Development of an Online Examination Monitoring System using Zoom

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ABSTRACT

Online Examination Monitoring system study was carried out using the Zoom application to monitor students taking an online examination to mitigate cheating; Even though the online examination system is widely used in most institutions and organizations there are still numerous issues to address to make the system more effective and efficient to use, such as mitigating cheating during examination, that has to lead to the undertaken of this study while the study aims to develop an online examination monitoring system. The waterfall methodology was selected for the study. This research finds that the study was effective as students can appear live when writing examinations from remote locations using the Zoom application. The online examination monitoring system has contributed to known knowledge that before now Zoom has been used as software for hosting online meetings and online classroom teaching. This study has revealed that Zoom can excellently monitor online examinations to mitigate examination malpractice.

Keywords
Online Examination, Monitoring System, and Zoom Application

1. INTRODUCTION
The development of software demands that the produced software meets the desired expectation, and customers' satisfaction, before marketing it for use and profit making. Online Examination entails electronically examining students to measure the participants' knowledge on a given topic. In the past, everybody had to gather in a room at the same time to take an examination in the presence of an invigilator. Many devices and software have been developed to efficiently and effectively monitor the examination process ([1]; [2]; [3]; [4]; [5]. With the advancement of technology, students can do the exam online, in their own time, with their device, regardless of where they live, and no physical invigilator [6];[7];[8]; [9]. You only need a browser and an internet connection [10].

The examination monitoring system has to do with a system being able to supervise a person writing an examination [11]. Therefore, an online examination System is the ability of a system to supervise candidates without human invention. [12]. carried out a comparative study on the secure examination system of two countries. Their work did not include their findings. Also, [13] carried out a study on a web-based online examination system but the way to mitigate examination malpractice was not done.

This paper demonstrated how an online examination monitoring system using Zoom is developed.

1.1 System Analysis of the Existing System
The analysis of the current system was based on the Covid-19 period and my personal experience as a student of the National Open University (NOUN) for a period from 2014 to 2022. This has granted me an in-depth knowledge of online examination systems using a human monitoring system. During the Covid-19 period, many students wrote an online examination from their homes using

The steps followed in the online examination in NOUN are:
Generate an examination time table: An examination timetable is provided for students to know their date of examination
Students travel to study centers to take the examination; students must travel to their study centers which they selected at the time of admission
Login with your matriculation number and password to start the examination: Students are to log in with their matriculation number and password to be able to write their examinations
Invigilation: An invigilator must be at the student's side while they write their examination to mitigate cheating.
Submit: At the end of the examination student clicks submit
Automatic grading: The scores and grades of students are provided at the final submission
Logout; Students leave the examination portal at the end of the examination for another student to log into that system to start his/her examination

1.2. Weaknesses of the Existing System
The existing system is faced with the following weaknesses
1.2.1 Lack of automatic monitoring: the inability of an online examination system to carry out examination monitoring by itself.

1.2.2 Lack of Remote location login for NOUN: This is the inability of students to write the examination from their homes.

1.2.3 Inability to mitigate examination malpractices during COVID-19: The students set their computer screens into two parts, and some have someone open and read answers to them.

1.3. Advantages of the Proposed System
The advantages of the proposed system are
1.3.1 Automatic monitoring: The system can carry out online examination monitoring by itself.
1.3.2 Remote Location: Students can write examinations from their various homes
1.3.3 No study center establishment cost and no room for impersonation

1.4. Analysis of the Proposed System

The proposed online examination monitoring system consists of the admin database, student database, linked database, NOUN registration system, and Zoom Automatic Examination Monitoring system.

The mode of operation is as follows;

1.4.1 Student data is obtained from the existing noun registration system to authenticate the students' database.

1.4.2 From the database, students who have registered for a particular course and examination are added automatically to participate in the examination through the admin panel dashboard.

1.Zoom application is on during the examination to monitor the examination exercise

2. REVIEW OF RELATED LITERATURE

The related literature is categorized into theoretical framework and empirical review work

2.1. Theoretical framework

[14]. define an online examination system as a type of examination that is taken through the World Wide Web (web-based). It is an examination system where examinations are given online; either through the internet or intranet using computing devices. One widely accepted measuring tool is an examination that effectively measures student ability and understanding of a topic/subject initially taught to learners [15]. An online examination system is a software solution, which allows a particular institute to arrange, conduct and manage examinations via an online environment [16].

Online Examination is a vital element in electronic or interactive learning, however, in the field of educational situations, most examinations are done in the usual paper-written way due to the need for resumption capability when power, network, and physical computer component failures occur, for this reason, adopting and developing a web-based examination system acts as an active research area in recent years [17];

With the fast development of computer technology, electronic devices are used more and more widely in all work of life [18]; [19]; [20]. [21]. It is therefore important to develop new online examination systems [22].

