Employee Assessment and Learning System using Android

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***Abstract* – Technology plays a vital role in everyday life. With the advancement in mobile technology and availability of smart mobile devices, a system to assess the knowledge level of the employees of an organization can be created. This paper summarizes the process of designing a system that integrates employee learning along with evaluation through objective test questions. The application namely, QBuzz is developed to enhance learning and to keep the employees engaged with the platform. Android being the most popular mobile operating system, is chosen in the construction of the application. QBuzz facilitates augmented learning with assessment and substantially aids in elevating the standard of an organization and its employees.**

Keywords: **Android, Employee Assessment, Learning.**

I. INTRODUCTION

Qbuzz acts as an assessment platform for the employees of an organization. This paper aims at establishing an application to monitor the apprehension state and knowledge level of the employees. Basically, there are several parameters to assess an employee individually of which the learning capacity and performance of an employee are the key aspects. With the ever-increasing growth in technology and related industries, it is understood that learning becomes a lifelong process and is not just restricted to students. But for people, who is working, time becomes a huge constraint and they might be unable to update themselves to meet the demands of the organization. Thus it is essential that learning takes place but without consuming much time.

We consider objective tests to be a quick fix to the situation. It is also effective in terms of assessing an individual in connection with their knowledge and comprehension. The quiz pattern is designed in such a way that it doesn't consume much of the user's time. It is also quite complicated to keep an employee occupied with the platform. We especially use the achievements section to keep the users engaged with the application platform.

Unobtrusive monitoring of progress and suggestion of an appropriate learning course based on the scores are the important aspects of this application. This application allows the sharing of online resource materials to all the members of the organization. To further enhance the process of learning, a common forum for discussion is enabled within the platform where employees may discuss and other employees can join or just view and assimilate information from it.

The application, *QBuzz*, provides both user functionalities and a set of administrative tasks that need to be performed by the administrator or the employer. Implementation of the application in Android platform gives undemanding user experiences in the simplest way.

In a nutshell, our goal is to increase employees' performance, learning success, motivation and participation in the organizational projects and activities.

II. RELATED WORK

The focus of this work is on creating a platform which tests the employee, expands their knowledge and keeps them engaging. In today's world, Smart phones have changed our lives and have become an indispensable part of our lives because of its specialty to simplify our routine work and thereby saving our time. A Smartphone with an Android Operating System offers excellent functionality to the users offering a distinct experience. Most of the available applications are not well equipped in case of learning materials. Among many applications, we review Android based application related to quiz with multiple choices along with some modules that are required to be successful in terms of employable qualification.

Portable devices have become ubiquitous and several studies have shown how the assessment process can be made mobile: In [1], a system used for the knowledge testing of candidates of a software company who need a specific skill for job was created. It is an easy way to test the knowledge and reduces paperwork but a detailed insight on user's performance is not provided in this system.

[3] Created a framework of learning and communication through Smartphone. Learning process takes place by conducting MCQ Tests. However, the learner cannot discuss with the other participants who are involved in the learning process. [2] presented a system where the quiz is conducted from the administrator's side and presented to the users in a simple way but their theory work focuses on a classroom based setting involving students. It is said to enhance the students' learning experiences as conducting objective based tests is an interactive form of learning. [5] deals with development of android-based multiple-choice question examination system. This application is developed for educational purposes, allowing the users to prepare multiple choice questions for different examinations conducted on provincial and national level. The overall objective of this research thesis is to enable users to practice for subjective tests conducted for admissions and recruitment, with focus on the Computer science field. The prime objective of [4] is to allow any individual to take quiz through the Internet. Multiple choice questions (MCQ) will arrive for any interviewee with certain time limit for each quiz. All questions, answers and timer must be configured by an administrator and these administrative tasks including user creation can be done from "Online Quiz Application". Besides, report will generate with score where administrator can check for interviewee's result.

