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AN ONLINE VIRTUAL EDUCATIONAL CENTER

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Abstract

During the past decade, Sri Lankan education system has transformed into a highly competitive level and as a result private tuition has now become a necessity in Sri Lankan society. One main concern for most students when selecting a tuition class is the physical distance to the class from their home. As a result, most students have to waste a lot of time and money just for travel to the class. Although Individual and small/group classes provide a customized service compared to open classes, students have to bear a considerably higher tuition fee and that could prevent most students from getting such a service from teachers. Also most teachers have to address the issue of limited space availability and as a result they have to either rent a place or have to limit the number of students to fit in to the available limited space.

This web based system enables both students and teachers to self-register in the system and engage in all the typical class room activities with the use of internet. Teachers will be able to conduct live online classes via the system and large number of students will be able to participate classes from their residences. Also various educational resources are available in the system which enables everyone to be fully interacted with each other. Additionally functionalities to generate administrative reports, track visitor details and user activities are also included in the system along with more other useful functionalities. Students will get a customized service and limited space will no longer be a problem for teachers as everyone will interact based on their own locations. So this system will provide a cheaper way of conducting classes than current tuition classes, and also it is expected to operate as a way of minimizing the issues of the current private tuition education sector. Currently the system is based on English language and supports only one local language 'Sinhala'.

Keywords: Tuition; Online Education; Moodle.

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1. Introduction

Sri Lankan education has become highly competitive due to the reasons such as extremely competitive national qualifying examinations like grade five scholarship examination, O/L and A/L examinations, limited higher education opportunities and social competition to enroll in popular schools. Consequently, this high competition has created the phenomenon of private tutoring or more commonly referred to as 'private tuition classes' in Sri Lanka. In current Sri Lankan education system, there is a very high demand from students for private tuition classes and as a result large numbers of private educational institutions have been started in Sri Lanka recently. Most teachers are also willing to provide their services through these institutions, since this will generate an additional income for them. One major drawback in this system is that most of these classes are located around major cities of the country, so that only limited number of students can have the real benefit of these classes. Another issue is only a very few number of teachers can actually provide their services through these classes, since the management of these private institutions decide which teachers they should employ. Therefore students have no opportunity to select the teacher they want and they just have to accept whatever the available service. So as a solution, some teachers conduct individual classes or group classes mainly based on their residences, but still students may have the barrier of physical distance and teachers will have to address the issue of limited space availability as well. Another major problem in most private tuition institutions is the quality of the service they provide. After all, most of these institutions operate purely based on commercial objectives and there is a tendency to overlook the quality of the service they provide. This issue is mainly attributed to visibility of blackboard due to large number of students, poor sound systems, errors in the printed notes etc. The proposed system is expected provide solutions for these issues. [1][2][3][4]

2. Aim and Objectives

The aim of this system is to enhance the situation of current private tuition sector by introducing an online virtual educational institution. As the name suggests this system is expected to provide the services of an educational center through internet. In Sri Lanka, internet usage is increasing in a rapid pace and as a result, plenty of new opportunities in various sectors have been emerged. One of the most important sectors in any country is its education sector and therefore using technology to enhance the education system will be very important for the development of the country. Since young generation of Sri Lanka already has a sufficient amount of knowledge in using computers and internet, there is a high chance of making this project a success.

One of the objectives of this system is to eliminate the barrier of geographical distance between teachers and students. Main cause for the ineffectiveness in the current private tuition sector is the wastage of time when students travel to the tuition classes from their home. Since availability of internet in Sri Lanka is becoming more and more common, this system will be able to serve large number of students and teachers who live in various parts of the country thus eliminating the unnecessary time wastage.

Another objective of this system is to address the issue of limited space availability for conducting classes. Most large scale tuition classes as well as small group/ individual classes have the problem of limited space availability. Since this system will function as a 'virtual'

educational center, physical space will be no longer an issue. Also it will enable more and more teachers to engage in private tuition because they don't need to have a large space to conduct a class anymore.

Enhancing the quality of learning for students is another area that the system is expected to address. Most of the available tuition classes lack proper sound systems to reach each and every student and also the printed notes may not meet the best quality. Since this system will be operated mainly based on live classes and video lectures, the sound and video quality will no longer depend on the size of audience unlike in normal tuition classes. Apart from that, system administrators have the control over the quality of the video materials which will be uploaded in to the system. Also administrators can ensure that notes to be printed and other resources meet the quality standards as well.

