E-Learning Software in the Context of Bangladesh: Proposal for an Interactive Model according to Bloom's Taxonomy

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DECLARATION

We, Md. Ariful Hoque Raihan, University ID - 02201035 and Sheikh Sadik Shahriyar, University ID - 02201040 have completed the thesis on topic, "*E-learning Software in the context of Bangladesh: Proposal for an interactive model according to bloom's taxonomy*", Under CSE400 course regarding the partial fulfillment of our undergraduate degree of Bachelor in Computer Science and Engineering.

We, therefore, declare that this work has been published previously neither in whole nor in part in any thesis work or any conference or journals. I also mentioned work found by other researcher in the reference.

Signature of Supervisor   Signature of Author

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At last we want to express our obedience to our creator Allah for giving us strength to complete this thesis work properly then we would like to express of our special thanks to our parents for their continuous support of mental, physical and financial during our study at BRAC University.

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ABSTRACT

The latest information and communication technologies like internet service, telecom service, and live video conference have introduced a special form of distance learning: e-learning which removes the barriers of traditional learning system like time limitation, fixed scheduling, physical distance and other cost factors. Distance Learning is commonly used due to its flexibility, and efficiency. Increasing its instant feedback can maximize the effectiveness. In Bangladesh the e-learning system is very new and some e-learning software has been developed till date. Again, the success of distance learning depends on learners' interest and that is reinforced by the interactivity of the learning system. In our thesis-survey we have found that most of Bangladeshi software has a common tendency of only gathering and presenting information. But lack of feedback, structural inefficiency and lack of response process can pose threat to the acceptance of distance learning. So our goal is to formulate a design of a distance-learning model, which can maximize the interactivity.

Keywords: E-Learning, Distance Learning, Blooms-Taxonomy, Psychomotor, Cognitive, and Affective.

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CHAPTER 1

INTRODUCTION

"*Every human being has a learning style and every human being has strengths. No learning style is better or worse than any other style*" (Dunn & Dunn 2004).

The education system is developing day by day. Every day new technology is introducing and new invention is adding new benefits and changing the old system. At present, the electronic media has made vast effect on education system, which is going to change the traditional education system. Electronic media like TV, Radio, Computer, and Internet has introduced distance learning, where traditional educational barriers like fixed scheduling, time management, physical existence have removed. Now different types of e-learning software have developed which may be very effective tool for a learner. But in Bangladesh this is very new and un-structural, which cannot play good role as an instructor for learners. So our goal is to evaluate the learning software in the context of Bangladesh and propose an effective model according to Bloom's Taxonomy.

1.1   Motivation of Study

We have to visit Bangladeshi software market frequently for our other course work. But we found that there is a shortage of essential software, which will support our work. There is very few software in the market. But the quality of the software was very bad. I determined to do something on e-learning. I set up my mind and came to my supervisor. He encouraged me to develop an interactive model proposal.

1.2 History of Education

Many scholars tried to find the history of education. According to them, the history of education is both short and long. Dieter Lenzen, the president of University of Berlin said, "Education began either millions of years ago or in 1770". Education was the natural response of early civilizations to the struggle of surviving thriving as a culture. In ancient past, people used oral language to communicate. After times, they learned how to talk. They learned to build story. These stories spread out from generation to generation and man derived symbol and letters and learned written communication.

Formal education already placed in Egypt in 3000 or 2000 BC. In china formal education and examination system developed before 220 to 206 BC.

Education tools developed after human being learned formal education. Paper, ink, pen was invented and human being started their journey on civilization.

1.3 What is E- Learning?

Electronic Learning or e-learning is a wide term used for computer-enhanced learning. Here some quotes of different researchers has shown about their view of e - Learning.

The delivery of a learning, training or education program by electronic means "E-learning" involves the use of a computer or electronic device (e.g. a mobile phone) in some way to provide training, educational or learning material. (Derek Stockley 2003)

Education offered using electronic delivery methods such as CD-ROMs, video conferencing, websites and e-mail. (www.hobsons.com)

Learning that is accomplished over the Internet, a computer network, via CD-ROM, interactive TV, or satellite broadcast. (www.worldwidelearn.com)

1.4 E - Learning Tools

We use different learning tools to learn. Computer, Television, External media like CD / DVD, Internet provides support on E - learning.

Computer is the most powerful tool in E – learning. After invention it has been solving many problems till now. Now a day's computer becomes the virtual teacher for a learner.

Internet or inter networks also plays a vital role in E – Learning. Internet is a network of networks and it is a huge resource of learning.

External media like CD / DVD also plays a vital role in e – learning. Various E - Learning software like Type tutor, Flash tutorials, Programming Languages etc. has written in these external media and helps learners to learn in specific topics.

