An Implementation of Virtual Classroom and Performance Analysis of Teaching-Learning Outcome

Md Mahmudul Hasan[1] and Md Zobair Khondaker Rion[2]

[1] Daffodil International University

Abstract

Virtual classroom is an irreplaceable part of distant learning systems and an important direction in the online education research field. A number of research works have been carried out in this area and many of them have been successfully implemented. However, most of them are video tutorial-based learning portal and video streaming classroom. In this paper, a model of real-time interactive virtual classroom has been proposed and implemented that provides real-time interactive classes with the collaboration of teacher and students in a single portal. It allows some responsive and co-operative tools that help teachers and students to interact easily irrespective of their distance. This virtual classroom has been designed to focus on the learners living is remote areas who cannot access the modern amenities of education. One of the main research goals is to provide the effective teaching and learning system where the distance between teacher and students can be reduced. Moreover, this paper makes some analysis and discussion about the testing and effectiveness of virtual classroom and analyzes the learning outcome.

Index terms— virtual classroom; e-learning; e-teaching; web based leraning portal; interactive web application.

1 An Implementation of Virtual Classroom and Performance Analysis of Teaching-Learning Outcome

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In this paper, a model of real-time interactive virtual classroom has been proposed and implemented that provides real-time interactive classes with the collaboration of teacher and students in a single portal. It allows some responsive and co operative tools that help teachers and students to interact easily irrespective of their distance. This virtual classroom has been designed to focus on the learners living is remote areas who cannot access the modern amenities of education. One of the main research goals is to provide the effective teaching and learning system where the distance between teacher and students can be reduced. Moreover, this paper makes some analysis and discussion about the testing and effectiveness of virtual classroom and analyzes the learning outcome.

2 Introduction

n interactive web based virtual classroom can be defined as an online teaching (e.g. electronicteaching or mobile-teaching) and learning (e.g. electronic-learning or mobile-learning) portal similar to the environment of physical

classroom. Here the word 'Interactive' means face-to-face communication as commonly seen in the traditional classroom **??**1]. Web based virtual classroom is very common in this modern era. Many developed countries are using virtual classroom to provide online education to the students. As the world is being developed with the new technologies, discovering and manipulating new ideas and concepts of doing work are changing rapidly. There have been many research in the area of virtual education and many of them have been successful to implement such system **??**2]. Now enrolling themselves in virtual education is benefiting students. Some of the virtual classrooms are getting positive feedback for providing quality education **??**3].

The goal of this research is to make an interactive web based virtual classroom that will help teachers and students. It has been designed with a view to replicating a face-to-face classroom. The virtual application for education can be implemented in the rural areas to improve the accessibility of quality education. In the context of Bangladesh or any third world countries, the educational resources are not equally distributed. The villages or remote areas are often deprived of modern facilities.

3 II. LITERATURE REVIEW a) Background

Though many research works have been done to explore the effective way of virtual education, very few of them have been conducted in the context of Bangladesh. There are several organizations which are trying to research and develop the virtual education system in Bangladesh such as -a large publishing company of technological magazines and news (www.comjagat.com)

[4], Jaago School (www.jaago.com.bd) an online school [5] [19]. Hasan et.al **??**2013) shows how a facebook-based app can be utilized in terms of learning English [6]. Some existing classrooms deals with tutorial based video streaming classes where high bandwidth is needed [7]. The people of pastoral area or villagers may not afford the bandwidth Volume XV Issue VII Version I Year 2015

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The percentage of student engagement in online education is increasing day by day. For example, a statistic shows -over 6.7 million students are enrolled in online education in United States and in last 5 years, 96% students have registered for online courses **??**3]. Not only in developed countries but also in third world countries like -Bangladesh, many students are engaged in online educational activities and social networks. Even though many virtual classrooms have been developed and implemented maximum of them are tutorial-based learning portal like video steaming and blogging. Students are still looking for something that is interactive, user friendly and most importantly easy to learn. The rest of the paper is organized as follows. Chapter two describes literature review with background and related works. Proposed model has been described in chapter III. Results has been described and analyzed in chapter IV. Finally, concluding remarks have been mentioned in the last chapter. enough to attend those online classes and another problem is that those online classrooms are not designed in the context of Bangladesh. Therefore, some research questions have been formed for this argument -? How to explore the concept of a virtual classroom where teachers and students can play their role interactively? ? How to make it more effective in the context of Bangladesh? ? How can it be run with lower bandwidth?

