Model e-Learning Web Portal Targeting to Enhance GER of Higher Education in West Bengal

Anirban Das, *Member, IACSIT,* Dilip K. Banerjee, and Kajla Basu

***Abstract*—Only 26.33% enrollments in higher education in West Bengal canvas the worst scenario in terms of overall gross enrollment ratio. Targeting to increase the GER of West Bengal it is recommended from every spheres of international educational hubs that to implement e-learning based education as a supporting substitute to the traditional education system. This paper demonstrates a framework of e-learning web portal which impart all the learning components as well as services and that will be extremely adaptive to all the higher education aspired students. Through the proposed e-learning framework students and teachers/instructors will able to take the opportunity to use learning components and services from anywhere irrespective of any specific location or time through familiar communication protocols such as FTP or HTTP. Regardless of presence of time and location constraints will make the dropping out or already dropped out students and the current higher education aspiring students interested to pursue higher studies which will gradually increase the GER of West Bengal.**

***Index Terms*—BizTalk Server, CMS, e-learning, GER, higher education, web services**

I. Introduction

E-Learning is overtaking the conventional teaching learning techniques, through its facility of knowledge propagation to the learners flexibly and also removal of the reasons of less enrollments [1], [2]as stated by mainly the remote, rural school students of West Bengal.

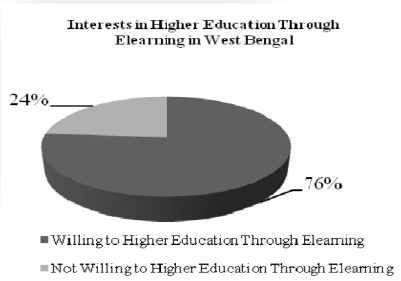
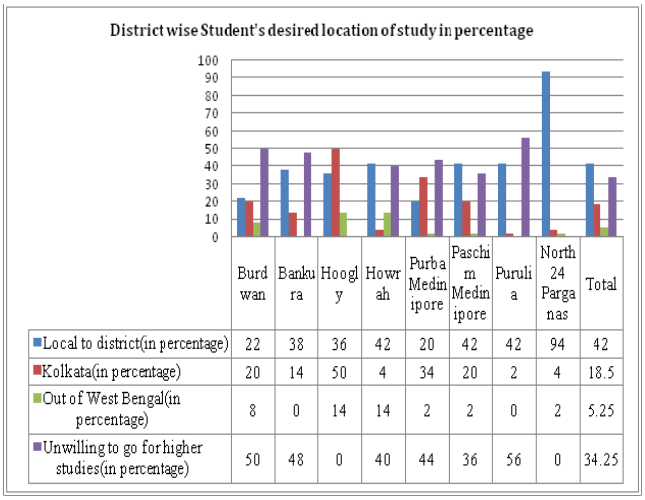


Fig. 1. Interests in Higher Education through e-learning in West Bengal

Das *et al.* indicated [3] that in West Bengal 76% eligible students are willing to go for higher studies based on e-learning and rest 24% students are unwilling to go for higher education as shown in Fig. 1.

To establish an e-learning platform in each and every school it is necessary to accommodate infrastructure like, high capacity storage, Network Attached Storage, Storage Area Network and a galaxy of other components to store the e-learning content. From budgetary standpoint it is hardly possible to manage for all the remote and rural schools in West Bengal.

Das, Banerjee, Basu proposed a concept[4] of e-learning classrooms local to the students' residence and the e-learning control room will be in higher education ministry of West Bengal. And the ministry will manage the whole system. The justification of placing the e-learning centers nearer to the students' residence is as per Fig. 2. From the survey in West Bengal with remote school students the district wise students' desired location of study is determined.



	Burdwan	Bankura	Hooghly	Howrah	Purba Medinipore	Paschim Medinipore	Purulia	North 24 Parganas	Total
Local to district(in percentage)	22	38	36	42	20	42	42	94	42
Kolkata(in percentage)	20	14	50	4	34	20	2	4	18.5
Out of West Bengal(in percentage)	8	0	14	14	2	2	0	2	5.25
Unwilling to go for higher studies(in percentage)	50	48	0	40	44	36	56	0	34.25

Fig. 2. District wise students' desired location of study in West Bengal

For only willing students desired location of higher education the scenario is something different as per Fig. 3.