CHAPTER 2
DISTANCE LEARNING

2.1 What is Distance Learning?

Distance Education is a field of expertise exploring situations in which the learner and the teacher are separated in time, space or both. Some key characteristics of this field were identified by Desmond Keegan (1956) which are:

• The separation of the teacher from the learner(s)
• The use of technical media
• The influence of an educational organization

Other authors (Gayol, 1999) have added as key attributes:

•The emphasis on the design of educational materials
• The central role conferred to learners in the educational process

Marshall McLuhan stated in his most famous sentence: "the medium is the message", research in distance education consistently proves that the attributes of the medium affects the teaching/learning process. For this reason, distance learning instructors have paid a lot of attention to these attributes. The technologies used to mediate in the teaching/learning situation are classified in four groups: printed, audio, video and electronic, according to the following structure:

• **Printed** Correspondence education like books, study guides, texts and other printed materials.
• **Audio** Broadcast radio, telephone, audiocassette, audio conference
• **Video** Broadcast and cable TV, Satellite, Videoconference, Recorded Video (Cassettes, DVDs)
• **Electronic** Computer mediated communication, mobile learning

2.2 Type of Distance Learning

There are many ways of Distance Learning. Every Communication media can be used as a Distance Learning tool. The key types are stated below:

- Through regular mail
- Synchronous or asynchronous conduction on Internet
- Content delivered via radio or television
- Content provided via external media like CD / DVD

2.3 Origins

Modern distance education has been around at least since Isaac Pitman taught shorthand in Great Britain via correspondence in the 1840s. Since the development of the postal service in the 19th century, Commercial correspondence colleges provided distance education to students across the country." Computers and the Internet have only made distance learning easier, just as it has for many other day-to-day tasks.

One of the oldest distance education universities is the University of South Africa, which has been offering Correspondence Education courses since 1946. The largest distance education university in the United Kingdom is the *Open University* founded 1969. In Germany the FernUniversität in Hagen was founded 1974. There are now many similar institutions around the world, often with the name **Open University.**

2.4 Methods

In Distance Education, students may not be required to be present in a classroom, but that also may be a question of option. As for an electronic classroom or Virtual Learning Environment, it may or not be a part of a distance education set up. Electronic classrooms can be both on campus, and off campus. We would call such institutions as using a 'flexible' delivery mode.

CHAPTER 3
BANGLADESH SCENARIO

3.1 Overview

In Bangladesh, the concept of E – Learning is quite new. People come to know about E-Learning after early 80's. Bangladesh is one of the most densely

populated countries in the world with nearly 140 million people within an area of 147,570 square kilometers. Its vast population would be the major resources of the country. However, in transforming the potential people into a productive force and ensuring a dynamic environment for social, economic and political development is still a big challenge for its government. Though the literacy rate is officially said to be 66%, but according to private survey the rate is only 42%. Education, therefore, has been recognized as a priority sector by all governments since her independence in 1971. Distance education is an important alternative for educating mass people in Bangladesh for many socio-economic reasons.

The e-learning was first introduced in Bangladesh in 1956 by a radio-broadcasting program, and later expanded much by the establishment of BOU in 1992. However, BOU is still using mostly traditional one-way media and far behind to use modern interactive ICTs in delivering its courses.

ICT is the emerging sector in Bangladesh. The government has declared it as thrust sector and the overall education sector is in the priority list of the government. However, these two sectors have lot to develop in terms of reach, quality and contribution to the development process. In fact, though the challenges facing Bangladesh are significant, the challenges of old, low and uneven education participation, poor quality education, low per capita incomes, and a rapidly growing population have been joined by new and more daunting challenges, including corruption, globalization, lack of political commitment, and rapidly advancing technology. The size of this challenge is clear. In the area of introducing eLearning in Bangladesh, a small number of initiatives are already in action and most of the learning materials are developed in western countries with limited relevancy in terms of content and language. We need local, relevant and user friendly eLearning system, not only high tech solutions. In consideration of the recent growth in the ICT sector, the opportunities are now promising to introduce eLearning programs in Bangladesh at broader aspect.

3.1.1 Bangladesh Open University (BOU)

Bangladesh Open University, the only distance learning university in Bangladesh, was established on October 21, 1992 by an Act of Parliament. The Government of Bangladesh and the Asian Development Bank have provided funds for setting up of the University. The Bangladesh Open University is an all terms system of education contributing to the uplifting of the overall educational scenario in the country. Through formal & non-formal programs it gives educational opportunities to the large section of population, helping in the human resource development of the country. Prime objective of Bangladesh Open University is to transform the country's vast human resources into an educated and trained work-force by extending to them a wide range of academic programs both formal and non-formal. BOU`s programs are aimed at every one, particularly working people and women and those socially disadvantaged groups who cannot enroll in traditional universities.

3.1.2 Television Program

In early eighty's some television program was broadcasted by Bangladesh Television gave some essence of distance learning. Programs like "Jaana Ojaana", "Gonit Onushilon", "Mithoskria", and "Biggan Jagat" taught something on science and mathematics. Later in 90's programs like Bangladesh Open University launched some TV programs on English Learning, Arabic Learning, Quiz, S.S.C Mathematics etc. The most popular program in Bangladesh history was "Maati o Manush" which was an agricultural development and learning program was popular to every one.

3.1.3 E-Learning Software

After late ninety's some local companies of Bangladesh launched e-Learning software. The initial software's were mainly computer oriented. Later different learning issues came to the software. Maximum software was traditional learning systems like Secondary English, Computer Trouble Shooting, and Kids Tutorial etc. In last two year E – Learning software like motor driving, physical exercise, health care, Geography, physics etc. developed.

3.1.4 Online Forum

Online forum is a recent tool of Distance Education in Bangladesh. Now days, many public and private university use these online forum for discussion. In this way a student can knew the lecture, syllabus. He also submits assignments, term projects through online forum. For online forum Yahoo groups, Google groups, Orkut, Hi 5 etc. online portals gave necessary space and contents for the learners. In BRAC University many courses have online groups and students joined and discussed problems, ideas etc. bucse423fall06googlegroups, bu420spring07groups.yahoo.com etc.

