

Incremental Thinking Questions in E-learning

A Thesis

**Submitted to the Department of Computer Science &
Engineering**

of

BRAC University

By

Parvez Ahmad

Student ID: 02101056

Tania Islam

Student ID: 02101054

In Partial Fulfillment of the

Requirements for the Degree

of

Bachelor of Science in Computer Science & Engineering

May 2006

DECLARATION

This is certified that I, Parvez Ahmad bearing University ID 02101056 have designed the database of our proposed system Incremental Thinking Questions in E-learning under CSE-400 course and I therefore declare that this thesis is based on the results found by myself. Materials of work found by other researcher are mentioned by reference. This thesis, neither in whole nor in part, has been previously submitted for any degree.

Signature of
Supervisor

Signature of
Author

ACKNOWLEDGMENTS

At first, I should thank Almighty Allah for making us able to complete our project in time. We were assigned to implement a new system that can be an interactive solution to distance learning. I would like to express our gratefulness and thanks to our respected thesis supervisor Dr. Yousuf M. Islam for giving us the opportunity to work on real life activity. His dynamic guidance at all stages of work has encouraged us to accomplish our work successfully. We always have felt that we are under guidance of highly qualified and experienced personal. I would like to thank BRAC University CSE department for giving us overall support and co-operation.

ABSTRACT

E-learning is the use of technologies to deliver lessons . It is an interactive instructional experience in which the student and the teacher are in separate physical locations. We have generated an E-learning engine or template for the teachers to enable the students to learn the lessons through incremental thinking questions chosen by the teachers in their absence. By using our software tool, interfaces will be generated automatically lesson by lesson after getting all required information from the teachers. Each question will be case (background text) based, so that the students can be able to get the answers right without being taught the topics by the teachers. The students will get feedback immediately through hints and guide to right answers. If they are unable to give the right answers, then they can get to know how to get the answers right through guide to right answers. If they give the wrong answers, then the system will give them the hints through messages for making them able to get the answers right. The students will be able to evaluate themselves through this tool after knowing their scores. They will also get to know how much they are prepared or how much they should be.

CHAPTER 1

INTRODUCTION

1.1 E-learning

Though an E-learning system does not consist of any physical learning materials issued to students or actual face to face contact, but it is efficient, task relevant and just-in-time learning grown from the learning requirements of the new, dynamically changing and scattered world. E-learning is the use of technologies to deliver lessons. It is an interactive instructional experience in which the student and the teacher are in separate physical locations. It is designed for those who intend to improve upon the level of their education or professional skills by studying at home or at places of their work. It meets the need for education of all classes of people particularly those deprived of education in conventional institutions.

1.1.1 E-learning Methodology

The four fuels of E-learning are in the following:

- Technology (means)
- Learning Methodology (means)
- Acquiring new skills and knowledge (consequence)
- Accessing information (consequence)

The first means and main delivery mechanism of E-learning is technology (means). A learning methodology is a set of procedures composed of methods, principles and rules for enhancing individual capacity and performance. When most people think of developing E-learning, they think of the technology and content. However, this can normally only bring about knowledge, which is important, but learning often needs to go one further step which is performance. This normally requires that a skill be mastered by the student. While there are a

number of means of achieving this, we have described one option in a *Learning Framework*, which builds on the four main design architectures of:

- Receptive: absorbing information
- Directive: frequent responses coupled with feedback (behavioral roots)
- Guided Discovery: active constructive process mediated by problem solving
- Exploratory: finding and processing information

The four architectures help us to learn by various experiences:

- Absorb (read, hear, feel)
- Do (activity)
- Interact (socialize)
- Reflection

The main strength of E-learning is its ability to send information, thus its main architecture often turns out to be *Receptive* in nature. This post is a good example in that it sends text and images for the reader to *absorb*.

The second strength of E-learning is its ability to allow us to interact with each other. Thus, we can get feedback from peers (*Directive*), we can discuss concepts with others (*Exploratory*) and we can have directed conferences to solve problems (*Guided Discovery*).[7]

1.1.2 The purposes of E-learning

Learning Object – a digital file or tool that can be reused in E-learning contexts.
Learning Management System (LMS) – a collection of E-learning tools available through a shared administrative interface. A learning management system can be thought of as the platform.

1.1.3 Analyzing factors of E-learning

Developers don't seem to be aware of how people learn, they use flawed models of instruction: presentation models, programmed instruction/tutorials. ROI in the technology and in courseware development rather than on valid measures of effectiveness developed from analysis of organizational and individual performance goals, corporations are more interested in throughput and low unit cost. The strategic planning process is often driven by technology, not by commercial objectives. An unclear valuing of technological solutions for the planning of education.