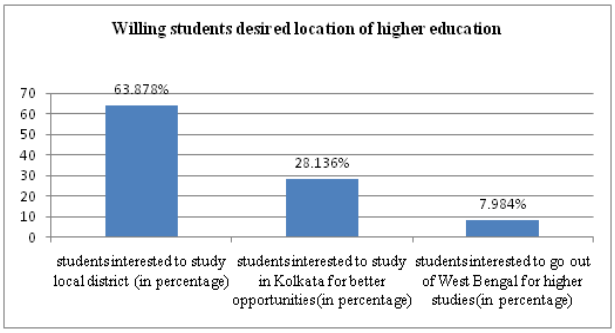


Fig. 3. Desired location of study, said by students willing to go for higher studies

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Anirban Das is with the Department of Computer Applications, Dr. B. C. Roy Engineering College, Durgapur, West Bengal, India (Phone: +919474623504; email:anirban-das@live.com)

Dilip K. Banerjee is with Central University of Jharkhand, India (Phone: +919504120464; e-mail: dkbanrg@gmail.com).

Kajla Basu is with Department of Mathematics, National Institute of Technology, Durgapur, West Bengal, India (Phone: +919474532576; e-mail: kajla.basu@gmail.com).

So, it can be stated with overconfidence that e-learning centers should be established in nearer to the students' residence as the tendency of their pursuance higher education is own district prone. In this paper our approach is to propose a framework for e-learning based education in West Bengal to increase enrollments.

II. Web Portal Framework for e-Learning

An e-learning portal refers to an online learning service which is like an interface through which both teachers and students will be able to fulfill their learning and instructing objectives. This portal will pull the people, product and services together, where people refers to the intended higher education aspiring students, teachers or instructors and the administrator, responsible to administrate portal. [5] Product refers to the skill set shared by the instructors, digital content of the online course materials etc and services are like emailing, blogging, chatting, online helps, online registration to examinations, digital library, video conferencing etc. [6], [7].

In traditional classrooms in rural West Bengal, both teachers and learners go to the class and the students listen to the class; if they get puzzled or confused, they ask questions to the respective class teacher or instructor.

The Scenario of classrooms of higher studies in rural West Bengal through traditional learning and the e-learning based projected classrooms will be alike Fig. 4 and Fig. 5.

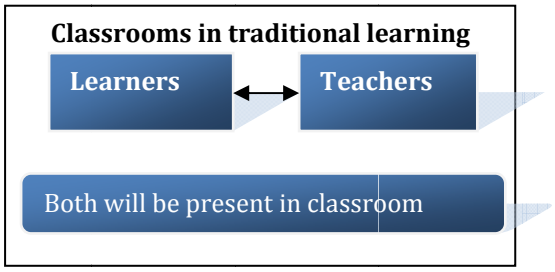

Fig. 4. Scenario of classrooms of higher studies in rural West Bengal through traditional learning

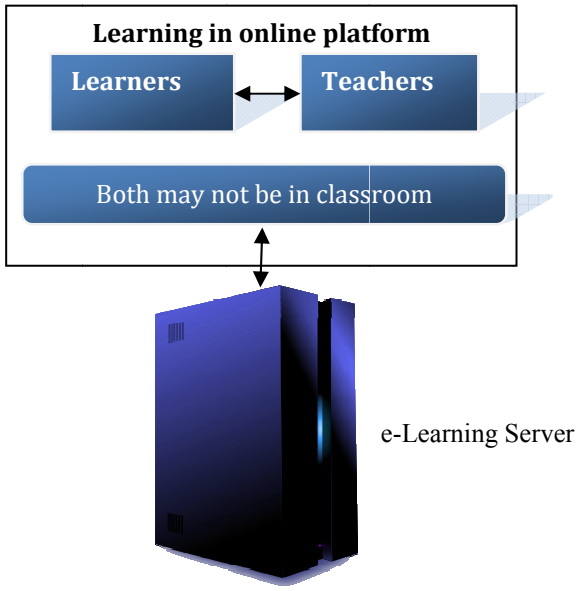

Fig. 5. Scenario of projected classrooms of higher studies in rural West Bengal through e-learning