3.2 Barriers

Although e-learning in the universities and educational institutes of the developed countries are getting popularity day by day, it is still a dream for the less developed countries because of poor ICT infrastructure and other socioeconomic reasons. Due to very high primary cost for infrastructural development and to increase public access to internet and other ICTs, the developing countries are still far behind from getting benefit from the e-learning. The main points that should be considered before introducing e-learning in the developing countries are briefly discussed below:

- Reliability of technology

  Until technology becomes more reliable, the democratization of e-learning will be difficult.

- Stability of technology

  The rapid evolution of the technology is another source of concern for both e-learning providers and learners.

- Cost of equipment and access

  The marketplace has in the past five years been very sensitive to the cost of equipment and access to networks.

- Maintenance costs & infrastructure

  E-learning depends on hardware and software infrastructures or platforms that require constant attention.

- Direct cost

  One of the major issues in a period of technological and cultural metamorphosis is estimating and managing the direct costs to determine whether the investment required is worthwhile.

- Conversion costs (equipment, skills)

Because of the general state of technological and economic flux, planning the implementation of new systems and skills is a precarious exercise.

3.4 Opportunities

Internet connections are very few; this model has high potential to attract large crowd, which helps to entrepreneur to be a part of e-learning.

We have energetic and meritorious students who are able to take the advantage of E - Learning.

High quality Internet infrastructure and networking will help to deliver high quality courses. CD-ROM training now offers movie-quality lectures by famous Professors that include a variety of quizzes and exercises.

Due to socio-economic conditions, large number of students still avoids schools; e-learning may involve them in studies.

E-learning provides the courses round the clock i.e. 7 days a week and 24 hours a day, which further attracts working peoples, students and even individuals.

CHAPTER 4

ANALYSIS ON SELECTED

SOFTWARE

4.1 Technique used for Evaluation

In our research we have used a specific technique named as Bloom's Taxonomy.
It was a learning model which was used for all type of learning.

4.1.1 Introduction to Bloom's Taxonomy

Bloom's Taxonomy was initially published under the leadership of American academic and educational expert Dr. Benjamin S Bloom. Bloom's Taxonomy was primarily created for academic education; however it became relevant to all form of education. Programmers must attain knowledge about a system before they can perform specific software maintenance tasks on it. Traditionally, computer scientists have described the activity of attaining this knowledge as 'software comprehension'. However, if we look at the educational literature, attainable knowledge has been described with much finer granularity. Bloom's (1956) taxonomy identifies six separate levels of knowledge within the cognitive domain, one of which refers to a (more constricted) definition of comprehension. Several other levels in Bloom's taxonomy seem to correlate more directly to specific software maintenance tasks.

4.1.2 Bloom's Taxonomy Structure

Cognitive (knowledge/ mental skill)
- Comprehension
- Analysis
- Evaluation
- Application

Psychomotor (skill/ physical skill)
- Perception
- Guided Response
- Steps
- Adoption

Affective (attitude)
- Receiving Phenomena
- Responding Phenomena
- Valuing

4.2 Software Analysis

We have got some locally developed e-learning software in the market, which have very interesting and effective application to the learners. Among them "English Grammar", "S.S.C Algebra, Geometry and Trigonometry", "Bangla typing tutor", "Computer Trouble shooting" are very attractive. We also got another software like GCSE series for 'A levels', which is developed in UK. But in our country these software, specially the locally developed have failed to create demand to the users. We have evaluated these software according to Bloom's Taxonomy.

4.2.1 Computer Hardware with Trouble Shooting

Contents:
1. Description of computer parts
2. Assembling
3. Bios Setup etc
4. Troubleshooting

Screenshot:

Scene 1

Fig: 4.2.1.1

In this figure we can see that this is the first interface of the software. It has some menus like description of parts, assembling, bios setup, hard-disk partition and overview of the send and third CDs. It is developed in flash and linked with other interface like web page.

Scene 2

Fig: 4.2.1.2

In the above figure it is seen that the external part is described. This interface contains the topic background. The history of computer and invention is described. It's main objective is to serve the purpose of lecture.

Scene 3

Fig: 4.2.1.3

In this part we can see that some internal parts are described. We can see the description of motherboard is given here. Purpose of motherboard, types and other information has given.

General Evaluation

Here it is seen that the software is based on gathering of information and representation. The whole software is like this presentation based. There is no way for feedback.

Evaluation according to Bloom's Taxonomy

[Table 4.2.1.1]

Mental Skill (Cognitive)	Always	Sometimes	Never
Knowledge	✓		
Targeted Learners			✓
Analytical Questions			✓

[Table 4.2.1.2]

Psychomotor (Physical skill)	Always	Sometimes	Never
Non-verbal communication			✓
Proper sequence		✓	
Motivation			✓

[Table 4.2.1.3]

Attitude	Always	Sometimes	Never
Receiving & Responding Phenomena (Instant feedback)			✓
Valuing			✓

Summary:

In table-1 the mental skill is evaluated. According to the table it is seen that the knowledge is represented always in the system, but here it is not defined the targeted learners and not provided any analytical questions which can produce the interactivity of the system.

In table-2 the physical skill is evaluated. In this table it is seen that there is no non-verbal communication and no motivation exist. Sometimes it is tried to maintain the lesson sequence, but not properly done.

In table-3 in attitude part it is seen that there is no system for instant feedback that is no receiving and responding phenomena and evaluating system.