? How can the distant learners be benefited using this virtual classroom? ? How can the modern education be spread to each district of Bangladesh and other countries?

In this case, an extensive research has been done in the area of virtual education to contribute in the context of Bangladesh.

5 b) Previous Research and Related Works

In this section we discussed the recent research and related works evolving this area. Patrikab Monda, SwagatoMisra and Iti Saha Misra (2013) proposed a plan to conduct virtual classroom with low cost and lesser bandwidth where they showed mainly two components of the virtual classroom -1) the shared visual module and 2) Voice streaming module [7].

Jiamao Liu, Junjie Wang and NingGu(2003) illustrates a virtual classroom with three-layer client/server architecture integrating some supported tools, cooperative mechanism and a real-time learning mode based on synchronization [8]. Matthew M. Chingos and Guido Schwerd (2014) showed a statistics of students engagement in Florida Virtual School (FLVS). FLVS is the statewide Internet-based public high school in the United States. FLVS deals with education virtually using social networks like -online blog, email, virtual chat system, audio, video and tutorial based learning. In 2012-2013, 30 states had multi-district, fully online schools with enrollment of about 310,000 students, and 26 states had state virtual schools with over 740,000 course enrollments (Watson et al. 2013) [9].

An online teaching and learning portal named Coursera is a non-profit educational organization founded by computer science professors Andrew Ng and Daphne Koller from Stanford University that deals with massive open online courses (MOOC) [9]. Generally it works with cooperation of different Universities to make some of their courses which are available in online classroom. As the latest report in October 2014, Coursera has 10 million users in 839 courses from 114 institutions **??**10].

Nicenet announced the public viability in the new Internet Classroom Assistant (ICA), an effective online communication tool for web based conferencing, messaging, scheduling, link-resource sharing to different kinds

of learning environments (January 2, 1998) **??**11]. CIA is designed for the distance learning and completing collaborative academic projects, this web application is free for all, though who finds it useful is welcome to use it. The fully dynamic site CIA is customized with two different levels -i) the user and ii) the class. Anyone can set up a class within a minute and allow others to join.

The ICA was intentionally designed as a low graphics environment to decrease the load time of each page. Nicenet is organized into classes. One person can belong to many classes but they are accessed individually [12]. A class is composed of sections or topics. It is within each topic that messages are stored and can be arranged by date and by posting. It is possible to have written conversations with the members of the virtual class and the instructors or moderators. In addition, each member of the class will have a mailbox for private messages that no one else will be able to access. Setting up a class on the Internet Classroom Assistant takes about 2 minutes. It needs to choose a username and password, then a name for your class, some contact information. It uses an unique 'key' which is assigned for class that canbe given to the students so they can create user accounts and access the classes **??**11].

CJ online classroom is the first ever online LIVE classroom in Bangladesh developed by a large IT Magazine company 'Computer Jagat' **??**13]. Computer Jagat(CJ) classroom is live for all that allows online live classes with live classroom of different kinds of options. Grabliele Piccoli, Rami Ahmed and Blake Levs (2001) proposed a model for an effective virtual learning environment (VLE) in the context of basic information technology skill training [14].

Udemy.com also offers a marketplace where anyone can initiate a course to teach and learn. It has both paid and free version **??**15]. It also offers the facilities to attract corporate trainers seeking to create coursework their employees. It is reported that Udemy has served more than 4 million students, and offers 20,000 course alternatives [16].

Ferreira, J.M.M. (2014) introduces Flipped classrooms which implements Google Apps. An essential Google Apps can be used in the context of pedagogical model that ensures collaborative, studentscentered learning and describes how a teaching and learning framework can be implemented as a Google site [17].

Google Classroom is a new tool coming to Google Apps for Education later in 2014. This classroom facilitates the teachers to create and organize assignments quickly, provide feedback efficiently, and communicate with their classes with ease. Google Classroom helps students to organize their work in Google Drive, complete any assignments, and communicate directly with teachers and peers [18] [19].

Rachel Fishman (2013) shows in his paper how the next generation will conduct online education, mostly public universities to adopt innovative, cost effective approaches to teaching and learning [20]. A "Next Gen U" allows a holistic online student experience by offering not only online courses (i.e. either hybrid or fully-online) and credentials, but also student services like early warning systems, counseling and support, financial aid, and even library and research services. To understand why more public institutions have not moved as quickly into the virtual world-transitioning to a Next Generation University model. It explores the different strategies employed by successful universities including Arizona State University, University at Buffalo, University of Central Florida, University of California at Riverside, Georgia State University, and University of Texas at Arlington to overcome these common roadblocks, and how they have shaped their institutional policies to help large and increasingly diverse student populations earn degrees [20].