So, on server will be dedicatedly used by lecturers or instructors in terms of uploading learning materials, lecture plans and slides, question and answers for tutorial etc. The students will also able to access the server to download the learning materials and they will also able to get involve in online blogging, chatting, conferencing, mailing and other online activities. Das, Banerjee, Basu [4] recommended the establishment of e-learning centers in remote regions of West Bengal where the gross enrollments in higher education is poor. From Fig. 3 it can be added and justified that the e-learning centers should be set up within the districts i.e. remote to the residence of any student interested in higher education.

III. Projected Model of e-Learning for Higher Education in West Bengal

The projected model will have two facades: one is learner centric and other one will be context centric. The learner centric façade will handle the overall design of e-learning system so that it will be well granted to both the learners and instructors. The context centric façade will be dedicated for the better delivery of e-learning content and approach of facilitating the delivery of curriculum, analysis of learning procedures and needs etc.

In the projected web portal there will be three types of users who will be given the permission to get entry to the e-learning application: teachers or instructors, students or learners and administrators. Administrators will do the administrative jobs like up to date and upgrade the information, notice, uploading the question papers for the tests or publishing of results etc. [8], [9].

There will be several activities of the said three types of users. From the students' viewpoint their activities will be like collect plan of learning, download the learning content and materials, self study, performing assignments online and submit, face the examination etc. [10], [11] Basic workflow representation of the students' activities will be as in Fig. 6.

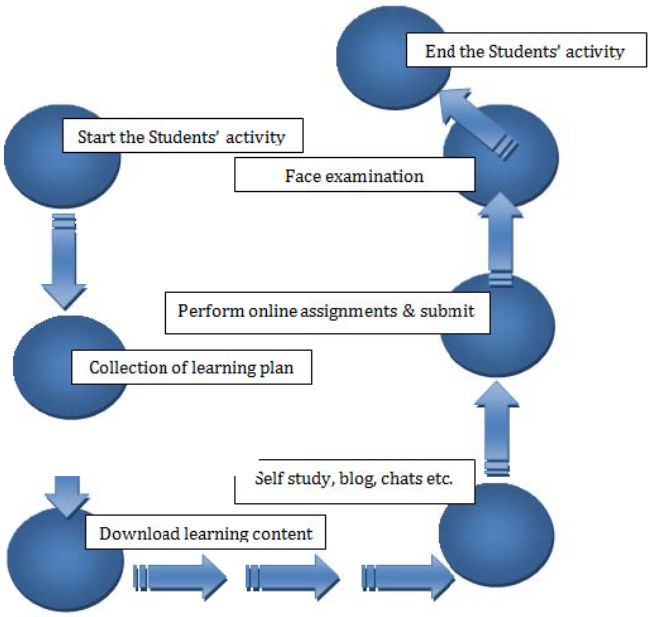

Fig. 6. Workflow activities of students through e-learning

Similarly, the concentration goes to the instructors' viewpoints. The basic activities of teachers will be like prepare teaching plan and upload, preparation of content and upload, Preparation of assignments and upload, assessment and involvement of students, service and knowledge support to students online etc. Basic workflow representation of the teachers' activities will be as in Fig. 7.