4.2.2 Bangla Typing Tutor

Contents:
1. Typing method
2. Typing speed

Screenshot:
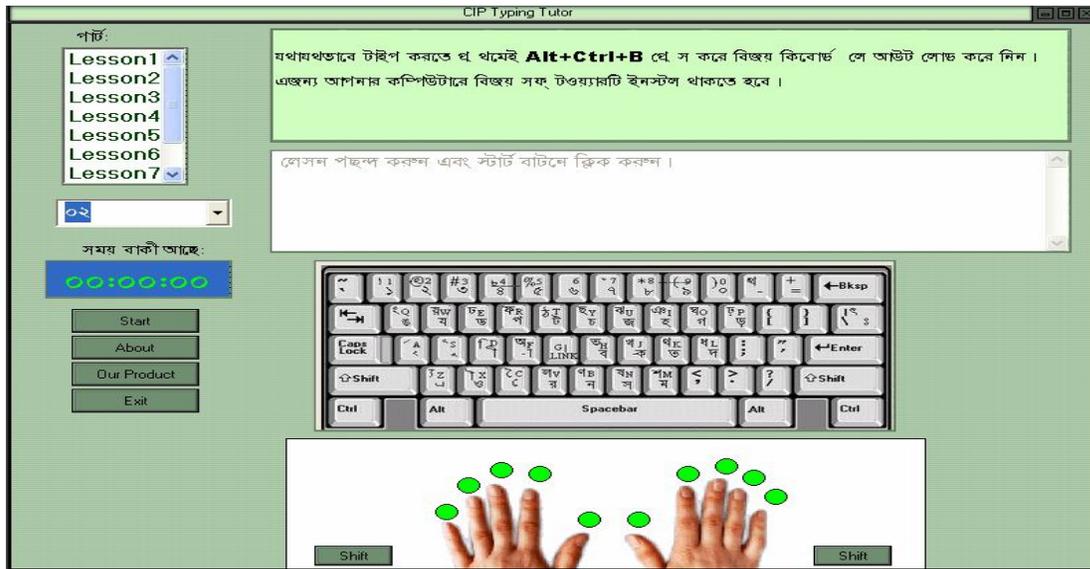
Fig: 4.2.2.1

The above figure represents the main interface of this software. It has only one interface. Here we can see that the software has some lesson part listed top of the left. Some techniques of the typing is given at the top. The performance of typing that is the typing speed is given at the left.

General Evaluation

Here it is seen that the software is based on input/output. The system has very simple feedback but there is some lack on knowledge presentation.

Evaluation according to Bloom's Taxonomy

[Table 4.2.2.1]

Mental Skill (Cognitive)	Always	Sometimes	Never
Knowledge		✓	
Targeted Learners			✓
Analytical Questions			✓

[Table 4.2.2.2]

Psychomotor (Physical skill)	Always	Sometimes	Never
Non-verbal communication		✓	
Proper sequence		✓	
Motivation		✓	

[Table 4.2.2.3]

Attitude	Always	Sometimes	Never
Receiving & Responding Phenomena (Instant feedback)		✓	
Valuing			✓

Summary:

In table-1 the mental skill is evaluated. According to the table it is seen that the knowledge is not properly represented. Targeted students are not defined and also there are no analytical questions.

In table-2 the physical skill is evaluated. In this table it is seen that there is very few non-verbal communication and motivation exist. Sometimes it is tried to maintain the lesson sequence, but not properly done.

In table-3 in attitude part it is seen that there exist very few instant feedback that is receiving and responding phenomena but no evaluating system.

4.2.3 Mathematics for SSC

Contents:
1. Mathematics solutions

Screenshot

Scene 1

Fig: 4.2.3.1

In the above interface some theory has represented on set operation

Scene 2

বাস্তব সংখ্যা

<div dir="ltr">

দ্বিতীয় অধ্যায়
প্রশ্নমালা – 2

বাস্তব সংখ্যা

সংখ্যার ধারণা গণিত শিক্ষার্থীর জন্য অত্যন্ত অপরিহার্য। সংখ্যা মূলত দুইপ্রকার। যেমন, (ক) বাস্তব সংখ্যা, (খ) কাল্পনিক সংখ্যা।

বাস্তব সংখ্যা (Real number) : ধনাত্মক সংখ্যা, ঋণাত্মক সংখ্যা এবং শূন্য (0) কে বাস্তব সংখ্যা বলা হয়। বাস্তব সংখ্যার সেটকে R দ্বারা প্রকাশ করা হয়। এক কথায় দৈনন্দিন কাজে ব্যবহৃত সংখ্যাগুলোই হল বাস্তব সংখ্যা যেমন, $1, 0, \dfrac{2}{5}, \sqrt{2}, \pi$ ইত্যাদি।

বাস্তব সংখ্যাগুলো মূলত চার প্রকার। যথা :- ১. স্বাভাবিক সংখ্যা (N) , ২. পূর্ণ সংখ্যা (Z), ৩. মূলদ সংখ্যা (Q) ও ৪. অমূলদ সংখ্যা।

বাস্তব সংখ্যাকে R দ্বারা প্রকাশ করা হয়। বাস্তব সংখ্যাকে সেটের সাহায্যে এভাবে প্রকাশ করা যায়: $N \subset Z \subset Q \subset R$

</div>

Fig: 4.2.3.2

In the above interface some theory on set operation has represented also.