We require an application that implements *Increased Interactivity, Applied Learning, Feedback and Enhanced Comparability* and *Systematic Assessment* with *Availability Anytime, Anywhere.*

Most of the other applications are entertainment-based with some limitations and little focus on educational paradigm. In order to overcome such limitations we propose a user friendly application which mainly focuses on gaining knowledge to emphasize not just on obtaining good scores in each module but also to develop a better understanding of the concept matter.

Although there are number of web based applications which are in a way related to quiz, still there are not many that help in learning and contribute to enhancement of the knowledge of employees. To our knowledge, there is no mobile prototype that meets our above defined requirements. Either there is a lack of usability, or the prototypes are limited to one use case only. Due to a high configurability by design, we manage to adapt the prototype to different requirements in very short time.

III. PROPOSED WORK

In the proposed system, we have envisioned an application that is broken down into several modules for efficient implementation. Our work focuses on the following functions in relation to the aspects:

A login section is created that requires the user to enter their email id and password in the respective fields. Every employee will be provided a unique username and password by organization. These details are authenticated by a backend database already holding the information of the employees of the organization. The application permits the authentication of registered users only. This way, any outside individual cannot access the application. The profile displays the user information and the department they belong to. An announcement section is provided to keep the employees notified on the test schedules and other ventures.

The *test* section displays all the scheduled tests for specific departments mentioning the time period during which it will remain active. The employee can attempt the test during the active period and can navigate to subsequent questions by pressing the *next* button. The test will be disabled if the user has already attempted the quiz or has navigated away from the test page.

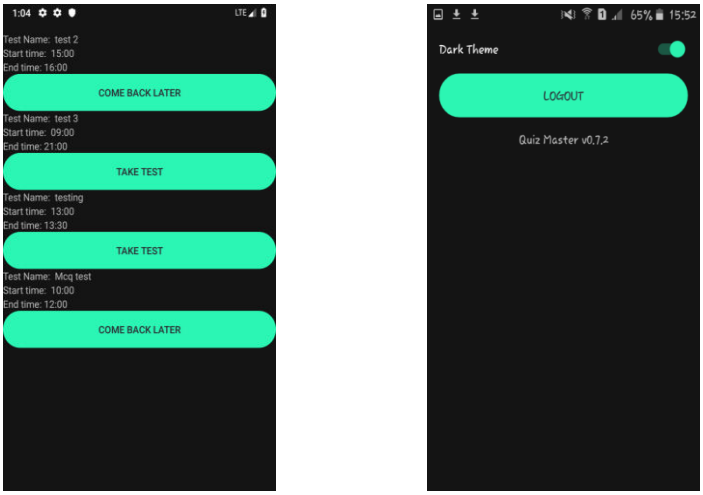

Fig 1. Sample screens of the test page and settings section of the Quiz module. Test Page(Left) and Settings(Right).

The objective test questions are randomized for each individual and strict time duration is imposed to prevent malpractice. At the end of the test, a *submit* button will be present to submit the answers. The top scores will be updated in the *achievements* section. The users can logout after attempting the test. We analyze the scores of the individual periodically. If the scores are less than the average percentage, the employee will be suggested to go through a particular learning material or take up a relevant learning course.

The application permits multiple test scheduling for objective type tests to be conducted for employees of various departments. The application consists of an achievements section which will list the employees according to their active performance in tests. This engages the users in a unique way and connects them to the brand. It is also valuable in self-assessment. If the authenticated user is an admin, the scores of the tests will be displayed. Additionally, specific administrative tasks such as adding and deleting tests could be performed by the admin.