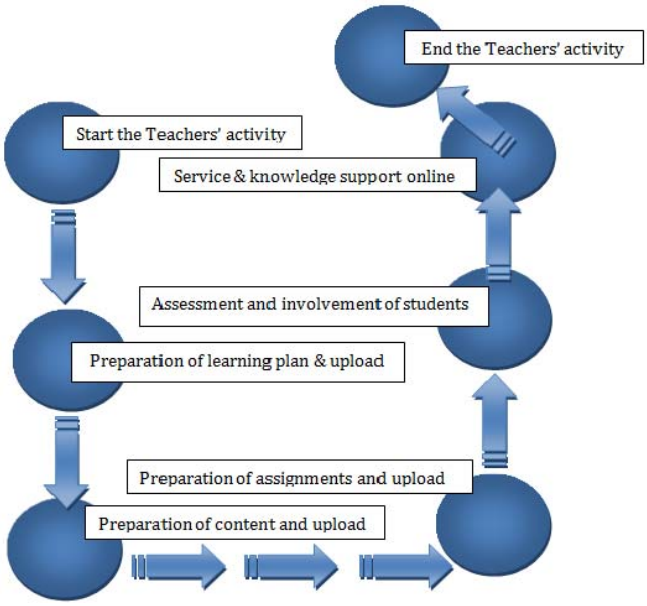

Fig. 7. Workflow activities of teachers through e-learning

The basic activities of administrators will be like learning & teaching support in e-learning environment, test and results publication, publishing notices and announcements, managing records of resources, managing enrollment and users, other administrative jobs etc. Basic workflow representation of the administrators' activities will be as in Fig. 8.

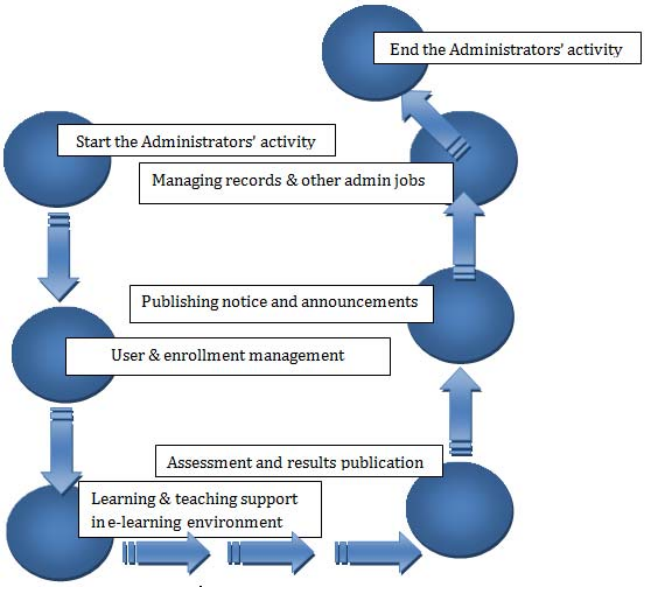

Fig. 8. Workflow activities of administrators through e-learning

With the objective to enhance the overall gross enrollment ratio in higher education in West Bengal, a model is proposed in Fig. 9.

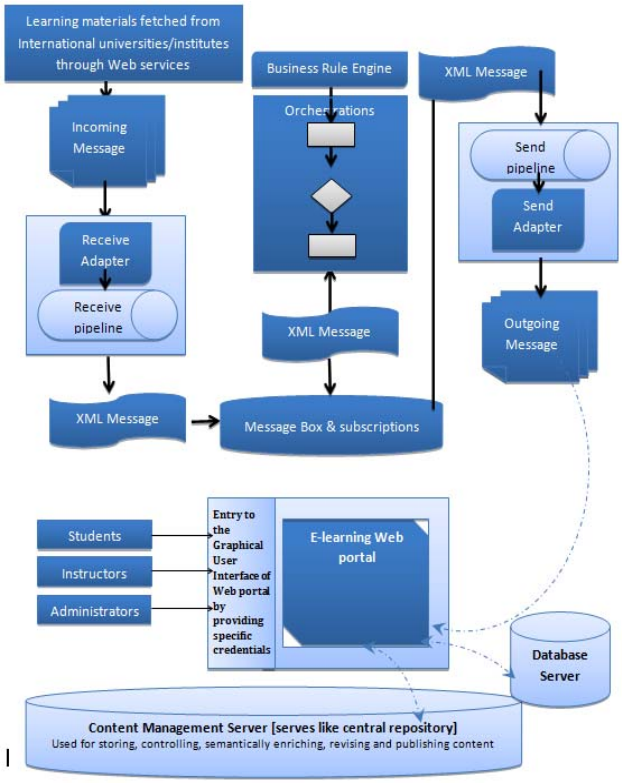

Fig. 9. Proposed model of e-learning web portal architecture (establishment)