There are some web based solutions or portal which are available for e-learning such as Accu Conference which needs no software to be installed and configured **??** In this chapter several research and related works of virtual classroom have been described. From the above discussion, it is clear that virtual education is being spread all over the world and students are now more engaged in e-learning.

6 III. PROPOSED MODEL

The proposed model has been designed with the help of previous research and related works which are discussed in the earlier section.

7 a) Mathematical representation of the proposed model

The key objects used to create the virtual classroom model are: Courses, Students, Teachers and Assessments. This conceptual model or Course Tree Structure (CTS) has been shown in the following figure 1.

8 c) Use-Case of the developed system

In this subsection, two use cases have been described in the perspective of teacher's and student's view. The following figure **??** shows the use case of a teacher/course instructor.

9 Figure 3 : Use case for teachers' in virtual classroom

The following figure **??** illustrates the use case of the student's activities.

10 IV. RESULTS AND DISCUSSIONS

In this section, we are going to describe the results and analysis of the developed system. We have taken quizzes in several educational institutions to measure the effectiveness of our developed virtual classroom and its effectiveness. Here, Sr is the total marks counted for a student qf=0%? Sr? 100%

Here qf is the overall performance of a student.

We have implemented the virtual classroom in four different institutions. According to the above accumulat-edcalculations, we have found the following results of effectiveness of learning and teaching in these institutions which is shown in the following table 1: From the above table 1, the effectiveness of implementing virtual classroom is 3.95 (i.e. average point) out of 5.00.

Performance analysis of virtual classroom in the case of learning is shown in the following figure 6: According to the above graph the performance has been tested in several educational institutions by conducting live classes through the virtual classroom. And the results of the test vary because of the teaching style of the same class by different instructors (e.g. T1, T2, T3 and T4). However, it is to be noted that implementing virtual class room in these institutions has been satisfactorily performed well in a comparison of physical classroom.

11 V. CONCLUSIONS

Virtual Classroom is a web application that provides users with an effective environment of teaching and learning. Both teachers and students can be benefitted in training and learning by this application. Classroom environment becomes friendlier as it is easy to navigate and find the resources and class lectures. It can be a better solution in the field of learning and teaching to make education more accessible. The main goal was to create a web application where both students and teachers can collaborate at the same time and get benefit in terms of teaching and learning. Improving collaboration among teachers and students is one of the important goals of our application.

The virtual classroom minimizes the physical barriers between classroom and students. In addition, the performance of teaching-learning outcome was satisfactorily good and can be improved through further research.

The future scope of this research work is to make a reliable application that will be compatible in any platforms and more user friendly based on user experience. [1] [2]
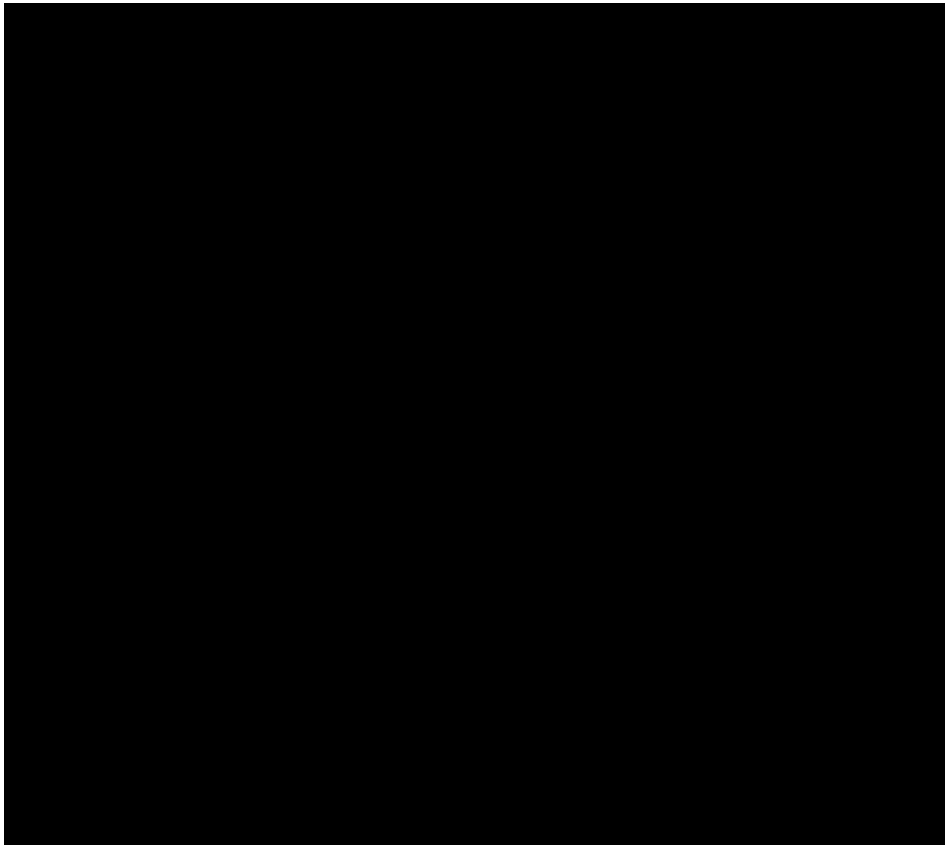