Very simply put, on-line learning (or E-learning) is where a student uses a variety of computer and networking technologies to access (often geographically) remote training materials, interact with students, etc. (Note that not all on-line learning or E-learning is distance learning, for example, student might use an interactive CD-ROM on his or her computer.)[8]

Teachers and students need to know how to use evolving technologies to best effect when teaching and the **E-tutor Course** has been designed to provide educators with the experience and know-how they will need to:

- Transform their own teaching methods;
- Support individuals and groups using online communications;
- Make effective use of the web as an educational resource;
- Make choices about how and which technologies can help their students;
- Understand usability and accessibility issues;
- Determine the most effective delivery method for their students.

1.1.4 Ten hypotheses of E-learning[7]

Hypothesis 1:E-learning is a means of implementing education that can be applied within varying education models like face-to-face or distance education.

Hypothesis 2:E-learning enables unique forms of education that fits within the existing paradigms of face to face and distance education.

Hypothesis 3:The choice of e-learning tools should reflect how technology is used is more important than *which* technology is used.

Hypothesis 4:E-learning advances primarily through the successful implementation of instructive innovation.

Hypothesis 5:E-learning can be used in two major ways; the presentation of education content and the facilitation of education processes.

Hypothesis 6:E-learning tools are best made to operate within a carefully selected and optimally included course design model.

Hypothesis 7:E-learning tools and techniques should be used only after consideration has been given to online vs. offline trade-offs.

Hypothesis 8:Effective E-learning practice considers the ways in which end-users will engage with the learning opportunities provided to them.

Hypothesis 9:The overall aim of education, that is, the development of the student in the context of a predetermined curriculum or set of learning objectives, does not change when E-learning is applied.

Hypothesis 10: Only instructive advantages will provide a lasting underlying principle for implementing E-learning approaches.

1.2 Incremental Thinking Questions

Incremental Thinking Questions are that kind of questions which will start from the basics and get more detailed sequentially one after the other question. The questions will be case (background text) based which can be considered as scenario or theory in absence of the teachers for the students to get the answers right. The students will be able to think more after going through the (background text) of each question.

CHAPTER 2

BACKGROUND

2.1 Literature Reviews

Before starting our thesis we have read some papers and gather information about E-learning. Some of the important paragraphs are given the bellow:

2.1.1 Using internet as a tool for E-learning

Online education has changed the interface of education with a revolution in learning technologies. It is a revolution, which has made education conveniently available to millions around the world. In US more than 10 % of students and 80% of institutions are engaged in online education [3]. Within the world of knowledge dissemination and learning this unprecedented trend will bring many changes. Teaching an online course is a challenge. Online learning and teaching have placed new demands on students and teachers. In the online mode the students are not in a classroom and the teacher is not managing the class face-to face. Opportunities to create a captive class environment through charisma and threat are virtually absent. The expression of personal emotions is reduced to a few symbols and notations for the online classrooms. Verbal and Non-Verbal communication is severely limited to the ability of the technology. To provide successful online education it is essential to understand how some of these limiting factors affect the students, educators and the programs. The effectiveness of learning management systems depends on its ability to identify the learning dimensions that are responsible for a student's performance improvements [1].

2.1.2 Thinking in E-learning

There were some disagreement about whether students should get access to the full functionality of E-learning in year one or if it is better to introduce E-learning incrementally. The consensus amongst the Guinea Pigs seemed to be that incremental use - moving from simple document delivery and storage in year one, though to interactive online seminars in year three - was the best design. This idea of incremental change in teaching methods and learning tools agrees with work by Trowler, Saunders, and Knight on best practice in changing teaching techniques. This incremental approach to change can also be a useful strategy for teachers as “the professional individual must perceive him or herself as being competent to implement the necessary changes and be sufficiently intrinsically motivated and committed to investigate possible ways forward”.^[2]

2.1.3 Providing informative feedback

Some educators believe that the most important facilitator behavior is timely and personal response to student contributions and questions. Facilitators-as-instructors provide informative feedback that offers students guidance about how they might improve their performance. Feedback is even more critical in E-learning than traditional classrooms because students may feel isolated and detached due to lack of environmental and nonverbal signals. The element of timely feedback is especially important. Facilitators should establish a standard such as a forty-eight hour turnaround time. Students should provide feedback to each other, too. Facilitators must establish peer feedback as an expectation in delineated guidelines posted at the beginning of a course.^[3]

2.1.4 Few key words from paper learning references

1. E-learning has changed the interface of education

2. In US more than 10 % of students and 80% of institutions are engaged in E-learning.
3. Online learning and teaching have placed new demands on students and teachers.
4. In the E-learning mode the students are not in a classroom and the teacher is not managing the class face-to face.
5. Incremental approach also be a useful strategy for teachers to prepare well-structured lectures.
6. Lack of feedback.