2.2. Empirical Review

[16] Designed and developed an Online Examination System: In Perspective of association for computing machinery (ACM) Live Selection, to design and develop the system, the Software Development Life Cycle (SDLC) which is a conceptual model used in project management that describes the stages involved in an information system development job. The Model View Controller (MVC) software architecture pattern was followed to design the user interface and activity flow.

[23] in his study: Enhancement of Student Electronic Examination (E-Examination) used the Assessment Method Using Face Recognition and Psychological Distress Factors, as he was concerned with security in the re-examination scheme. In accordance to know if the person taking the examination, is the actual student.

[24] Study, they developed an online examination management system using a genetic algorithm and added two new features to the online examination automatic generation of timetable and automatic grading. The generation of a timetable means that the system produces examination time for end users and automatic grading means the production of student scores by the system

3. METHODOLOGY

The Waterfall methodology was followed. It is a step-by-step developmental stage that flows like a waterfall passing all stages of a project; these stages are analysis, design, development, and testing, for example with each stage getting to the end before the next stage begins was adopted for this study.

HTML, CSS, My SQL, PHP, and Zoom software are all design tools applied in the development of an Online Examination Monitoring System using Zoom.

PHP stands for hypertext preprocessor and it is used to create the administration database of this system together with MYSQL which stands for Microsoft structured query language which is used for the student and administration database creation.

The online examination monitoring system database was created with tables and dashboards, such as the Admin login page, addition of course ,questions setting, student login page, available courses, Admin account table, course table, examination table, and examination results, each is explained and discussed in results and discussions. Below are few codes for online examination monitoring system using zoom

(A) Coding for the administrator login page

The below codes are the admin database that will show the admin login interface.

```
<html lang="en">
<head>
<title>CEE LOGIN</title>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="icon" type="login-ui/image/png" href="images/icons/favicon.ico"/>
<link rel="stylesheet" type="text/css" href="login-ui/vendor/bootstrap/css/bootstrap.min.css">
</head>
</html>
```

(B) Coding for student login page

This code computes the student's login page, students are expected to log in with their matriculation numbers and passwords.

```
<!DOCTYPE html>
<html lang="en">
<head>
<title>NOUN LOGIN</title>
<meta charset="UTF-8">
<meta name="viewport" content="width=device-width, initial-scale=1">
<link rel="icon" type="login-ui/image/png" href="images/icons/favicon.ico"/>
</head>
</html>
```

(C) Coding for Analytical Dashboard

This is where the admin will add a course, manage the course, add examinee and manage exam (set examination questions)

```
<!-- MAO NI ANG HEADER -->
<!doctype html>
<html lang="en">
<head>
<meta charset="utf-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta http-equiv="Content-Language" content="en">
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
```

<title>Analytics Dashboard - This is an example dashboard created using build-in elements and components.</title>
<meta name="viewport" content="width=device-width, initial-scale=1, maximum-scale=1, user-scalable=no, shrink-to-fit=no" />
<!-- MAIN CSS NIYA -->
<link href="./main.css" rel="stylesheet">
<link href="css/sweetalert.css" rel="stylesheet">
<link href="css/facebox.css" rel="stylesheet">
</head>
</body>
</html>
(E) Coding for available courses
Students can select courses that are applicable to them
<!-- MAO NI ANG HEADER -->
<!doctype html>

<html lang="en">
<head>
<meta charset="utf-8">
<meta http-equiv="X-UA-Compatible" content="IE=edge">
<meta http-equiv="Content-Language" content="en">
<meta http-equiv="Content-Type" content="text/html; charset=utf-8"/>
<title>CEE</title>
<meta name="viewport" content="width=device-width, initial-scale=1, maximum-scale=1, user-scalable=no, shrink-to-fit=no" />
<!-- MAIN CSS NIYA -->
<link href="./main.css" rel="stylesheet">
<link href="css/sweetalert.css" rel="stylesheet">
</head>
<body id="body">