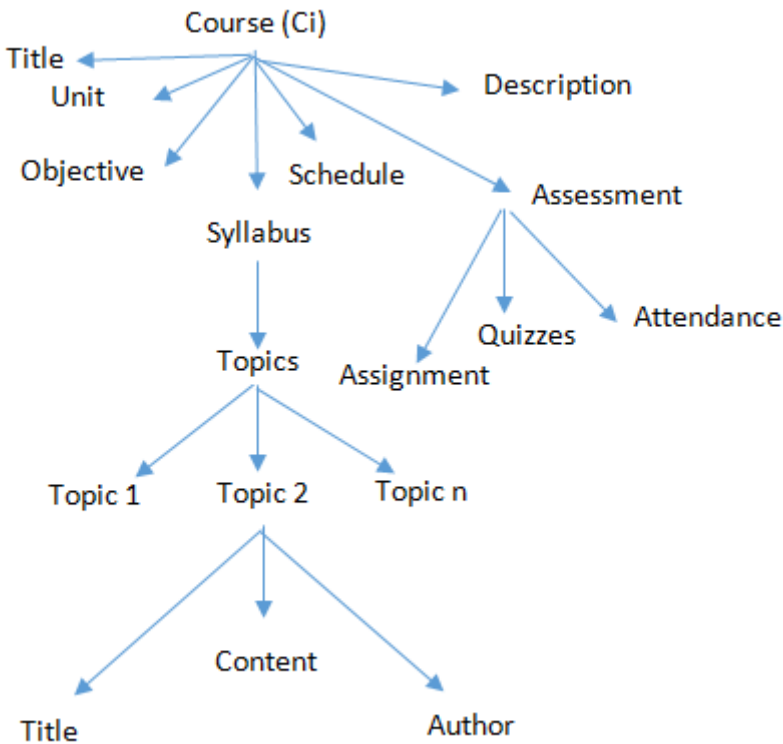Figure 1: Figure 1 :

