online testing/assessment which leads to confusion. Countless options are available but all of them needs to be managed differently. Every choice provides something that may entirely differ from other. So first and foremost, we need to select some of the available assessment tools for evaluation.

Step 2. Identification of performance parameters.

In general, performance measurement can be defined as regular measurement of results and outcomes. However, it differs from task to task and product to product. In online assessment tools, it is crucial when measuring performance, parameters needs to be evaluated to know what outcomes are important to the stakeholder i.e, users. Following are the parameters that are evaluated to measure performance of the online assessment tools:

- Availability
- Response time
- Number of users
- Resource utilization
- User friendliness
- User interface

Fig 1: Steps involved in the methodology

- Password retrieval
- Email notification
- Technical and non-technical users
- Customization
- Target customers

Step 3: Analysis of performance of online assessment tools.

Analyzing performance of online assessment/testing tools is important because we cannot randomly pick the best available tool from hundreds of easily available tools. Tools needs to be evaluated according to the demand and criteria of the organization or the user. The basic parameters which almost every user looks in an online assessment tool are mentioned in step 2. So, after identifying performance parameters of online assessment/testing tools, we analyzed those parameters of all eight tools.

The selection of these parameters for the tools depends upon the usage of these easily available online and easily accessible for users. Upon spending a good amount of time on Internet and exploring number of tools, we came to conclusion to select these 8 tools which are explained, analysed, compared further. Keeping in mind the technicality of the users where they are only accessible for technical users or also for non-technical ones. Response time being an important factor because usually user get irritated and leaves a tool halfway when they take long responding. Other factors like number of users at a time was also kept in mind because traffic on a website or tool can cause a crash of the online tool. While taking or creating a test one needs to focus on customization as it can be required at any point of time. So, customization parameter is also taken in consideration. Updates from these tools needs to be notified to the users.

Step 4: Comparison of tools.

Based on the performance parameters, we compared eight online assessment tools. The comparison results which we obtained are shown in the table 1 and table 2.

V. RESULTS

Table 1 shows the comparison of Socrative, GoogleForms, ThatQuiz and ExamTimeQuiz with respect to selected parameters. Table 1 clearly depicts how these tools are available for free and where you need to pay for more services. Response time for them is almost a few seconds as they don't take time to response. All of these tools are user friendly. However, the user interface differs on the basis of attraction, interactivity and colors. The results show how some tools are boring and dull while some are interactive as well as interesting. Socrative, ThatQuiz, ExamTimeQuiz are easily accessible while GoogleForm requires a bit af technicality. Three above mentioned targets education area however Google Form focuses on education and business as well. All of these mentioned tools require a good internet connection, a machine, and a user. They also provide email notification facility except ExamTimeQuiz. Limited number of users can access Socrative at one time, but there is no limit for the users of GoogleForm. On the other hand, no number of users is specied for ThatQuiz and ExamTimeQuiz. If you create an account then password retrieval is possible in Socrative, ThatQuiz and GoogleForm but ExamTimeQuiz doesn't provide any such facility. Limited customization options are given by ThatQuiz, on the contrary Socrative and GoogleForm provides every possible customization option available.

Table 2 shows the comparison of Testmoz, PollEverywhere, Proprofs and Gnowledge with respect to selected parameters. PollEverywhere and ProProfs provides trial version for free while Gnowledge and Testmoz are free of cost. These tools response very efficiently and are quite user friendly. User interfaces of PollEverywhere and ProProfs are attractive, interesting and colorful on the counterpart Gnowledge and Testmoz interfaces are quite dull, plain and boring. Fair amount of technical skills is required to operate PollEverywhere and ProProfs at the same time no technical skills are needed for Testmoz and Gnowledge. Focus of PollEverywhere and ProProfs is business and secondary is education however Testmoz and Gnowledge priority is just education. A good range of customization options are available in PollEverywhere and Testmoz, ProProfs has limited options and Gnowledge customization option is only applicable once you are their registered user. User, internet connection, a PC/Laptop/Smartphones are the resources required for these tools. Number of users can be controlled by the test taker in PollEverywhere, umlimited users can perform test at on time in ProProf, only 100 users can take test in Testmoz while the number of users is not specified in Gnowledge. Once you create an account, all these tools provide an option of password retrieval as well as notifies through email except for Gnowledge.

Table 3 shows the comparison of eight online quiz tools according to the features provided by them. All these tools allow quizzes and test. Gnowledge, ExamTimeQuiz and ThatQuiz doesn't generate reports however rest of the tools generates reports, these three tools also don't holds any options for discussion rooms while the remaining provides this option. Multimedia is only supported by GoogleForm, ProProf and ThatQuiz. Sharing of results in allowed in all tools excluding Testmoz, ThatQuiz and ExamTimeQuiz. Question banks/pools are accepted by Socrative, GoogleForm and Testmoz only.