General Evaluation

Here it is seen that the software is based on gathering of information and representation. The whole software is like this presentation based. There is no way for feedback.

Evaluation according to Bloom's Taxonomy

[Table 4.2.3.1]

Mental Skill (Cognitive)	Always	Sometimes	Never
Knowledge		✓	
Targeted Learners		✓	
Analytical Questions			✓

[Table 4.2.3.2]

Psychomotor (Physical skill)	Always	Sometimes	Never
Non-verbal communication		✓	
Proper sequence	✓		
Motivation		✓	

[Table 4.2.3.3]

Attitude	Always	Sometimes	Never
Receiving & Responding Phenomena (Instant feedback)		✓	
Valuing			✓

Summary:

In table-1 the mental skill is evaluated. According to this table it is seen that the knowledge is always tried to represent, but here it is defined the targeted learners and not provided any analytical questions which can produce the interactivity of the system.

In table-2 the physical skill is evaluated. In this table it is seen that there is no non-verbal communication and no motivation exist. Always it is tried to maintain the lesson sequence.

In table-3 in attitude part it is seen that there is no system for instant feedback that is no receiving and responding phenomena and evaluating system.

4.2.4 English Grammar

Contents:

1.   Description of computer parts
2.   Assembling
3.   Bios Setup etc
5.   Troubleshooting

Screenshot:

Scene 1

Fig: 4.2.4.1

In the above screenshot this is the first interface of this software. The menus are represented here. The software is developed in flash. Menus are presented as button.

Scene 2

Sentences

A word or a group of words having a complete meaning in a given context is called a sentence. অর্থাৎ যে শব্দ বা শব্দসমষ্টি কোন একটি প্রসঙ্গে একটি পূর্ণ অর্থ প্রকাশ করে, তাহাকে Sentence বা বাক্য বলে।

নিম্নের উদাহরণ সমূহ লক্ষ্য করুন :

    Goes to school.
    They in the field.

উপরের উদাহরণ দুটি কোন Sentence নয়, কারণ এদের কোনটি দ্বারা পূর্ণ অর্থ প্রকাশ পায় না।

    Siam goes to school.
    They are playing in the field.

এবারের উদাহরণ দুটি Sentence; কারণ এদের দ্বারা পূর্ণ অর্থ প্রকাশ পায়। তাই Sentence এর সংজ্ঞানুযায়ী বলা যায়, এই উদাহরণ দুটির প্রত্যেকে Sentence; এরা হল **Multiple Worded Sentence.**

এবার আরেকটি উদাহরণ দেখা যাক:

    Mr. Ripon : Do you know him?
    Mr. Anjum : Yes.

এখানে Yes দ্বারা পূর্ণ অর্থ প্রকাশ পায়, তাই এটি **Single Worded Sentence.**

Main Page   *Next*   *Exit*

Fig: 4.2.4.2

In this figure the definition of "Sentence" and some examples are given.

Scene 3

Fig: 4.2.4.3

In this figure the definition of "Gender" and some examples are given.

General Evaluation

Here it is seen that this English grammar learning software is based on gathering of information and representation. The whole software is like this presentation based. There is no way for feedback.

Evaluation according to Bloom's Taxonomy

[Table 4.2.4.1]

Mental Skill (Cognitive)	Always	Sometimes	Never
Knowledge	✓		
Targeted Learners			✓
Analytical Questions			✓

[Table 4.2.4.2]

Psychomotor (Physical skill)	Always	Sometimes	Never
Non-verbal communication			✓
Proper sequence		✓	
Motivation			✓

[Table 4.2.4.3]

Attitude	Always	Sometimes	Never
Receiving & Responding Phenomena (Instant feedback)			✓
Valuing			✓

Summary:

In table-10 the mental skill is evaluated according to Bloom's Taxonomy. In this table it is seen that the knowledge is always tried to represent properly, but here it is not defined the targeted learners and not provided any analytical questions which can generate the interactivity between the learner and system.

In table-11 the physical skill is evaluated. In this table it is seen that there is no non-verbal communication and no motivation exists. Here it is tried to maintain the lesson sequence.

In table-12 in attitude part it is seen that there is no system for instant feedback that is no receiving and responding phenomena and evaluating system. So a learner cannot put importance on the topics.

General summary

On the above analytical report according to Bloom's Taxonomy it is found that Bangladeshi learning software are not properly designed. There exists lot of interactivity, which diminishing the success of the e-learning system. It is very important to have instant feedback, which also adds extra interactivity between the learners and the system. Actually these learning software are not following the Bloom's Taxonomy.