2.2 Previous Software

At first, we have studied successes and failures of E-learning Softwares. We have found that the rate of failure is much more higher than the rate of success. Thus we have analyzed and tested a software named “**LEARN SPREADSHEET**”.

2.2.1 Limitations of the Previous Software

We have found out the following limitations of the previous software.

1. Some questions don't give the access to go to the next question until getting the answers right of the current question.
2. It takes multiple answers, which is useless.
3. Sometimes typing mistake does occur. It deducts mark frequently.
4. Answering process is much lengthy and boring.
5. Total mark is not equal to the sum of individual mark.

6. .As there is no option for guide to right answer, so if any student is unable to get the answer right, then he/she cannot get to know how to get the answer right.
7. Lack of pre-planned lecture delivery.

2.2.2 Three types of tests on the previous software

“**LEARN SPREADSHEET**” was tested among 118 students of BRAC University.

There were three types of tests. These are in the following:

- Pre-Test
- Post-Test
- T-Test Analysis

2.2.2.1 Pre-Test

A Pre-Test was conducted on the papers among the students without having the software.

2.2.2.2 Post-Test

A Post-Test was conducted among the students using the software.

2.2.2.3 T-Test Analysis

A T-Test Analysis (a mathematical test based on statistics) was conducted among the students after getting the results of Pre-Test and Post-Test.

2.2.3 The reasons behind making an improved version of the previous software

After getting the results of Pre-Test and Post-Test, T-Test Analysis was performed. The outcome of T-Test was positive.

For this reason, we have decided to make a software tool using Incremental Thinking Questions, which is the improved version of the previous software. Basically, we have made a tool for the teachers to enable the students to learn the lessons chosen by the teachers in their absence.

Through our software tool the students will get feedback immediately. By knowing about their scores, they will be able to evaluate themselves through this tool. They will also get to know how much they are prepared or how much they should be.

CHAPTER 3

OUR PROPOSED SOFTWARE TOOL

We have generated an E-learning engine or template. By using this software tool, interfaces will be generated automatically after getting all required information from the teachers for the students who want to give the exams. This system is mainly a tool for the teachers to enable the students to learn specific topics chosen by the teachers in their absence. It will provide required lessons of specific topics through the case (background text) of each question, so that the students can be able to get the answers right without being taught the topics by the teachers. This case (background text) of each question can be considered as the guideline of the teachers. It is basically a case (background text) based learning which can be used for any subject by a teacher.

The teachers can give any number of questions as inputs with corresponding

lesson number, title, case, marks, confirmation, right answer, wrong answers, messages and guide to right answer through the input scheme. Questions related information will be given sequentially, so that corresponding interfaces of questions can be generated sequentially one after the other maintaining the order of given questions by the teachers.

First of all, the teachers have to decide which class of students will use this software and they have to choose the topics on the basis of those students. Then they have to prepare some questions, obviously relevant questions which will be case (background text) based (not necessarily all the time) for making the students learn without their assistance. After that, the questions will appear in the monitors in a sorted way i.e. from easier to harder.

If any student is unable to get the answer right, then he/she can get to know how to get the answer right through guide to right answer. If any student gives the wrong answer, then the system will give him/her the hint through message for making him/her able to get the answer right. If any student gives the right answer, then the system will show how the answer is right or confirmation of the right answer and after that confirmation will be shown in the below. In this way, questions will appear. Students' Names, Total Scores and corresponding Question Sets will be saved in the database to find out what is the highest score and who has got it. In case of the right answer, the score will be the will be the same as the out of. In case of the wrong answer, "2" will be deducted.