3.1 Zoom software is used to carry out the online examination monitoring as the examination is going on, all processes are specified in the discussion.
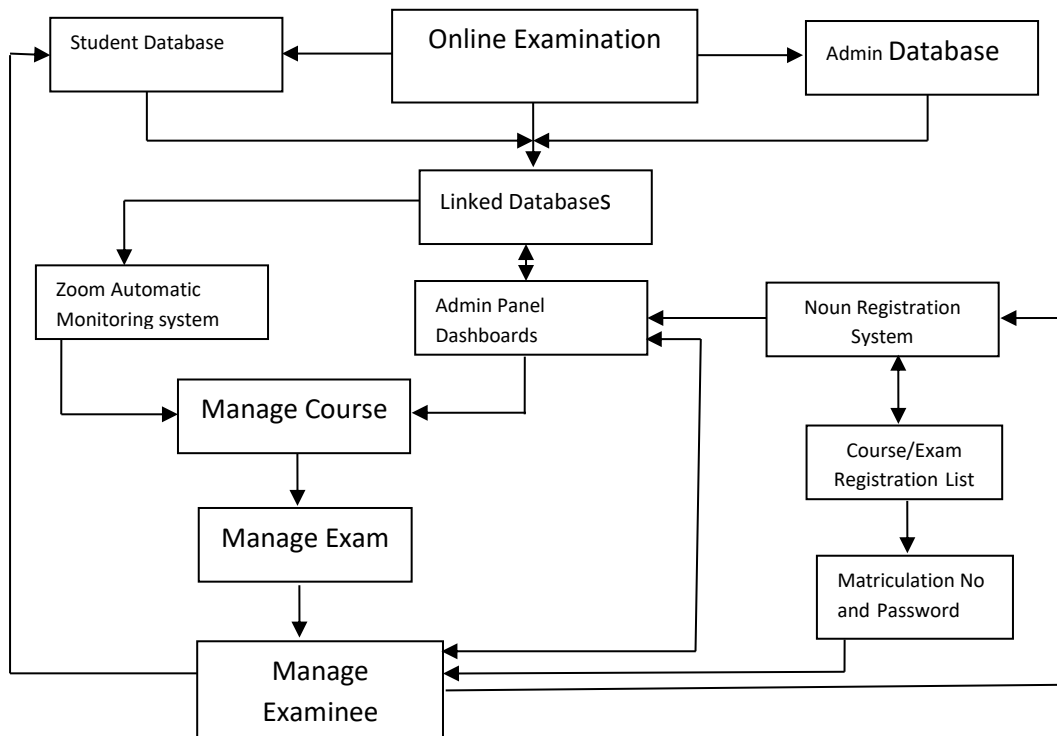
Fig: 1. High-level Model of the Proposed System.

4. RESULTS AND DISCUSSIONS
4.1 Admin login page
This is the control center of the system, this is where the administrator will enter her username and password to get control over students, in other to set their questions, add a course for students, manage examinees, and set the number of examination questions and timing for the examination
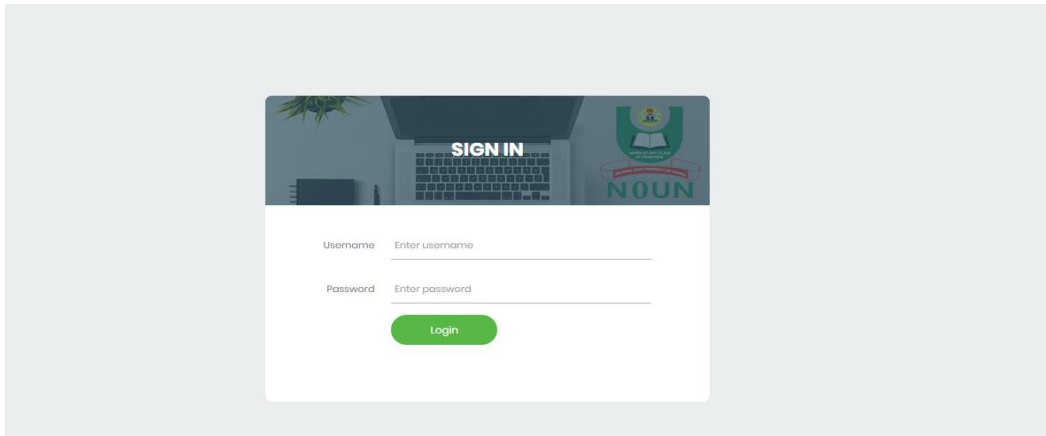
Fig. 2 Admin Login

4.2 The System's Dashboard

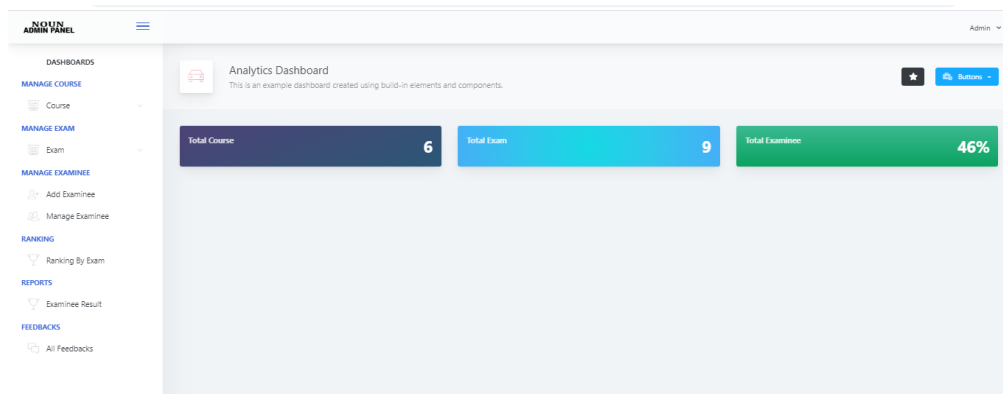The display subsystems manage the course, manage examination, and manage examinee, ranking, result, and feedback