Here three servers are necessitated: BizTalk Server, Content Management Server (CMS) and Database Server. This set up is to be established in the e-learning control room in West Bengal, from where each and every node of e-learning centers can be managed. Here the web services are used to connect and fetch learning services from the universities of internationally repute across the globe. In accordance with the definition of W3C, web service is a software system which is basically designed to support machine to machine communication maintaining interoperability throughout the network. Generally web services use XML messages which follow SOAP (Simple Object Access Protocol) standard. [12]

From the international institutions the projected web portal will able to fetch learning materials through web services. Basically the data will come in the portal's end like XML messages. Now through parsing the XML messages, it is possible to get our desired materials and that can be published or reflected to the web portal.

But in the portal architecture setup the messages are channelized through BizTalk server. BizTalk server is an enterprise application integration solution developed by Microsoft Corporation. This application integration solution is made through the presence of out of box i.e. build in XML and SOAP support. [13] Through the integration with Visual Studio Dot Net, it facilitates speediness, flexibility and reliability in standard application integration. Besides BizTalk server provides the support of built-in EDI (Electronic Data Interchange) functionality supporting X12 and EDIFACT.

In the Fig8 we have the XML messages from web services. The files get entry through 'Receive Adapter' and through 'Receive pipeline 'the XML messages are passed to the

'Message Box and Subscriptions '. Messages come to the BizTalk server through HTTP, SOAP, files etc. Adapters are additional transport support to the messages. Message Box is the central storage of BizTalk server which ensures the reliability of messages regarding delivery to exact destination.

The XML messages are then fetched in 'BizTalk Orchestrations' to process through some custom rules. Orchestrations are nothing but the processes that are well-defined in Business Process Execution Language. Business Rules Engine is present to install current rules or protocols from Orchestration and these are getting changed time to time. Then the XML messages are sent out to 'Send Adapter' through 'Send pipeline'. Now the outbound XML messages are sent to the destination i.e. in the portal, after parsing of the XML messages, the developers will able to fetch their desired data and place the same in the desired locations.

The Content Management Server is set up with the web portal to take the effectiveness of managing the workflow among the students, instructors and administrators in the proposed e-learning web portal. The key advantages of CMS is that data can be defined like anything such as documents, images, videos, mathematical and scientific formulas and more other types. These versatile types of storing data are essential to present the learning contents or lectures with animations, nuggets, diagrams etc. Moreover, CMS can be used as a central repository and it handles duplicate or newly updated data through versions. These version control feature will be effective in uploading the revised contents in the web portal.

The database server is also proposed to be set up; which is basically a software program, manages the database services following the client server model. This server is to be accessed from front end as well as at back end. From front end the users will ask for data and the back end that is run in the server.

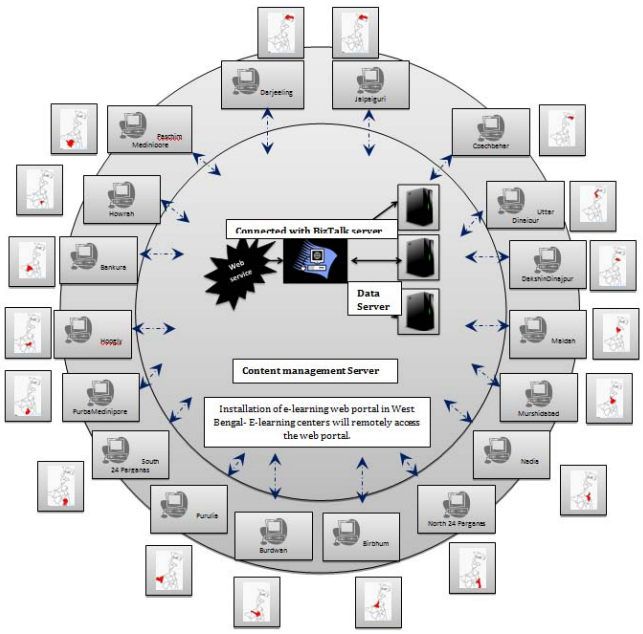

Fig. 10. Functional model of e-learning web portal, will be accessed from district headquarters and remote e-learning centers in West Bengal

The three types of users such as students, instructors and administrators will login to the e-learning portal with their specific credentials and access the learning facilities. The district-wise view of e-learning portal establishment is represented in Fig. 10.