The system is expected to facilitate students and teachers to self-register in the system and also they should be able to maintain their profiles. Depending on the requirements, students should be able to select a teacher by reviewing the teacher profile and on the other hand teacher should be able to decide whether the student will be accepted or not, depending on student details and past performances. Although the system will not charge fee from students, they will need to pay a monthly payment for the teacher for his/her service. The primary media of the lessons is live classes and video lectures where teachers should create the videos and upload it in to the system initially, so that the system will automatically enable the registered students to view the videos. Meanwhile students can schedule limited time slots per week to communicate with the teacher to clarify the matters if any. Also the system will allow the registered students to download the handouts and tutorials which were uploaded by the corresponding teacher. The system will also facilitate the teacher to conduct exams through the system where students can log in to the system and take the examination within a specified time period. A forum will be provided for students to discuss the matters openly with other students and solved past papers will be provided via the system which will be accessible by even non registered students. The system is mainly expected to facilitate teachers to conduct online classes using the available whiteboard feature which is one of the major functionalities of this system. Additionally, there will be other useful resources in the system such as presentations, and documents which will be downloadable by even non registered users.

In the Introduction section, present clearly and briefly the problem investigated, with relevant references.

This section should put the focus of the manuscript into a broader context. As you compose the Introduction, think of readers who are not experts in this field. Include a brief review of the key literature. If there are relevant controversies or disagreements in the field, they should be mentioned so that a non-expert reader can delve into these issues further. It should conclude with a brief statement of the overall aim of the research or experiments and a comment about whether that aim was achieved.

The goal of this section is to combine information about the setting of the action research project and the story behind the project into a smooth narrative that gets the reader engaged in your work's context; the critical question is also introduced here. This section is usually about three to

five pages long. The reader should have a good idea what the paper is about before finishing the first page.

3. Background

When considering the existing technologies, *Moodle*[6] is a very popular tool used in the current educational industry. *Moodle* is an application which is commonly used by most of the universities and some other educational institutes as a way of interacting with students. It facilitates teachers and students in terms of sharing and organizing learning materials and other useful resources, designing quizzes, forum facilities etc. Although it can be used as a repository for educational resources and materials, other related user management and administrative functionalities are not provided by *Moodle* itself. Therefore some kind of improved technology is needed to combine features of *Moodle* with user management and administrative functionalities, in order to provide a successful online learning environment.

According to a comparative study[7] that carried out focusing the architecture of *Moodle*, it is one of the systems that have been increasingly gaining worldwide popularity in e-learning systems. The paper discusses comparisons between different virtual learning management systems, and why *Moodle* has been adopted by many people and organizations around the world. According to the paper, *Moodle* offers a tightly integrated set of tools that was designed from a social constructive perspective.

Content Management Systems (CMS) is another very popular technology used by many due to the easiness of implementation without having a detailed technical knowledge. Among the popular CMS currently available, *Joomla*[8] is one of the major technology used around the world. It is another open source application which enables users to easily configure a considerably complex website. Joomla has a very active community which provides a vast amount of open source third party components so that website builders can use those components effectively to build their customized websites. Although Joomla provides a large number of components in user management and other administrative functionalities, still it cannot use solely to facilitate online education, due to the lack of other relevant components or plugins. So, in order to provide successful online learning environment, there is a need for a different technology that can combine Joomla user management and administrative functionalities with advanced features to share and organize learning materials.

A third party study[9] also has been carried out regarding how a hybrid learning platform can be quickly erected based on Joomla, and results shows that Joomla supports management of learning content, learning methods, learning resources, e-learning files, video-on-demand and other aspects. Since the purpose is to use Joomla in e-learning context, results of the study indeed made a strong case for the ability of Joomla to achieve this purpose successfully.

There are plenty of websites[10] currently operational, which had used the *joomla* technology to configure the website. On the other hand there are lots of websites[11] which uses *Moodle* to create customized websites. So those sites were referred to get an idea of how these open source applications are used in websites. Also there is another free component called *Joomdle*[7] which

acts as a bridge to connect Joomla and *Moodle* so that *Moodle* features can be used from Joomla which gives website builders plenty of options and flexibility when building a complex website.