Fig: 3. Dashboard Display

4.3 Course Addiction

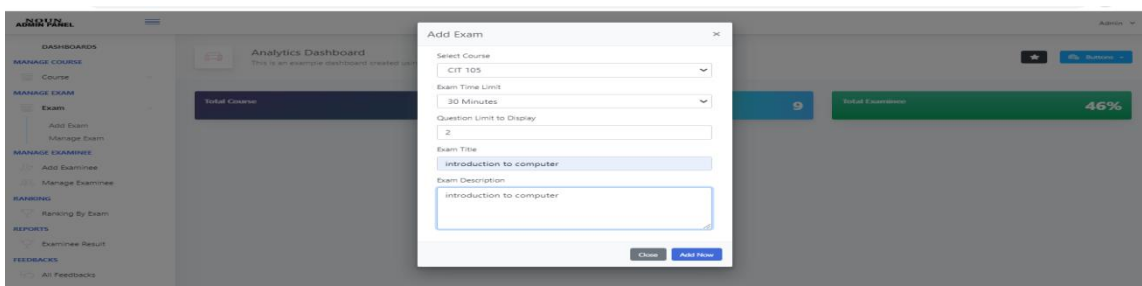The "manage course" helps an examiner to add new courses to be written during the exam

Fig: 4. Addiction of courses

4.3 Examination Questions Setting

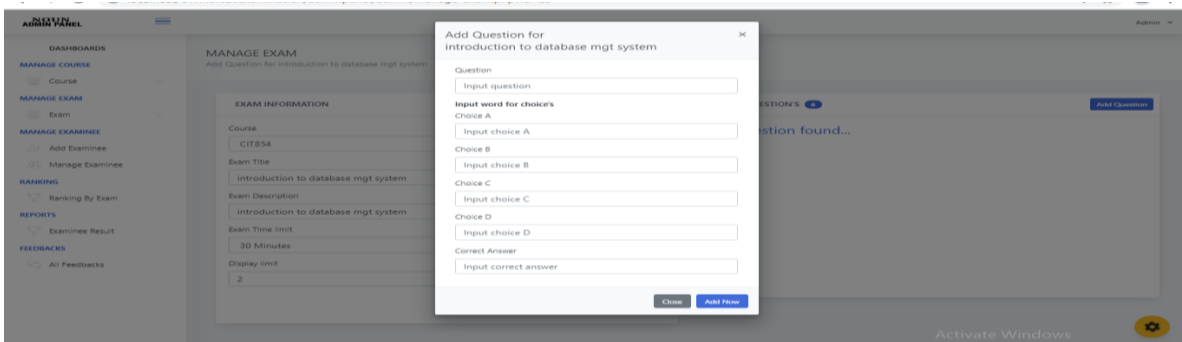Manage examination is the subsystem that will lead you to set your examination questions for examinees.

Fig: 5. Questions Setting

4.4 Student login page

After the student has login with his/her matriculation number, the available courses are displayed for the student to click and start the examination
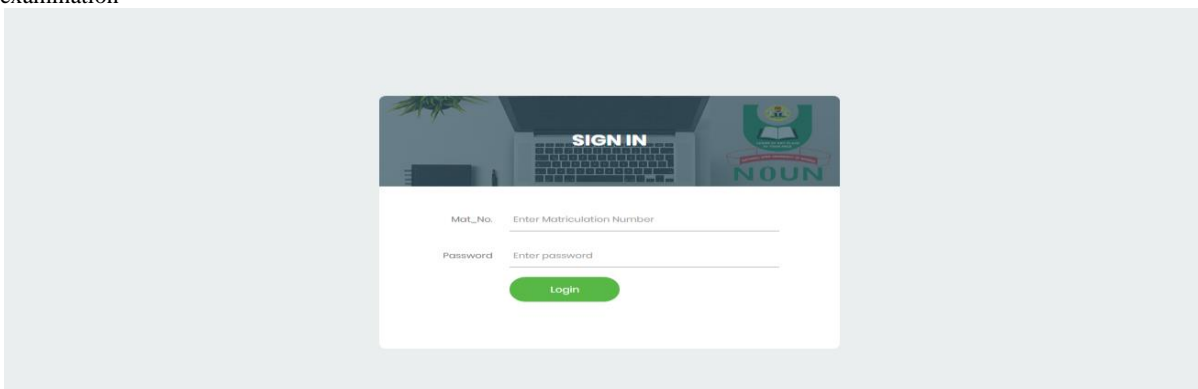