4.2.5 GCSE Physics

Developed by "The Times"
Developing tool: Macromedia Flash

General Evaluation

Here it is seen that this learning software represents all information very descriptively and with proper guidance. There is excellent feedback system, which can evaluate the performance of a learner. The interactivity is very high. There are many examples as non-verbal communication.
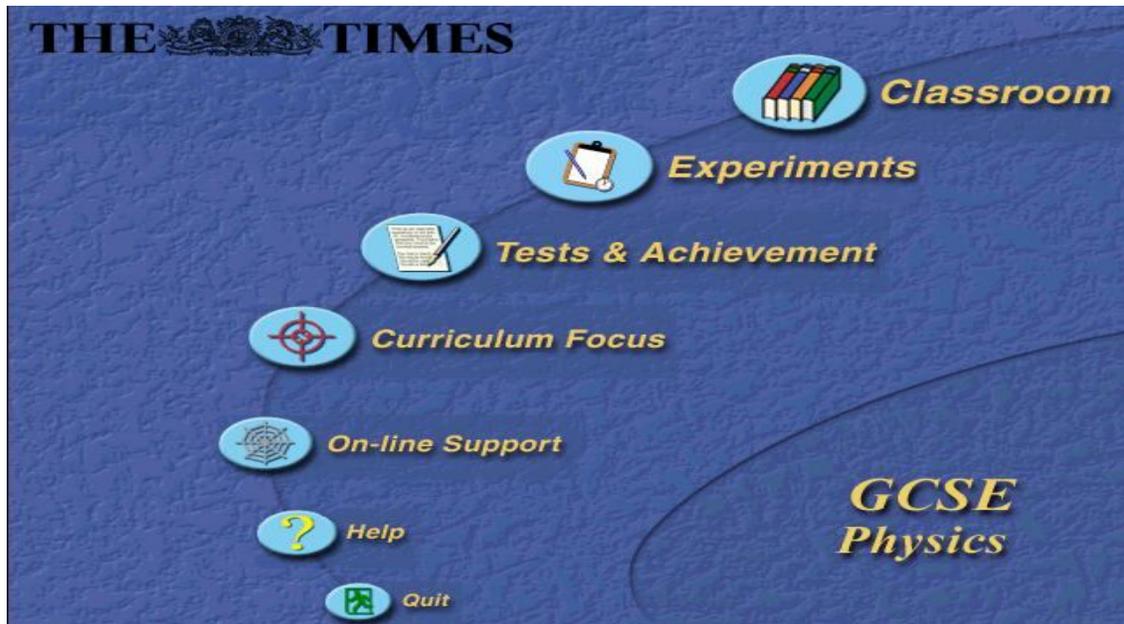
Screenshot

Scene 1

Fig: 4.2.5.1

In the above figure this is the first interface of this software. The menus like "classroom", "experiments", "test and achievements", "help" are represented here. The software is developed in flash.

Scene 2
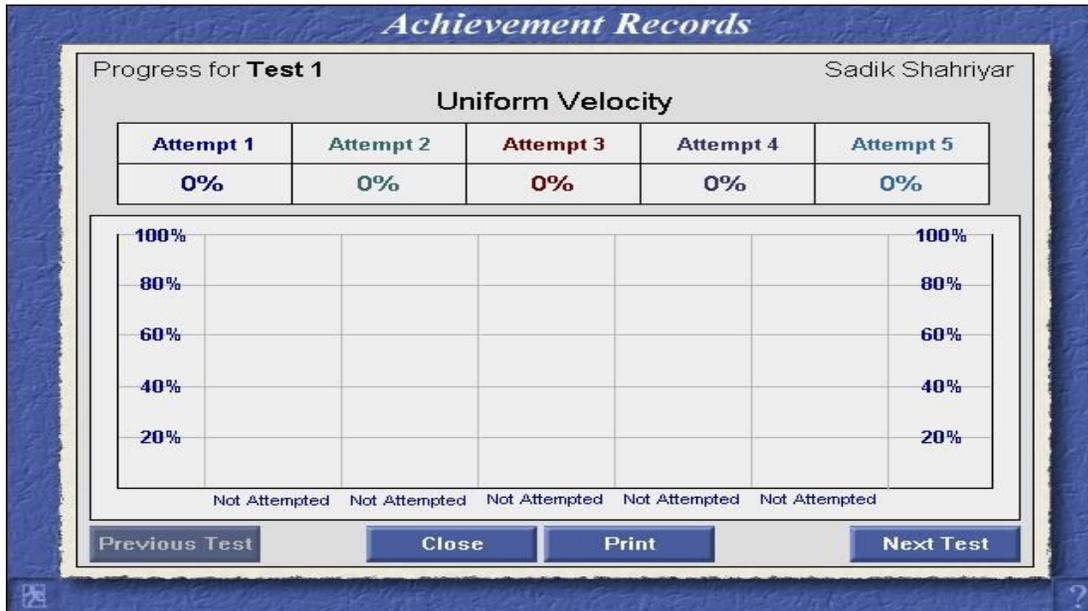

Fig: 4.2.5.2

In this figure the achievement records are given, which is a part of instant feedback. Here a learner can judge his own performance.

Scene 3

Fig: 4.2.5.3

In this figure the test part is given, which is a part of instant feedback. Here a learner can test his quality and performance. After giving the test the result is instantly shown, which increase it's interactivity.

Evaluation according to Bloom's Taxonomy

[Table 4.2.5.1]

Mental Skill (Cognitive)	Always	Sometimes	Never
Knowledge	✓		
Targeted Learners	✓		
Analytical Questions	✓		

[Table 4.2.5.2]

Psychomotor (Physical skill)	Always	Sometimes	Never
Non-verbal communication	✓		
Proper sequence	✓		
Motivation			✓

[Table 4.2.5.3]

Attitude	Always	Sometimes	Never
Receiving & Responding Phenomena (Instant feedback)	✓		
Valuing			✓

Summary:

In table-13 the mental skill is evaluated according to Bloom's Taxonomy. In this table it is seen that this part is mostly reflected in the system. The knowledge is always tried to represent properly, defined the targeted learners that is the system is developed for 'A' level students and provided many analytical questions, which generate the interactivity between the learner and system.

In table-14 the physical skill is evaluated. In this table it is seen that there is many non-verbal communication and no motivation exists. Here it is tried to maintain the lesson sequence properly.

