Lyceum – Classroom without Walls

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Education system in India is still following a traditional classroom lecturing system and slowly adopting new pedagogies involving technological infrastructures. However, incorporating technology enabled learning solutions to schools should consider the cultural context of the region and the practices that works best for their system. A major factor hindering quality education in India is the constant rise in the student population and the teaching overload of the educators. In this paper we propose an information technology based solution, Lyceum, which enables teachers to conduct lectures to a larger number of students in different classrooms with two way communication between the teacher and the students just like in a classroom. The first version of the product has been deployed in three schools in India and we are currently collecting feedback for continuous improvement.

ICT in Education.

1. INTRODUCTION

Schools are considered the melting pot of vibrancy and a unique hoarding of enormous talents. School life experiences mould an individual not just through textbooks or celebrated academic events but with the sheer volume of experience a person goes through during his time at school. World is filled with exciting stories and schools offer a perfect platform for a young person to listen to hundreds of stories, poems and real life experiences of several hundreds of people and learn the best from them.

Primary educational institutions in India follow a traditional path of classroom lecturing using blackboard teaching and direct interaction with students. A main contributor for following such a system is the belief in a tried-and-worked method and the economic overheads of moving to technology based pedagogies. However, the cost of overhead projectors, cameras and other Information and communication technology (ICT) devices have gone down in the recent years and more schools are trying to incorporate them in their daily activities.

The Indian education market is a billion dollar industry [1] with more than 1.5 million schools across the country. Though many ICT related solutions for education developed in other countries can be used in Indian systems, there are a number of factors that hinders it. The context of the education solution from one region may not be appropriate for another [2]. The cost of buying and maintaining the ICT solutions also act as a deterrence for schools to adopt these solutions. Hence, there is a dire need of locally developed and maintained solution that understands the context in which an Indian school operates.

In this paper we discuss one such solution that we developed with Techgenstia Solutions, Lyceum, customised for high schools in India. Lyceum aims to expand the reachability of the contents taught beyond the limitations of the classroom wall, thereby increasing the efficiency in teaching. This is important to the context of India where the student population is increasing at an exponential rate. The rest of the paper is organized as follows. Section 2 discusses on Lyceum Architecture, followed by the workflow of the application in section 3, the mobile version of the application on section 4 and the details of deployment in section 5.

2. LYCEUM ARCHITECURE

The basic architecture of Lyceum is a connected classroom with a centralised studio system [3]. This helps in conducting school-wide video announcements, programs and giving lectures to a larger volume of students in different classrooms. Figure 1 gives an overview of the architecture of Lyceum.

2.1 Lyceum Studio

A studio room is arranged in the host school with high definition camera, studio lights and a microphone. The studio enables the teacher to conduct classes and to receive questions from students in various classrooms.
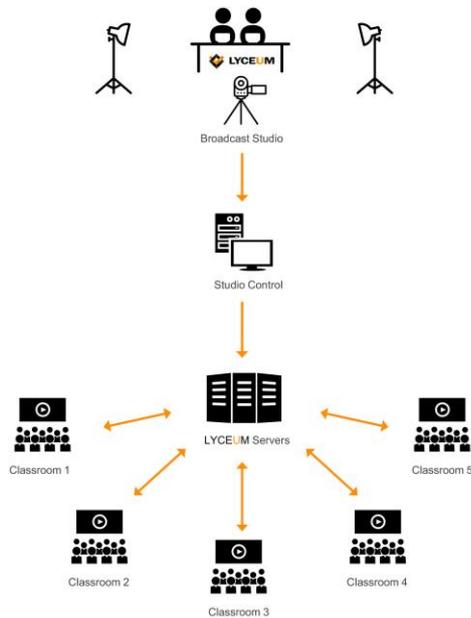
Figure 1 Architecture Overview

2.2 Lyceum Server

The contents of the studio is transferred to the recipient classrooms through the Lyceum Servers. The studio control software manages the two way communication between the studio and the server. The server supports up to 20 nodes with real time full HD Video, and high speed data sharing with H.264-VP9 encoding/decoding [4] and other sophisticated server components running on Ubuntu base server. Some of the features of the server are the following:

➢ Interactive TV channel

➢ Real time multi party virtual classroom

➢ Distant debate platform

➢ Real time sharing of Desktop with all the participants along with multi-party video

➢ On demand video/audio enabling from connecting end points/classrooms

➢ Powerful admin tools to control the remote end points /classrooms

➢ Multiparty text chat feature in a specific room

2.3 Lyceum Software

The basic software running on Lyceum platform is designed for real-time audio and video communication with the studio. The software has the following features:

➢ Real-time Audio/Video Communication

➢ Text Chat

➢ Data Sharing

➢ White Board

➢ Information Board

➢ Alert System

➢ Customized School Administration Channel

2.4 Smart Classrooms

Each of the classroom is equipped with a projector, camera and microphone. Real-time feedback from the classroom is given back to the studio alerting the teacher if there are questions from the class. For instance, if a student raises their hand or asks a question in one of the classrooms then it is fed back to the studio for the teacher to address.

3. LYCEUM WORKFLOW

The current implementation of our application works as following:

➢ The studio which will broadcast its video real-time to the connected classrooms

➢ High quality lighting, video and sound capturing systems from the studio with Full HD-tilt-pan cameras and stereoscopic audio are used

➢ Classrooms can be connected to the studio as receive only mode for video and audio

➢ Raise Hand option for classrooms to start their video and audio

➢ Raise Hand requests can be allowed or disallowed from studio

➢ If Raise Hand request is allowed the Classroom/Participant will start sharing their video and audio

➢ Multiple participants can join with Raise Hand option at the same time

➢ Public messaging system from the studio

➢ Private messaging system between studio and classrooms

➢ Public notices as scroll messages under the common video

➢ Alert messages from studio to public and individual participants

➢ Automatic voice activity detection and placing the participant in the major video area

➢ Video and Audio mute options in each classroom and studio

➢ Kick out option if something is disturbing

➢ Whiteboard with collaborative drawing features

➢ Data sharing facility from the studio and from classrooms

4. LYCEUM MOBILE APPLICATION

As an extension of the application, Lyceum also provides a mobile application that enables distant learning by accessing the content directly live through personal mobile phones. The mobile application is secured with latest obfuscation techniques [5] so that the contents are secure while transmitted. Even though the functionality is appealing, currently the mobile application is used for broadcasting information to parents. The following are some of the use cases that the mobile phone app is used so far:

➢ Streaming special programs and classes live to parents.

➢ Real-time notification to parents regarding student progress and circulars.

➢ Online parent-teacher meetings via mobile app.

5. CURRENT DEPLOYMENT

The first version of Lyceum has been deployed in two public schools and one private school in India. The users are currently quite satisfied with the product and we are gathering their feedback continuously to improve the product to extend the solution to educational institutions across the country.

6. CONCLUSION

To address the rapid growth in the students in regions like India, teaching institutes should have mechanism in which the current teaching resources should be utilized in a way that it can reach more classrooms without adding too much overload on educators. Lyceum, is a product that understands this need and provide a solution to schools by using the advents of ICT to expand the reach of lectures given by teachers.

7. REFERENCES

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