Fig: 6. Student login page

4.5. Available courses

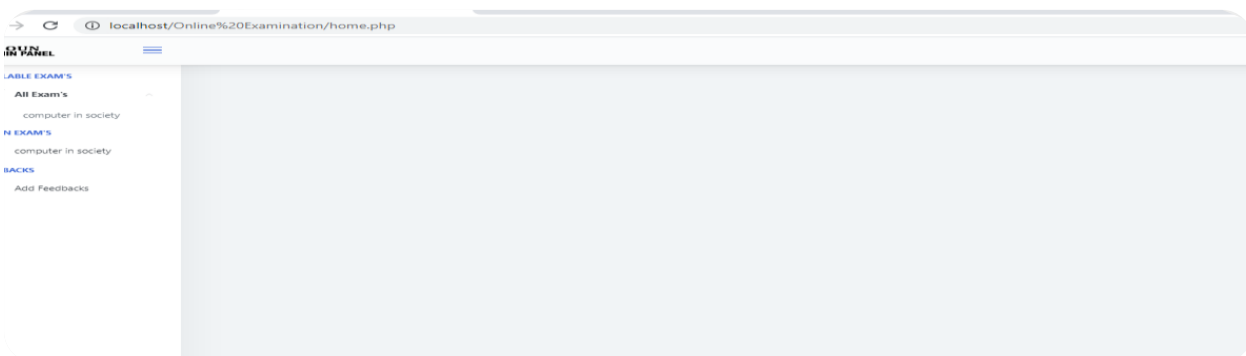This shows the number of courses available for a student to take his/her examination

Fig: 7. Available courses

4.6. Admin Account Table

Administration (Admin) Account: This is the database table where an admin can add or change the user name and password to log in to the site.
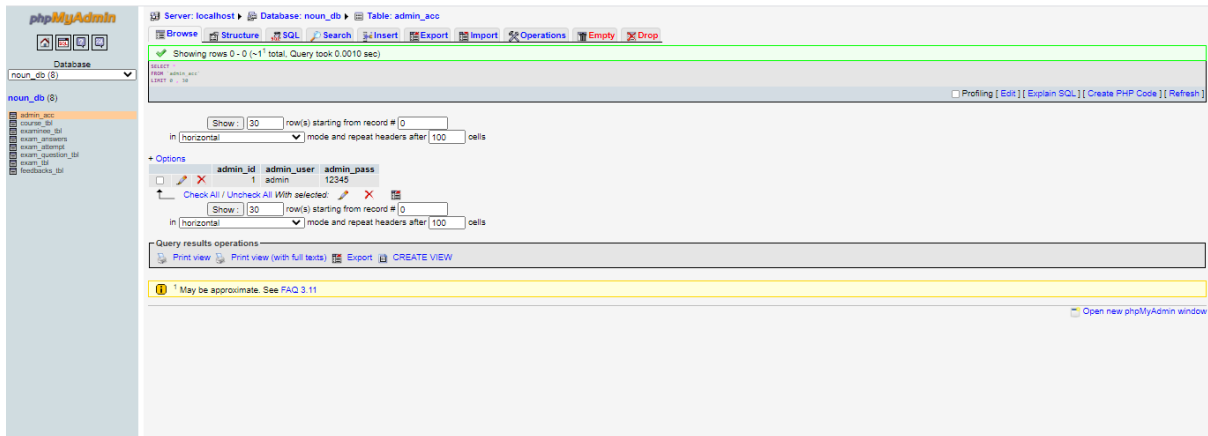
Fig: 8. Admin Account Table