The functional model of the e-learning enabled web portal (in Fig10) defines that in e-learning control room the web application will reside along with the three servers and from district e-learning headquarters and also e-learning centers of any district the students and instructors will able to login and access the portal. Only administrators and instructors have the permission to access the web portal from e-learning control room which will be present in State headquarters. And from state headquarters i.e. from e-learning control room the web based teaching learning activities will be maintained properly.

IV. Conclusion

To establish the e-learning based higher education it is integral to design and develop a web portal which can be accessed from the e-learning centers. The web portal, proposed in this paper, will enhance the teaching learning process and mostly all the characteristics of web based learning will be covered i.e. students and instructors will able to obtain all the facilities that are offered by an e-learning system. As, it is already a proven fact that e-learning is the best way out in learning processes in higher studies, through implementation and installation of this web portal the gross enrollments of West Bengal in higher education will enhance.

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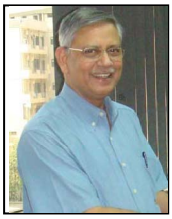
Anirban Das is pursuing his research work in the Department of Mathematics from National Institute of Technology, Durgapur, India. He is a member of IAENG, IACSIT and IEDRC. He is having around 5 years of work experience in academics and industry. He started his career with HCL Technologies as a software Engineer. He is Microsoft Certified Technology Specialist (MCTS) in Microsoft Office Sharepoint Server 2007. Presently he is Assistant Professor in department of Computer Applications in Dr. B. C. Roy Engineering College, Durgapur, India. He has around 15 research papers in various eminent journal and conferences.

Mr. Das has interests in Statistical Analysis, e-commerce, e-learning and computer applications as domain of research.

Kajla Basu is as Associate Professor in department of Mathematics in National Institute of Technology, Durgapur, India. She passed M. Sc. in Mathematics with national scholarship along with C.S.I.R, J.R.F and SRF (for 5 years) and Ph.D degree from IIT, Kharagpur. She is having around 15 years of work experience at National Institute of Technology, Durgapur. She has around 13 research papers in various eminent journals and conferences.

Prof. Basu is a life member of ORSI and her domain of research interests are in Statistical Analysis, Operations Research and Fuzzy Mathematics.



Dilip Kumar Banerjee is presently associated with Central University of Jharkhand, Jharkhand, India. He was Dean & Principal at Globsyn Business School, Kolkata since January 2011. He has had his education in Mathematics and Statistics from Ranchi University and Bhagalpur University. He joined as a Research Fellow in Computer Science and Information Technology in Indian Statistical Institute, Kolkata and obtained his Ph. D. degree from the Jadavpur University. He attained the M.B.A degree from Sikkim Manipal University while working at the Sikkim Manipal Institute of Technology. He worked as a Scientist in the prestigious Knowledge Based Computer Systems project of ISI, Kolkata. Selected as a UNDP fellow from ISI, he went to the University of Washington, Seattle for advanced training and research in applications of Artificial Intelligence techniques. During 1991-1995 he visited France and Euorope several times as a Fellow of the International Centre for Pure and Applied Mathematics (CIMPA) and worked with the leading researchers of his field. He taught at the undergraduate and postgraduate levels at ISI, Kolkata, Jadavpur University, Sikkim Manipal Institute of Technology (as the Head of the departments of Computer Science and Information Technology departments). He was the Director of the Durgapur Institute of Advanced Technology and Management during 2005-2007 and the Director of the Asia Pacific Institute of Management, New Delhi during 2008-2010.Besides academic experience for about 20 years he also worked in industry for about 15 years in Sarabhai Chemicals and Leica Imaging System Ltd.,Cambridge, UK.

Dr. Banerjee has over 35 research articles published in prominent national and international journals and conferences.