The propagation of Massive Open Online Courses (MOOCs) and other online courses has changed the landscape of guided learning for both students and teachers. Professors who once stood in front of classrooms filled with dozens of students now stand in front of webcams in front of thousands or tens of thousands of logged-in users. Grading papers, scoring tests, and giving personalized feedback are all totally different pursuits in an online environment, and technology companies are rushing to build the tools that make online learning easier, more effective, and more enjoyable for teachers and their students. Literature survey was also done on the popular MOOCs before designing this system. [12].

4. Analysis, Design and Implementation

After studying the background of the current tuition education system in Sri Lanka, the pertaining issues and the required improvements were identified and a need for solution was highlighted. As a result, specific requirements for a proposed system were gathered in various methods. Then the gathered requirements were analyzed and categorized in to specific functional and non-functional requirements. The analyzed requirements were then divided in to specific system functionalities and based on the identified functionalities; design of the proposed system was prepared in number of dimensions.

The identified functional requirements of the system are as follows.

- Students should be able to register in the system
- Teachers should be able to register in the system
- Students and teachers should be able to maintain their profiles
- Students should be able to join a class by considering subject, teacher qualification and cost
- Teacher should be able to manage classes by uploading video lectures, tutorials and handouts and conducting exams etc.
- Teacher and student should be able to discuss matters through the system. Also there is a FAQ section for each subject where teacher can add questions and answers to that section.
- Teacher should be able to conduct online live classes through the system using the whiteboard feature.
- Also after each class, a corresponding video lesson can be uploaded to the system, so that if a student misses a particular class, he can still follow the lesson using this feature.
- System should provide a forum so that students can post problems and answers
- System administrator should be able to audit the system performances and statistics

The non-functional requirements which enhance the overall value and usefulness of the system are as follows.

- Accuracy – System should be accurate, should be false proof and system users should be able to trust the system. Maintaining user profiles, audit system statistics, performances and mapping students with the correct teacher are some functional areas where accuracy has a very high importance.

- Consistency –The system should be able to generate identical results under identical conditions. It makes the system reliable and it’s vital for the success of the system.
- Security – The system should be secure in the sense that it should only allow the registered users to access the system and malicious users should be blocked by the system.

Architecture Design

This system follows the client – server architecture and the system is installed and runs in a central location called web server whereas multiple clients access the server simultaneously to get the required services as indicated by the following Figure 1.