4.7 Course Table

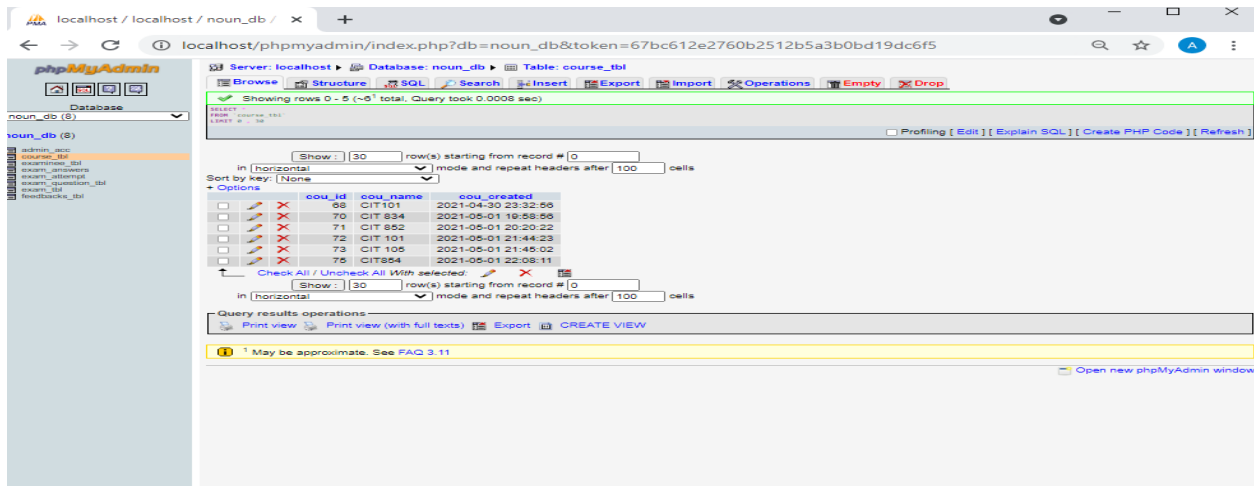This table shows the time and dates the course was created

Fig: 9.Course Table

4.8 Examination Table

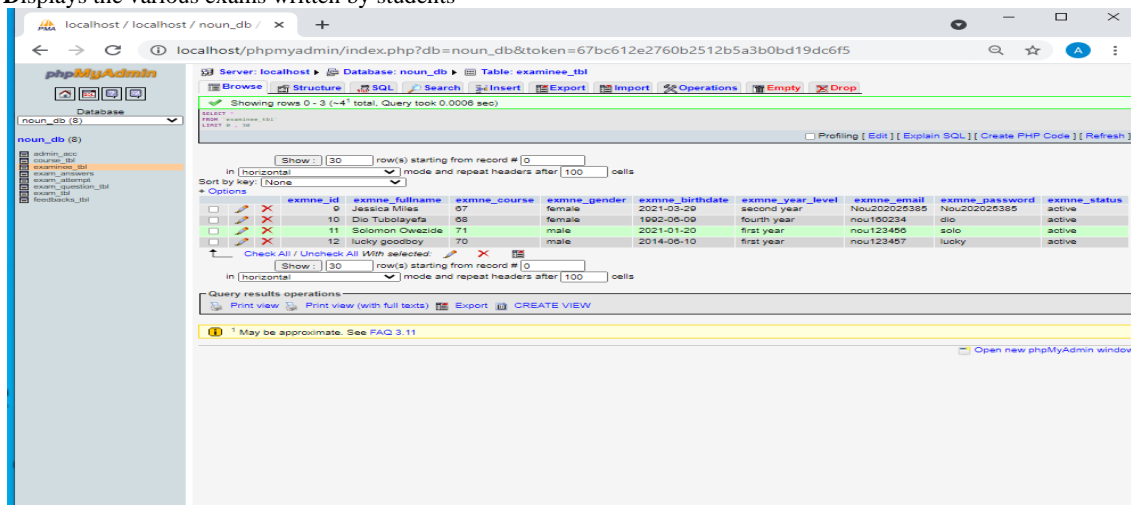Displays the various exams written by students

Fig: 10. Examination Table

4.9. Host login

The hosts of the examination have to log in to monitor their students from the host device
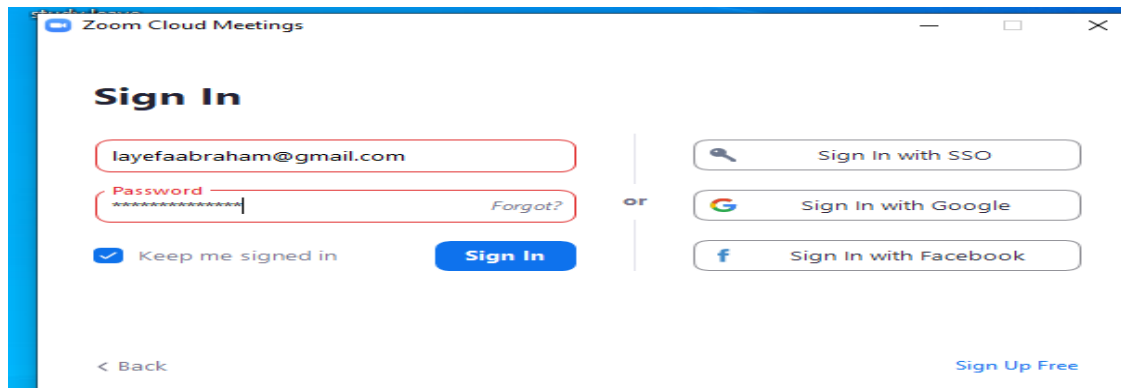
Fig: 11a. Host login