3.1 Coding

3.1.1 Front End

```
Dim i, j, k, l, o1, o2, o3, o4, o5, o6, o7, o8, o9, o10, mark, total, ii, ij As Integer
```

```
Dim a, b, c, d, name_ppp, asd, hints As String
```

```
Private Sub cmddone_Click()
```

```
If op1.Value = True Then
  If Sheet4.Cells(o1, 4) = "Yes the answer is right" Then
    a = Sheet4.Cells(o1, 4)
    l = MsgBox(a, vbOKOnly + vbInformation)
    a = Sheet4.Cells(o1, 5)
    l = MsgBox(a, vbOKOnly + vbInformation)
    lblcon.Caption = Sheet3.Cells(j - 1, 4)
    mark = mark + Sheet4.Cells(o1, 3)
    lblc.Caption = mark
    total = total + mark
  Else
    a = Sheet4.Cells(o1, 4)
    l = MsgBox(a, vbOKOnly + vbCritical)
    a = Sheet4.Cells(o1, 5)
    l = MsgBox(a, vbOKOnly + vbInformation)
    'lblcon.Caption = Sheet3.Cells(j - 1, 4)
    mark = mark + Sheet4.Cells(o1, 3)
    lblc.Caption = mark
    total = total + mark
  End If
End If
If op2.Value = True Then
  If Sheet4.Cells(o2, 4) = "Yes the answer is right" Then
    a = Sheet4.Cells(o2, 4)
    l = MsgBox(a, vbOKOnly + vbInformation)
    a = Sheet4.Cells(o2, 5)
    l = MsgBox(a, vbOKOnly + vbInformation)
    lblcon.Caption = Sheet3.Cells(j - 1, 4)
    mark = mark + Sheet4.Cells(o2, 3)
    lblc.Caption = mark
    total = total + mark
```

Else

```
a = Sheet4.Cells(o2, 4)
l = MsgBox(a, vbOKOnly + vbCritical)
a = Sheet4.Cells(o2, 5)
l = MsgBox(a, vbOKOnly + vbInformation)
'lblcon.Caption = Sheet3.Cells(j - 1, 4)
mark = mark + Sheet4.Cells(o2, 3)
lblc.Caption = mark
total = total + mark
```

End If

End If

If op3.Value = True Then

If Sheet4.Cells(o3, 4) = "Yes the answer is right" Then

```
a = Sheet4.Cells(o3, 4)
l = MsgBox(a, vbOKOnly + vbInformation)
a = Sheet4.Cells(o3, 5)
l = MsgBox(a, vbOKOnly + vbInformation)
lblcon.Caption = Sheet3.Cells(j - 1, 4)
mark = mark + Sheet4.Cells(o3, 3)
lblc.Caption = mark
total = total + mark
```

Else

```
a = Sheet4.Cells(o3, 4)
l = MsgBox(a, vbOKOnly + vbCritical)
a = Sheet4.Cells(o3, 5)
l = MsgBox(a, vbOKOnly + vbInformation)
'lblcon.Caption = Sheet3.Cells(j - 1, 4)
mark = mark + Sheet4.Cells(o3, 3)
lblc.Caption = mark
total = total + mark
```