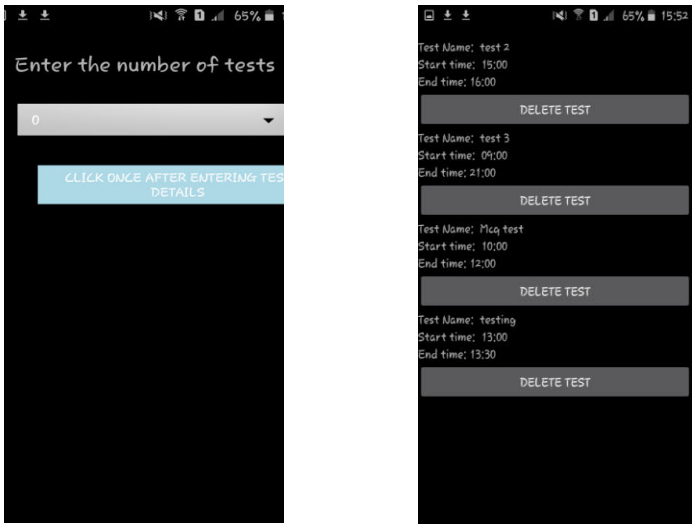

Fig 2. Example screens of Scheduling (Left) and Deleting (Right) modules for the admin to create tests and delete.

Implementation in Android platform gives undemanding user experiences in simplest way. The application provides both user functionalities and a set of administrative tasks that need to be performed by the admin. The user module allows the user to view the scheduled tests and take them up during the specified duration. Every test can contain a maximum of upto 12 questions and marks will be allotted for the right choices. The admin module provides functions for the admin to update and delete tests. The intention of providing the users with objective test questions is to keep it short which also a huge advantage as it is time saving. A common forum for discussion is provided within the platform where the users can discuss with other employees in the platform and other users can view and articulate from it. The purpose behind including a discussion forum is to encourage critical thinking.

QBuzz application aids in facilitating continuous assessment of the employees. The proposed system provides features for two-way communication between the employer and the employee through announcements and a feedback tool. It is developed with the intention of keeping the employees engaged with platform by sending notifications and setting achievements for them. The objective type tests act as a valuable tool that helps assess the employee performance. Employees can analyze and compare their performance with others through achievements. Thus, the main objective of the research is to develop an interactive mobile application based on android platform that focuses on measuring and improving the performance of employees and increasing their future potential and value to the company and is also instrumental in their individual development.

In order to improve the user/employee satisfaction, a feedback tool is provided in which users can opine and clarify their doubts. The setting tool allows the users to logout (if needed) and furnishes a touch of personalization by allowing users to change their background themes.

STEPS:

1: Login with the username and password provided by an organization.

2: Enter the *test* section and take up the tests that are active.

3: Submit the test on completion within the time limit.

4: View scores upon successful submission of test

5: Logout, if needed.

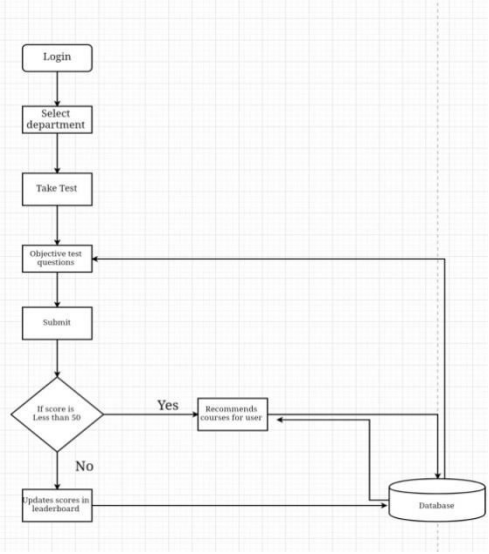

Fig 3: Illustration on the flow of Objective Quiz Test

IV. MODULES

A. Login

The login module is a portal module that presents app visitors with a form with username and password fields. It describes the interface implemented by authentication technology providers. These are plugged in under applications to provide a particular type of authentication.