4.10. Creating Meeting

The host has to click on schedule meeting to create a new meeting (examination).
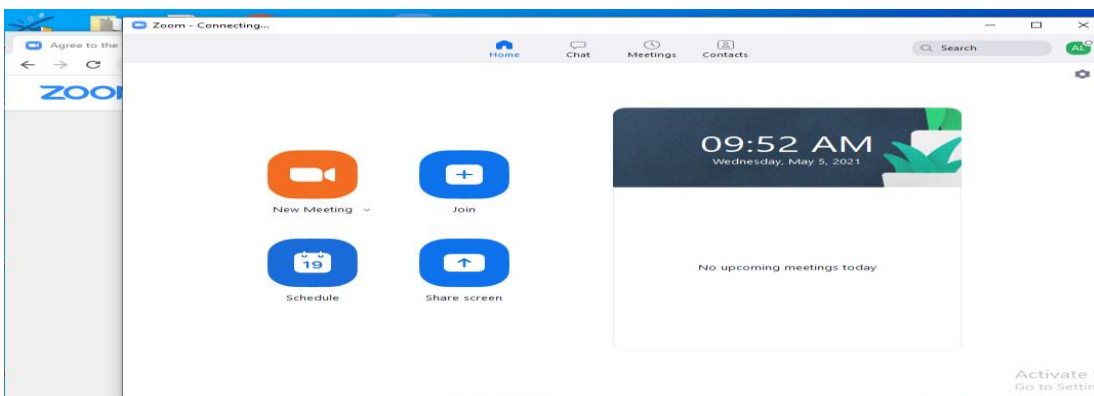

Fig:11b. Creating Meeting

4.11 Meeting Scheduling

After the host has successfully login, the host has to schedule a meeting by performing some settings to be in control of the overall examination such as date and time for examination, duration, and most importantly, with turning on participant's video which will automatically video a student immediately at joining time.
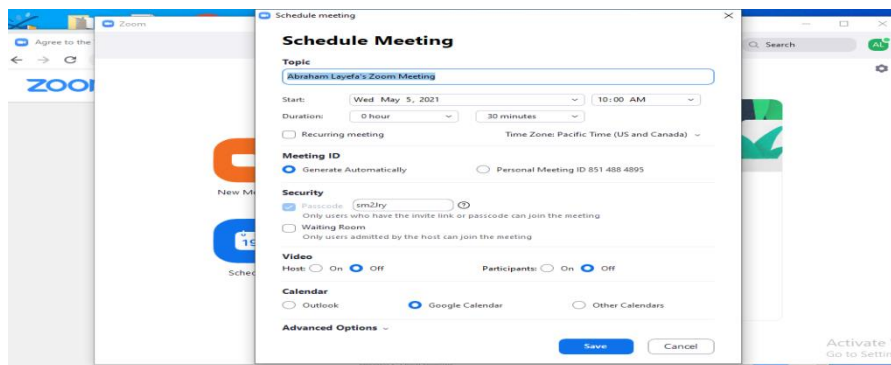

Fig: 12. Meeting Scheduling

4.12 Join Meeting

Joining Meeting: Participants are to click on join meeting to allow display by the host, Joining a meeting with a meeting identity (ID) which will be created by the host at the time of scheduling a meeting and the meeting ID will be sent to participants via email or other sources
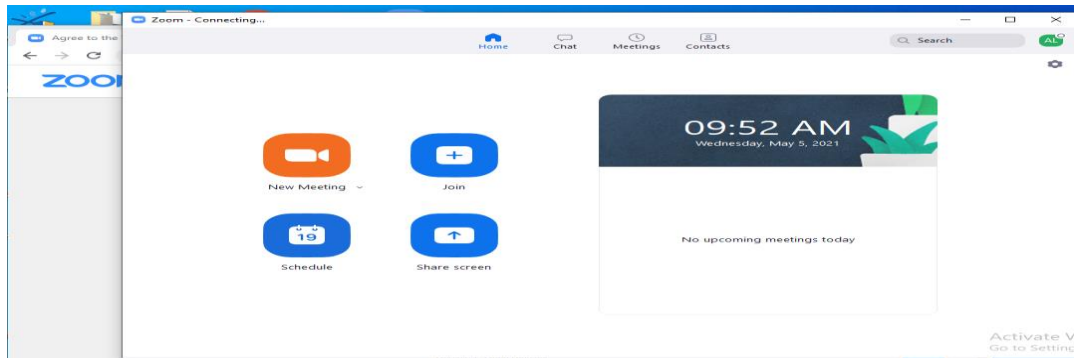
Fig: 13a. Join Meeting