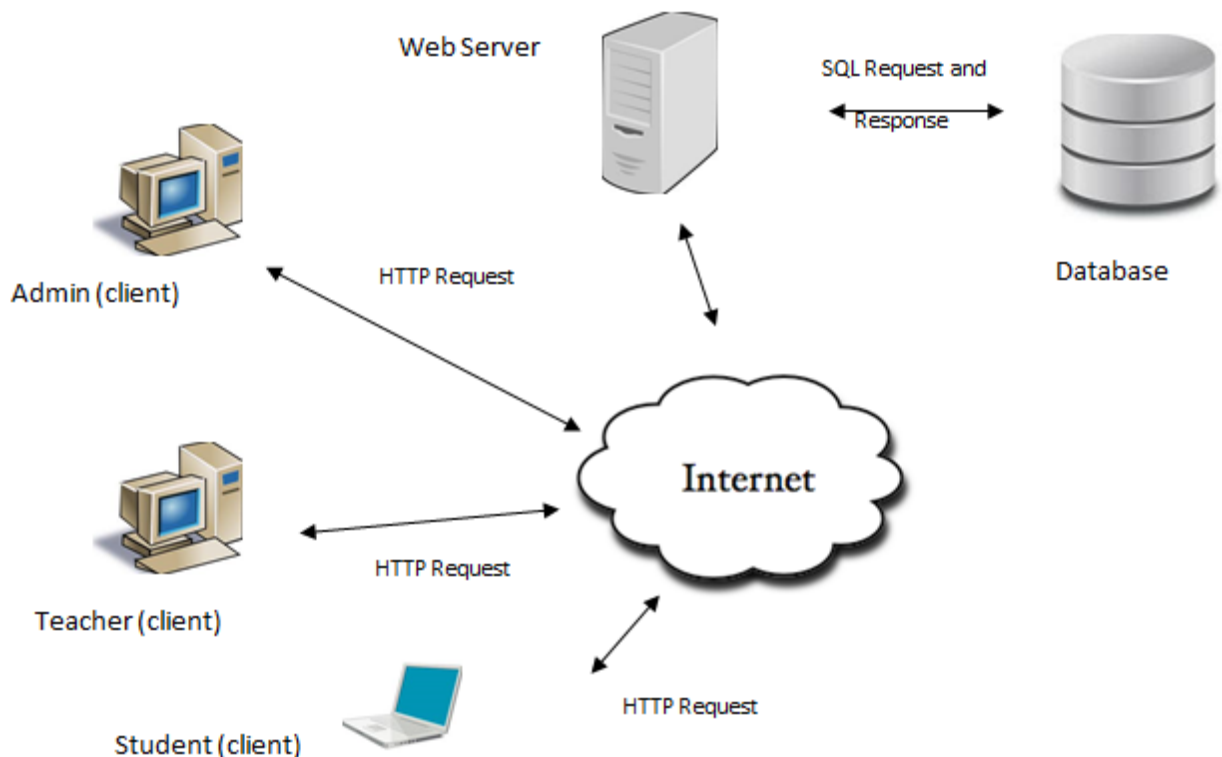


Figure 1: System Architecture

Generally, in the Client-Server model, the server is responsible for providing various services required by the clients. Therefore the server obviously should have a high processing power to process the requests it receives by the clients and should be able to serve the requests simultaneously. In the context of this particular system, the web server is responsible for processing the HTTP requests it receives from web clients called web browsers and it provides/sends the web resources to the clients if those are available.

Following figures 2,3,4,5,6 and 7 show how the implemented system looks like.



Figure 2: Home Page with Multi Language Facility

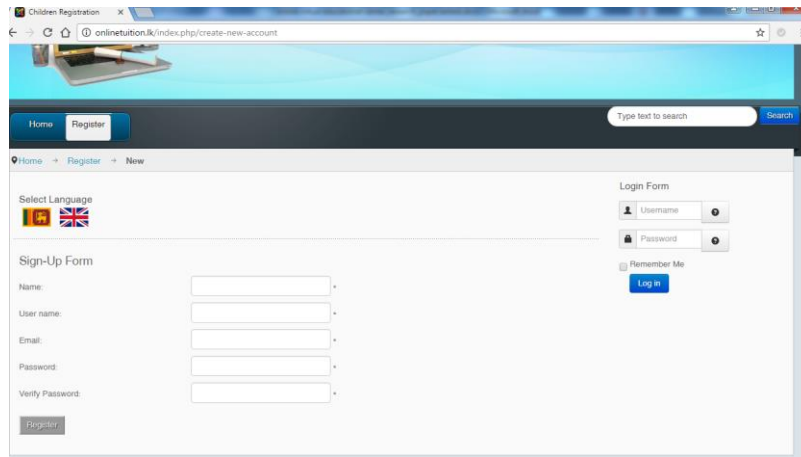


Figure 3: New User Registration

All users need to be registered in the system Figure 3 shows the user registration screen.