In table-15 in attitude part it is seen that there is excellent system for instant feedback that is receiving and responding phenomena but there is no evaluating system. So a learner cannot put importance on the topics.

General summary:

At last it is said that the e-learning software has a great reflection of bloom's Taxonomy. Here the interactivity is maximized and instant feedback system is very excellent.

CHAPTER 5
PROPOSED DESIGN

5.1 Design Overview

Bloom's Taxonomy emphasized on three areas. One is "Psychomotor" which is skill. The other two are "Affective" and "Cognitive" which represents attitude and knowledge.

Guided Response, Perception and Set are three major part of psychomotor. By Guided Response a person can perform any job as the instructor demonstrated. Guided response attracts a learner to trial a task of the instructor. The software should be interactive to get response from the learner. Interactive software means, the software can perform a job in a lively manner by which the learner gets confidence and self-belief to do the particular task.

Perception is a skill, which guide some one to do motor activity. It requires nonverbal communication cues. For an example, a person knows how to throw a ball. To teach a distance learner about physical exercise, perception is more effective than comprehensive description.

Set is a sequence of steps to do something in a disciplined way. It is actually a mindset, which helps the learner to do his tasks in a systematic way. Set is an important thing for Bangladeshi distance learners. It is very important for the virtual instructor to motivate the learner. On the context of Bangladesh, set is very important.

Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation are six major areas of Cognitive.

Knowledge, which is used here as recall information, is useful for the learners to do a particular task. For any type of e-learning software, recall information is must. Suppose, for computer trouble shooting software recall information about computer components is essential. If a person doesn't know about components like hard disc, ram, processor, motherboard etc, he can't able to trouble shoot.

Comprehension, which means understanding the problems, is essential for a learner. On the context of Bangladesh it is a very hard job. For the lack of technology and proper manpower, our people can't identify the problem properly. As an example above, the PC trouble shooting software can't be useful if it can't guide the learner to his problem. Here feedback plays a major role. The e-learning system should provide some sort of feedback like FAQ, MCQ can help the learner.

Application is a use of knowledge to help a learner to develop something within his knowledge. The software has to ensure that it provides enough information to help the learner make an application. Interactive tutorial sessions and some built in project can help the learner to customize his application.

Analysis is identification of components before starting a task. In software industry when a developer develops software, he collects information from client and identifies data. For the developer point of view analysis is an important task. He has to analyze the customer demands and has to set information through that.

Synthesis is using old information build up a system, which carry some new meanings.
Evaluation is the testing of knowledge on its effectiveness. It is always necessary to have evaluation on the software to know the actual demands of the learner.

Affective works on Receiving Phenomena, Responding Phenomena and value.

Receiving Phenomena is a type of situation when a learner decides to receive knowledge or techniques from the instructor. Sometimes students hear the lecture of the instructor attentively and some times not. The developer of the software should understand the type of the client he deals with and

Responding Phenomena is the sign from the learner by which he indicates his understandings to the instructor. It is a type of active participation.

Value is a situation where a learner evaluates a topic important or less important.
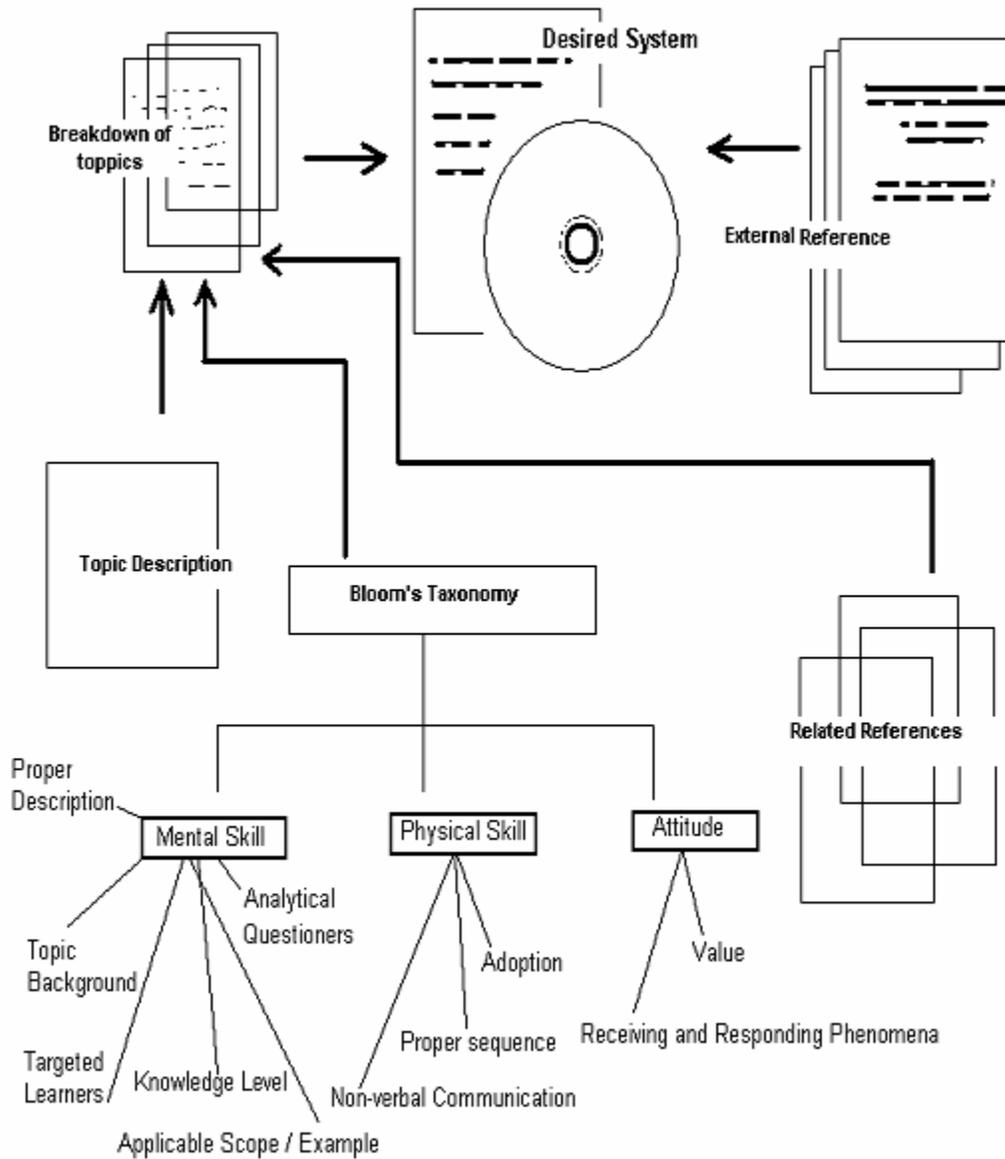
5.2 Our Proposal