TABLE I: COMPARISON OF SOCRATIVE, GOOGLEFORMS, THATQUIZ AND EXAMTIMEQUIZ

Parameters/Tools	Socrative	Google Forms	ThatQuiz	ExamTimeQuiz
Availability	Yes, Free	Basic features are for free.	Yes, Free	Yes, Free
Response Time	Within seconds	Within seconds	Within seconds	Within seconds
User Friendliness	Yes	Yes	Yes	Yes
User Interface	Plain, dull	Interactive however not that interesting	Not such interactive, fairly boring	Quite interactive and interesting
Technical and Non-Technical Users	Easily accessible by both	A bit tricky for non-technical users	Trouble-free access for both	Easy
Resource Utilization	IoS, Android, Internet connection, A tablet/PC/Laptop	Internet connection, A tablet/PC/Laptop	Internet connection, A tablet/PC/Laptop	Internet connection, A tablet/PC/Laptop
Number of users at particular time	50 users for Socrative and 150 for Socrative Pro	No particular limit	Not specified	Not mentioned
Email notification	Yes	Yes available	Yes available	No
Target customers	Teachers and students	Education, businesses	Education	Education
Customization	Yes	Yes	Limited options for customization	Not available
Password retrieval	Easy steps available	Available	Yes, through mail	No such case

TABLE II : COMPARISON OF TESTMOZ, POLLEVERYWHERE, PROPROFS AND GNOWLEDGE

Parameters/Tools	ProProfs	Gnowledge	Testmoz	PollEverywhere
Availability	Free for trial, starting price is $19.00 per month	Yes, but registration is compulsory	Yes, Free	Yes, basic features are free. $19.00 per month per user for advanced features.
Response Time	Within seconds	Within seconds	Within seconds	Within seconds
User Friendliness	Yes	Yes	Yes	Yes
User Interface	Attractive and colorful	Repetitive and dull	Plain, simple	Quite interesting
Technical and Non-Technical Users	More for technical users	Both type of users can avail it	Simple	Relative experience and skill is required
Resource Utilization	Internet connection, a tablet/PC/Laptop	Internet connection, a tablet/PC/Laptop	Internet connection, A tablet/PC/Laptop	Internet connection, A tablet/PC/Laptop
Target customer	Mainly Business and Secondary Education	Education (Students, Teachers, Parents)	Specially Students	Education and Business
Customization	Limited options	Once account created then customization is possible	A good range is provided	A good range is provided
Number of users	Unlimited	Not specified	100 users can take free test at a time	Number of users can be controlled by the test takers
Password retrieval	It is possible	Password retrieval is possible	Possible for only registered users	Applicable via e-mail
Email notification	Email notifications are received	Doesn't have such option	You get it	Yes

TABLE III: FEATURE COMPARISON OF ONLINE ASSESSMENT TOOLS

Tools	Quizzes	Rooms	Reports	Question banks/pool	Multimedia	Sharing of result
Socrative	✓	✓	✓	✓	✗	✓
GoogleForms	✓	✓	✓	✓	✓	✓
Testmoz	✓	✓	✓	✓	✗	✗
ThatQuiz	✓	✗	✗	✗	✓	✗
ExamTimeQuiz	✓	✗	✗	✗	✗	✗
Gnowledge	✓	✗	✗	✗	✗	✓
ProProfs	✓	✓	✓	✗	✓	✓
PollEverywhere	✓	✓	✓	✗	✗	✓

It is evident from table 3 that GoogleForms supports all the features and Socrative supports all the features except multimedia feature. However, the remaining six tools lack at least two features.

VI. DISCUSSION AND CONCLUSION

Online assessment tools are playing nowadays a vital role in e-learning. Thinking of today's circumstances these tools are a new requirement for learning in businesses and education. These online assessment/testing tools helps the learners to work irrespective of the location, physical presence. Although we have come to some conclusion but still we need to test it on real time user based on the above mentioned certain criteria. At this stage it is difficult to judge that which tools is more satisfied for the users belonging to education sector or industry. Therefore, usability testing will be performed to check user satisfaction levels. Usability test will be done but our focus will be both types of users, i.e., technical and non-technical along with other parameters. It not just the end, a lot of work and research is still required in this work. We strongly recommend checking the parameters before selecting any online assessment tool because the institute or the organization must be aware of their requirements.

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