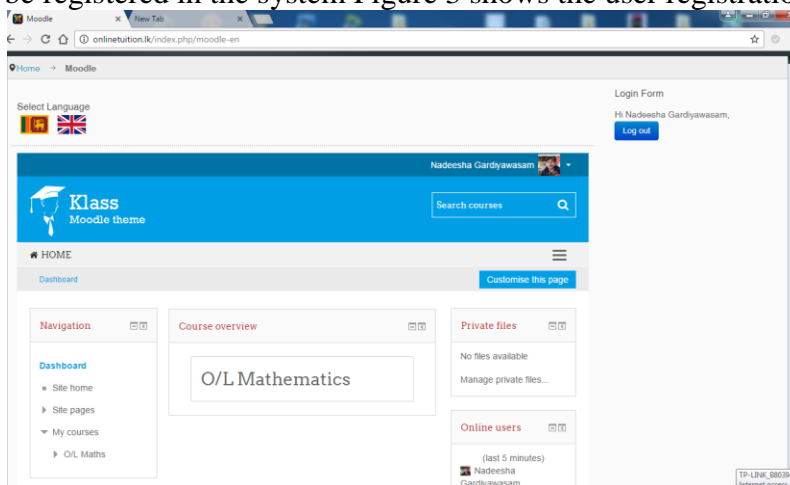


Figure 4: Moodle wrapper

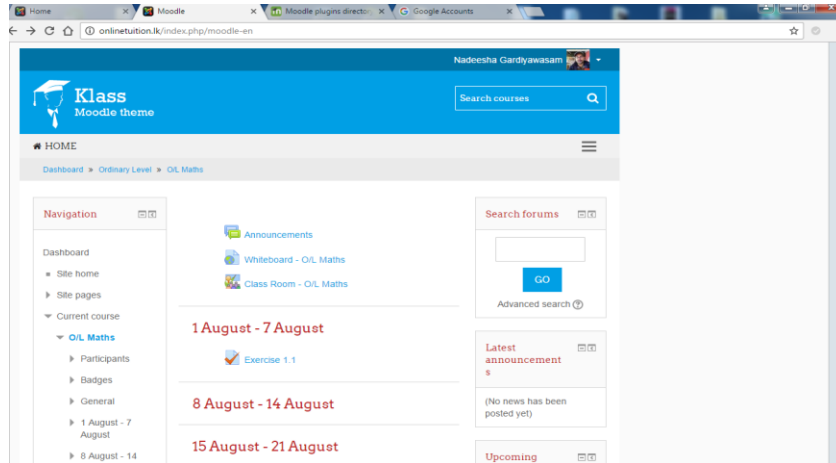


Figure 5: Course Page

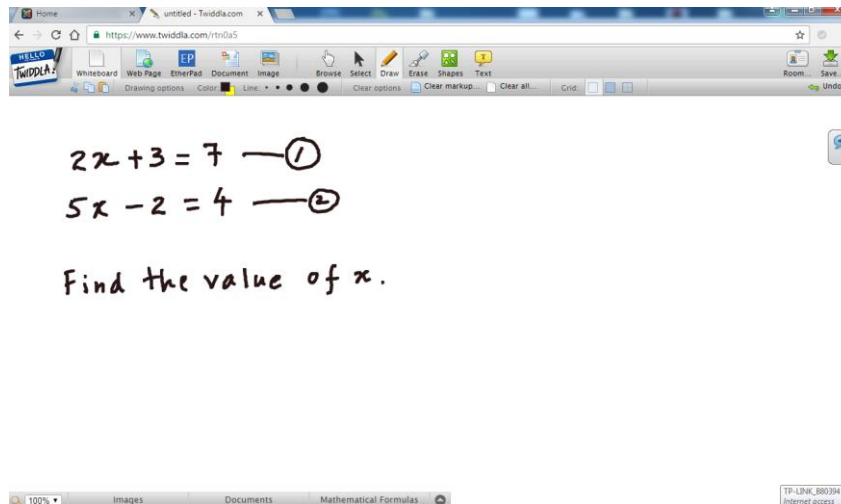


Figure 6: Interactive Whiteboard Example 1 (Mathematics lesson)

Interactive Whiteboard Example based on a Mathematics Lesson is given in Figure 7. Number of Students following the course can be shown on the right window.

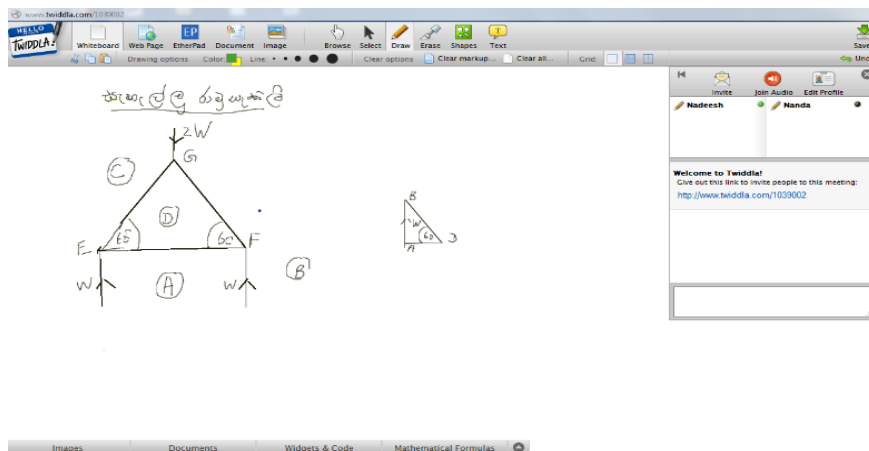


Figure 7: Interactive Whiteboard Example 2 (Mathematics Lesson)

5. Evaluation

System was evaluated after designing various test cases to simulate the real time scenarios. The extent of the success of test cases would decide the overall usefulness of the system. Following Table 1 gives the test cases carried out and the corresponding status of each test case.