Fig: 5.2.1

In our proposal our main theme is to develop a system where the desired system will be a combination of main topics and external topics. External reference is

those which are related to that topic but there are many differences between them. As for example when an instructor teaches the computer language like "C" then the external references may be C++ or Java. Then comes the main topics which will breakdown into topic description, representation according to Bloom's Taxonomy and related references. Here the related references are reference within the main topic. As for example we can say that when an instructor teaches about "C" language then differences between static variable and array variable may be related reference. Then comes the design according to Bloom's Taxonomy which is described bellow:

Mental Skill (Strong knowledge representation):

1. Topic background

    Topic's background is very important because learners can know what is going to presentation. It makes a good interest on the topics

    Ex:

    Computer language "C"

    How it comes, from when it was introduced, why it was designed?

2. Proper description

    Every topic should represent properly and briefly. In our thesis survey we have seen that most of the software prepared with short description, which insufficient for learners.

3. Targeted learners

    Most Bangladeshi software developed without learners' demand. There are different types of learners in different level like primary, secondary and higher secondary.

    Ex:

    The approach of design of mathematical software for primary level student should be different than secondary level students. More animation, interesting notes and interactive videos should be included for primary level

4. Knowledge Level:

   The software can be divided into three sections:
   - Primary / Beginner Level
   - Secondary / Amateur Level
   - Advanced / Professional Level

5. Applicable Scope / Example:

   Suppose software that teaches how to design and develop a database. If there are some tutorials like hospital management, student management then there should be some hints on hotel management, inventory management which will help a person to develop same type of system like library management, sales management etc.

6. Analytical Questioners:

   To follow the tutorial / lecture a person can build up an application on that topic.

   Ex:
   Suppose a tutorial of triangle drawing is given and the learner is asked to draw a rectangle.

   Physical Skill (Presentation):

7. Non-verbal Communication:

   It is very helpful to memorize any topic using symbolic image or character. Some times interactive animations also helpful to learn topics like Geometry, Physical Exercise etc.

8. Proper sequence:

Topics that are covered in the software should be very clear and sequential. To ensure proper learning sequence for the learner there should be a mock test to judge the level of the learners.

For an example, people are very interested in flash animation in our country. When they saw some advanced, attractive, flash animation in website or in any other place, become very attentive and determine to learn animation. But most of them don't know the basic properly and try to do the advance part first. As a result they understand nothing and give up their mind to learn flash animation. So, there should be a mock test that will test the level of the learner. If a person comes and tries to access the advanced part, he will face a mock test and the result will tell him his level.

9. Adoption:

Test one's capability on different field.
Ex:
A C.S.E student can try to move in Telecom. So, there should be some Telecom questions to test the capability of the student.

Attitude (Learners Mentality):

10. Receiving and Responding Phenomena:

It is the part where the learner reacts on the topic. Here, the learners will give their feedback to the system (learning process). He can give it after the learning session or can give instant feedback.

11. Value:

 The system will create a statistical report on the topic that he has studied or learned. It will determine the importance of the topic.

CHAPTER 6
CONCLUSION

6. CONCLUSION

The transformation of the education sector generally, and the e- Learning sector specifically, is being driven by a number of broad economic, technological, and social trends that have accelerated in recent years. One of the key ones is the significant increase in the demand for higher education in both developed and developing countries. Bangladesh is always keen on introducing new learning media like e- Learning and working to come up with specific forward thinking mechanism.

We tried to propose an interactive system based on Blooms Taxonomy. In our generic software design we used only major parts of Bloom's taxonomy. In future we will research detailed and will try to develop a software that fully supports Bloom's Taxonomy.

APPENDIX A

LIST OF TABLES

4.2.1 Computer Hardware with Trouble Shooting

4.2.2 Bangla Typing Tutor

4.2.3 Mathematics for S.S.C

4.2.4 English Grammar

4.2.4 GCSE Physics

APPENDIX-B

LIST OF FIGURES

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