4.13 Input and Output Format

Students have to log in first on Zoom software with their meeting identity ID, click on video and recording, select a location to store the video recording files, minimize Zoom in their system then login into the online examination website with their matriculation and password to begin examination. After the examination, clicks submit on the examination site, .

and at Zoom, click chart to send the recorded video to the host. The output will be at the click of submitting, a total number of scores and percentages will display on Zoom, and the video recorded during the examination will be stored on the cloud or device for the host to view later
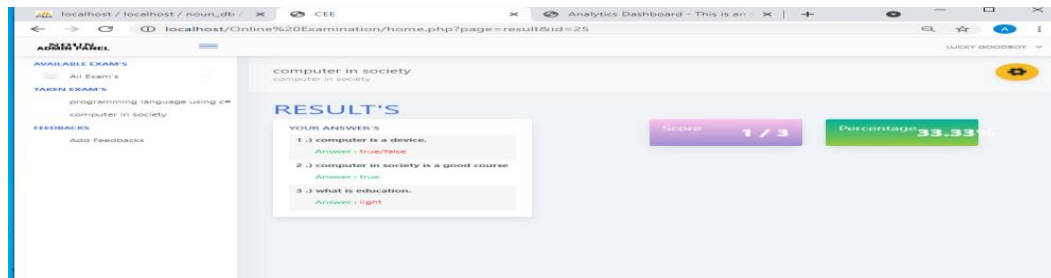

Fig: 13b. Examination Results

4.14. Effectiveness of the Proposed System

The developed system has shown to be very efficient and effective as it displays live the person taking an online examination refer to Figure14.
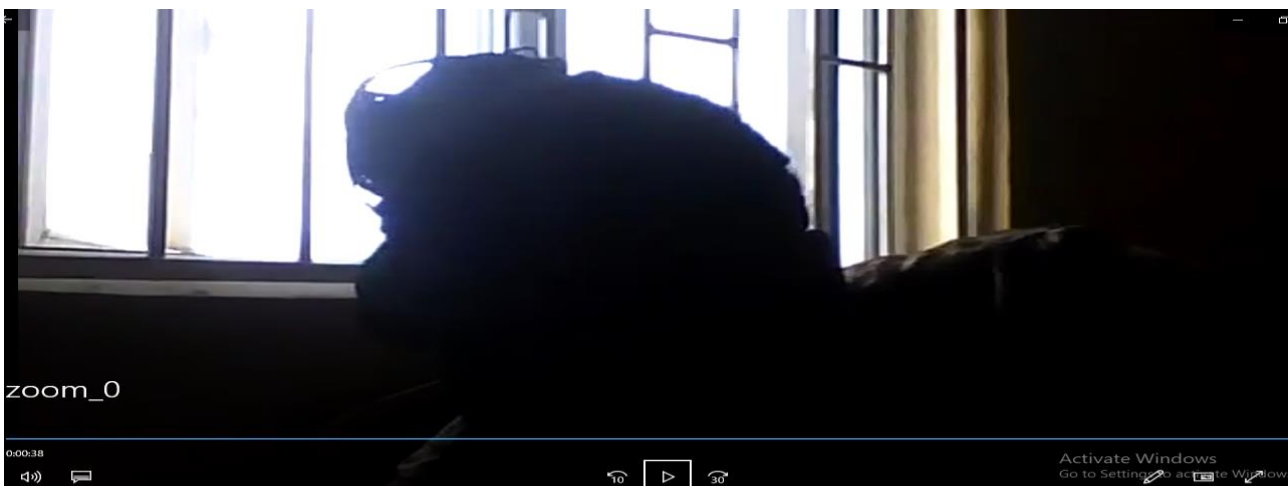

Fig: 14: Zoom Video Record Display

5. CONCLUSION

It is clear that the online examination monitoring system is very effective in monitoring online examinations as students can appear live when writing examinations from remote locations with the help of this Zoom application and it is easy to set up for usage. Thus, it is recommended that NOUN should upgrade its online examination system to this online examination

monitoring system. Funds should be made available by the government or online examination practicing institutions to support researchers in this area.

5.1 Application

The study is applicable in Classroom learning, and monitoring examination venues

5.2 Suggestions for Further Research

Many of the features of online examination have been covered however; I suggest future research on how to implement the linking of Zoom directly with the online examination system. Linking of Zoom directly with the online examination system

5.3 Contribution to Known Knowledge

The use of an online examination monitoring system is a very effective way to mitigate cheating in examinations.

Previously, Zoom has been used as software for hosting online meetings and online classroom teaching but this study has shown that Zoom can excellently monitor online examinations in remote locations

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