Figure 2: ?
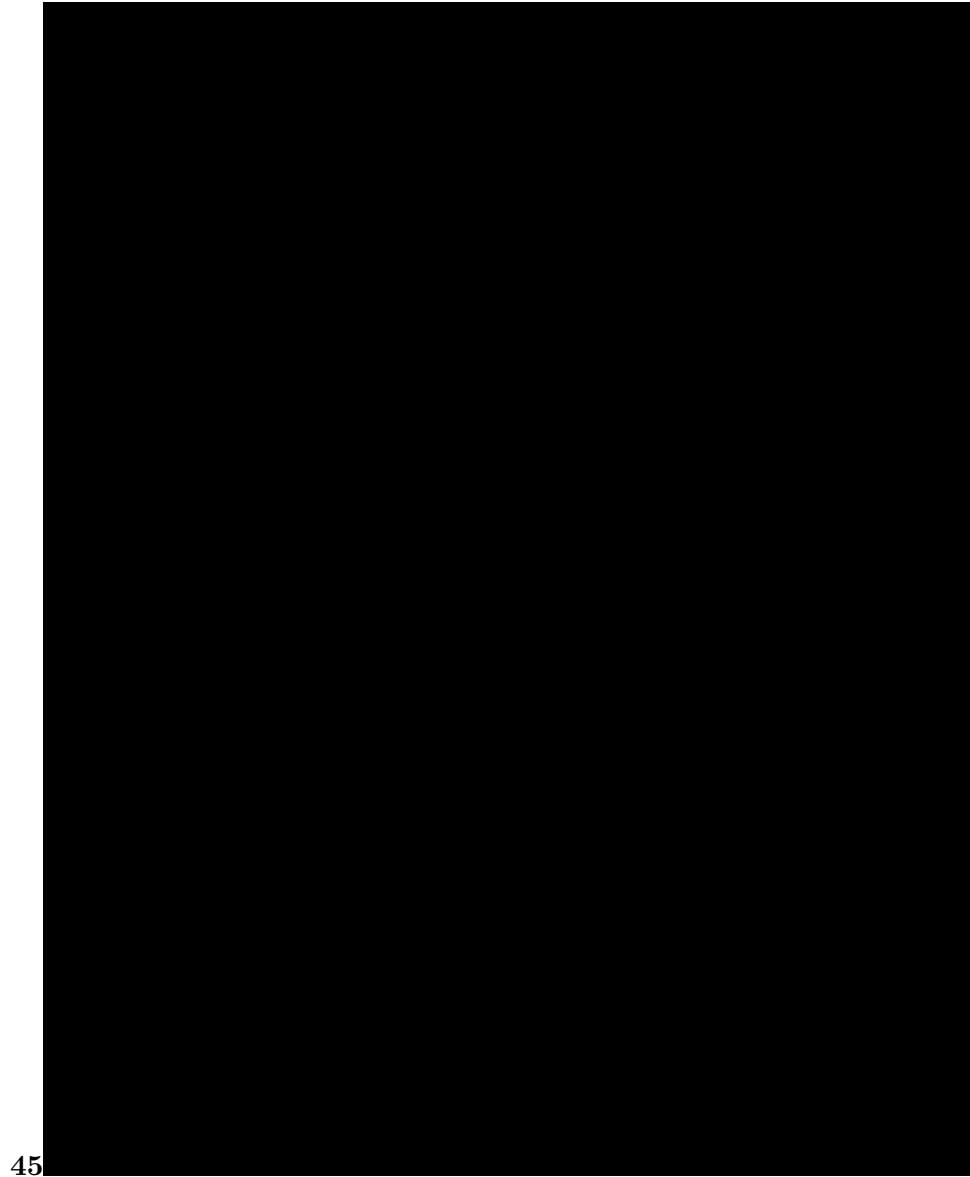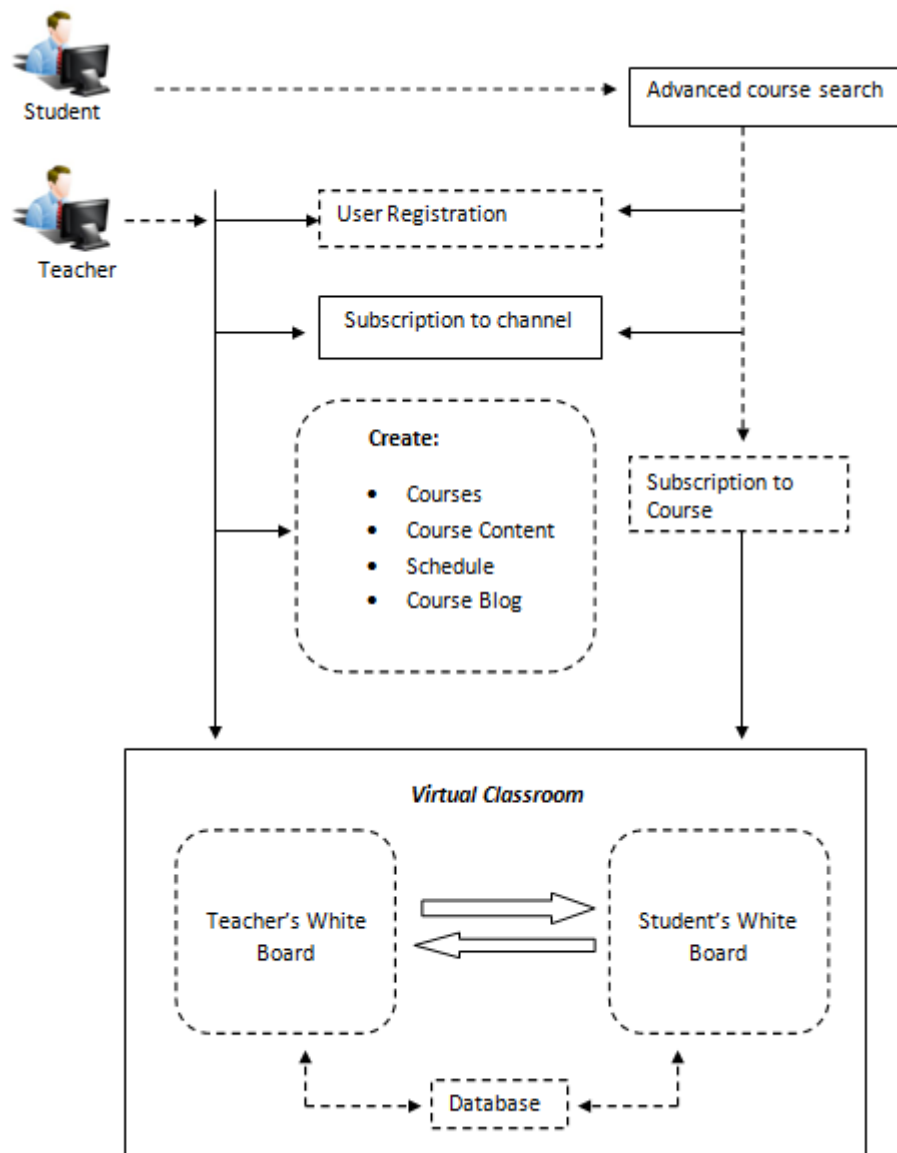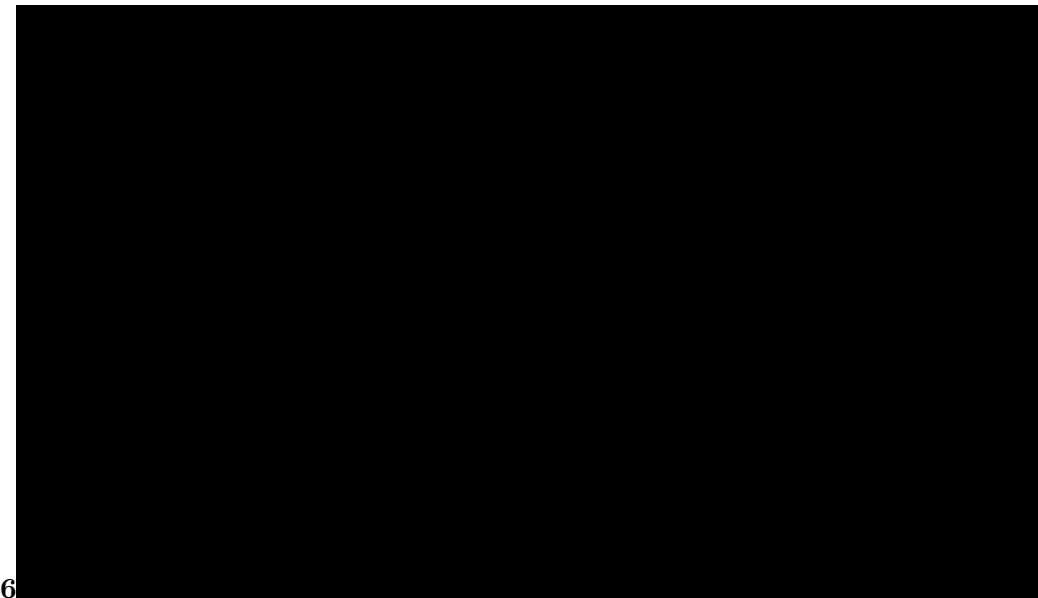
Figure 3: Figure 2 :

Figure 4: Figure 4 :Figure 5 :

Figure 5:

Figure 6: Figure 6 :

Figure 7: Figure 7 :

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Name of the Institutions	Total point of Actual Output Out of 5.00
Bogra Azizul Haque Govt. College, Bogra (BAGC)	4.15
Adamdighi Govt. Girls School and College, Bogra (AGSC)	3.85
Adamdighi Senior Fazil Madrasah (ASFM)	3.65
Adamdighi I.P.J Pilot High school , Bogra (APH)	4.17
The average point of Actual Output	3.95

Figure 8: Table I :

11 V. CONCLUSIONS

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