Table 1: Test Cases and Results

Test No.	Test Description	Expected Results	Status
1	Register new users	Users should be able to self-register in the system and user should confirm the registration by clicking the link in the automatically generated email	✓
2	Login to the system	Only the registered users should be able to login to the system by providing Username and Password	✓
3	Search the system	Users should be able to search the system by specifying key words and results should be displayed. Also advanced search should be possible, which enable users to provide some additional parameters to be considered when perform the searching	✓
4	Load Moodle within the website	By clicking the menu 'Moodle', logged in users should be able to access and interact with the Moodle inside the website, without redirecting users to a different URL	✓
5	View courses by category	By clicking the menu 'Course Categories', logged in users should be able to view the available courses by category wise	✓
6	View details of each course	By clicking the menu 'Course List', logged in users should be able to view topics, content and teacher details for a particular course.	✓
7	Enroll in to course	Logged in users should be able to enroll in to a course by visiting the menu 'Course List' and by clicking the button 'Enroll in to Course'.	✓
8	View the 'enrolled' courses	Logged in users should be able to view the courses in to which they have enrolled, by visiting the menu 'My Courses'	✓
9	Visit the Moodle course page for a each and every enrolled course	By clicking the name of the course which displays under 'My Courses' page, logged in users should be able to access and interact with the corresponding Moodle page for the course. Also by clicking the 'Go to Course' button displays under details of each course, users should be able to access the corresponding Moodle page for the course	✓
10	Participate in a 'live' class session	Enrolled users for a particular course should be able to participate in 'live' class session by clicking the 'whiteboard' link under the 'Course Contents' section	✓

11	Access course related resources	Enrolled users should be able to access resources such as documents, videos, forums for a particular course by visiting the section 'Course Contents' for each course	✓
12	Enroll as teachers	Registered users who wish to teach courses through the system should notify administrator about it and administrator should be able to change their role to 'Teacher' and provide required privileges	✓
13	Upload resources for a course	Teachers should be able to upload course related resources through the system	✓
14	Chat with users	Logged in users should be able to chat with other logged in users by visiting the menu 'User Chat'	✓
15	Provide user comments regarding the website	Users should be able to send their views easily to the administrator's email by using the form displays in the menu 'Request for Quotes'	✓

6. Conclusion and Future Work

The success of the system will largely depend on the fact that how well the system will be welcomed by the students as well as teachers. Additionally distribution and costs of internet connectivity will have a considerable impact on the outcome as well. Initially it will be perceived by the society as a strange but a fresh idea, though still it has its advantages.

No longer will students and teachers need to waste their time for travelling and teachers won't need to consider about the cost of physical class rooms anymore. But still they will have to have a computer and internet connectivity and additionally the teacher may have to purchase and use a drawing tab to ensure smooth use of the online whiteboard facility. The system will not charge students for the service, and teachers may charge a less payment from the student for their service. Time of the day that the class is conducted will not be a problem for either teacher or student, since they participate for the class while residing at their home. Number of students in the class will not be an issue for students since despite the number of participated students, each student will get an experience of an individual tuition class.

Although the current system is fully functional, there is still enough room for the system to be improved. At the moment, the system does not provide paid courses and paid resources for student, hence a payment scheme has not implemented. Teachers may charge students for their services, but still the system does not charge from students. This area can be identified as one of the areas to be improved in the future. Paid courses and paid resources can be offered through the system in addition to the free content, so that much more organized classes and resources will be available through the system and inevitably level of service will be improved for the paid courses. Virtuemart component can be used with Joomla to set up selling the courses and resources via *Paypal* or credit/debit card facility, which is the common method of online payment method used today.

Also when a live class session is going on, it would be better if the voice can be recorded, so that those students who missed the opportunity to participate in that particular class can later follow the recorded sound file.

The system can be further improved in some of the areas as mentioned above so that the users will have a much better experience and it will ultimately help to reach the goal of enhancing the level of tuition education in the country.

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