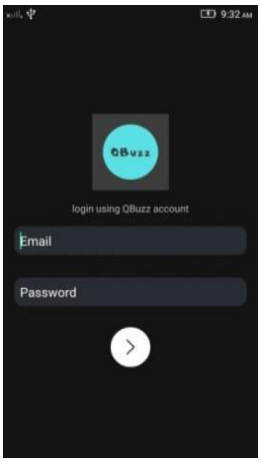

Fig 4: Example login Screen of the QBuzz application

B. Profile

The purpose of the module is it provides access to and a persistent data store for all the details of the user.

C. Test

This module provides with the name of test, date and time limit to attend the test.

D. Announcements

Announcements allow instructors to communicate with users about the course activities and post interesting quiz-related topics.

E. Discussion Forum

A discussion forum is an online bulletin board where you can leave messages and see responses to the messages you have left.

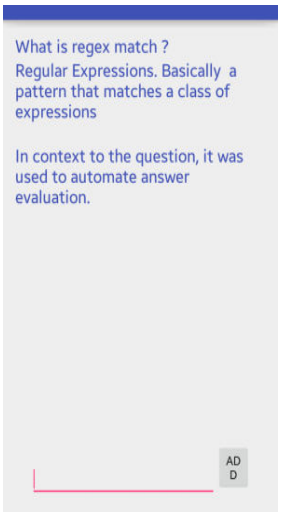

Fig 5: Discussion Forum for the employees to interact with each other and promote critical thinking

F. Achievements

This module provides the ranking from the results of each test. The purpose of a leader board is to show users where they rank. Those at the top enjoy the recognition it brings, as for everyone else, the leader board shows them where they stand relative to their peers.

G. Feedback

Feedback tool is that helps mobile app developers to extract real user feedback. They're positioned as an in-app customer support platform that enables admin to make improvements to the user experience, drive higher ratings and increase retention.

H. Settings

Settings allow the users to change the behavior and functionality of an application. Settings can affect background behavior; they can be more wide-reaching, such as changing the contents and presentation of the user interface.

V. REQUIREMENTS

Software Requirements

The software used for the development of the project is:

- Operating system: Windows, Android
- Programming Language: Java, XML
- Emulators: AVD
- Tools used: Android SDK Tools, Android platform Tools, Android developer
- Database: Firebase database

Hardware Requirements

The hardware used for the development of the project is

- Android phone (Lollipop 5.0 and above)

Technologies used

1. Android Studio

Currently, Android is recognized for being the most widely used mobile operating system. We are associating with mobile app development for Android platform considering the following reasons.

- It's incredible growth.
- It is a stable IDE providing Graphical user interface.
- Yet another reason is that it is a simple and powerful SDK with no licensing, distribution or development fee.

2. Firebase

We have employed Firebase Real Time Database to serve as a backend database for the application in accordance to the

Following features:

- It helps in creating, maintaining and managing the application without a backend server.
- Firebase controls and manages all data real-time in the database. Hence, the exchange of data to and fro from the database is easy and quick.
- Authentication is always a crucial part when it comes to developing an application. Firebase furnishes a highly secure authentication system that improves the user experience while they sign-up and sign-in
- The Real time database that is being employed to use in our application is hosted on a cloud and is a NoSQL database. Therefore, we are able to store and sync JSON data, real time.
- Firebase Crashlytics checks the app issues or errors that affect the app experience and quality at real time.

VI. RESULTS AND FUTURE WORKS

This paper summarizes the development of a performance but still preliminary application to provide a platform for employee learning and assessment.

Our future enhancement is to provide detailed analytics on each category or department and to make improvements in feedback module. We want to investigate the following tasks and research questions: (1) whether this system can be used in recruitment process and training of software companies. (2) Investigate how notifications and achievements affect employee learning, performance and motivation. (3) Work on extending the application to other mobile platforms.

VII. CONCLUSION

In this paper we have presented an application system *QBuzz* that serves as an effective learning and assessment platform for the employees. We have proposed that conducting objective tests is both an effective and efficient method to improve learning and performance and to leverage their potential value.

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