End If

```
End If
If op4.Value = True Then
    If Sheet4.Cells(o4, 4) = "Yes the answer is right" Then
        a = Sheet4.Cells(o4, 4)
        l = MsgBox(a, vbOKOnly + vbInformation)
        a = Sheet4.Cells(o4, 5)
        l = MsgBox(a, vbOKOnly + vbInformation)

        lblcon.Caption = Sheet3.Cells(j - 1, 4)

        mark = mark + Sheet4.Cells(o4, 3)
        lblc.Caption = mark
        total = total + mark
    Else
        a = Sheet4.Cells(o4, 4)
        l = MsgBox(a, vbOKOnly + vbCritical)
        a = Sheet4.Cells(o4, 5)
        l = MsgBox(a, vbOKOnly + vbInformation)
        'lblcon.Caption = Sheet3.Cells(j - 1, 4)

        mark = mark + Sheet4.Cells(o4, 3)
        lblc.Caption = mark
        total = total + mark
    End If
End If
If op5.Value = True Then
    If Sheet4.Cells(o5, 4) = "Yes the answer is right" Then
        a = Sheet4.Cells(o5, 4)
        l = MsgBox(a, vbOKOnly + vbInformation)
        a = Sheet4.Cells(o5, 5)
        l = MsgBox(a, vbOKOnly + vbInformation)
```

```
lblcon.Caption = Sheet3.Cells(j - 1, 4)
```

```
mark = mark + Sheet4.Cells(o5, 3)
```

```
lblc.Caption = mark
```

```
total = total + mark
```

```
Else
```

```
  a = Sheet4.Cells(o5, 4)
```

```
  l = MsgBox(a, vbOKOnly + vbCritical)
```

```
  a = Sheet4.Cells(o5, 5)
```

```
  l = MsgBox(a, vbOKOnly + vbInformation)
```

```
  'lblcon.Caption = Sheet3.Cells(j - 1, 4)
```

```
mark = mark + Sheet4.Cells(o5, 3)
```

```
lblc.Caption = mark
```

```
total = total + mark
```

```
End If
```

```
End If
```

```
If op6.Value = True Then
```

```
  If Sheet4.Cells(o6, 4) = "Yes the answer is right" Then
```

```
    a = Sheet4.Cells(o6, 4)
```

```
    l = MsgBox(a, vbOKOnly + vbInformation)
```

```
    a = Sheet4.Cells(o6, 5)
```

```
    l = MsgBox(a, vbOKOnly + vbInformation)
```

```
  lblcon.Caption = Sheet3.Cells(j - 1, 4)
```

```
mark = mark + Sheet4.Cells(o6, 3)
```

```
lblc.Caption = mark
```

```
total = total + mark
```

```
Else
```

```
a = Sheet4.Cells(o6, 4)
l = MsgBox(a, vbOKOnly + vbCritical)
a = Sheet4.Cells(o6, 5)
l = MsgBox(a, vbOKOnly + vbInformation)
lblcon.Caption = Sheet3.Cells(j - 1, 4)
```

```
mark = mark + Sheet4.Cells(o6, 3)
lblc.Caption = mark
total = total + mark
```

```
End If
```

```
End If
```

```
If op7.Value = True Then
```

```
  If Sheet4.Cells(o7, 4) = "Yes the answer is right" Then
```

```
    a = Sheet4.Cells(o7, 4)
    l = MsgBox(a, vbOKOnly + vbInformation)
    a = Sheet4.Cells(o7, 5)
    l = MsgBox(a, vbOKOnly + vbInformation)
    lblcon.Caption = Sheet3.Cells(j, 4)
    lblcon.Caption = Sheet3.Cells(j, 4)
    mark = mark + Sheet4.Cells(o7, 3)
    lblc.Caption = mark
    total = total + mark
```

```
Else
```

```
  a = Sheet4.Cells(o7, 4)
  l = MsgBox(a, vbOKOnly + vbCritical)
  a = Sheet4.Cells(o7, 5)
  l = MsgBox(a, vbOKOnly + vbInformation)
  lblcon.Caption = Sheet3.Cells(j, 4)
  mark = mark + Sheet4.Cells(o7, 3)
  lblc.Caption = mark
  total = total + mark
```

```
End If
End If
If op8.Value = True Then
    If Sheet4.Cells(o8, 4) = "Yes the answer is right" Then
        a = Sheet4.Cells(o8, 4)
        l = MsgBox(a, vbOKOnly + vbCritical)
        a = Sheet4.Cells(o8, 5)
        l = MsgBox(a, vbOKOnly + vbInformation)
        lblcon.Caption = Sheet3.Cells(j, 4)
        lblcon.Caption = Sheet3.Cells(j, 4)
        mark = mark + Sheet4.Cells(o8, 3)
        lblc.Caption = mark
        total = total + mark
    Else
        a = Sheet4.Cells(o8, 4)
        l = MsgBox(a, vbOKOnly + vbCritical)
        a = Sheet4.Cells(o8, 5)
        l = MsgBox(a, vbOKOnly + vbInformation)
        lblcon.Caption = Sheet3.Cells(j, 4)
        mark = mark + Sheet4.Cells(o8, 3)
        lblc.Caption = mark
        total = total + mark
    End If
End If
If op9.Value = True Then
    If Sheet4.Cells(o9, 4) = "Yes the answer is right" Then
        a = Sheet4.Cells(o9, 4)
        l = MsgBox(a, vbOKOnly + vbInformation)
        a = Sheet4.Cells(o9, 5)
        l = MsgBox(a, vbOKOnly + vbInformation)
        lblcon.Caption = Sheet3.Cells(j, 4)
```

```
lblcon.Caption = Sheet3.Cells(j, 4)
mark = mark + Sheet4.Cells(o9, 3)
lblc.Caption = mark
total = total + mark
```

```
Else
```

```
  a = Sheet4.Cells(o9, 4)
  l = MsgBox(a, vbOKOnly + vbCritical)
  a = Sheet4.Cells(o9, 5)
  l = MsgBox(a, vbOKOnly + vbInformation)
  lblcon.Caption = Sheet3.Cells(j, 4)
  mark = mark + Sheet4.Cells(o9, 3)
  lblc.Caption = mark
  total = total + mark
```

```
End If
```

```
End If
```

```
If op10.Value = True Then
```

```
  If Sheet4.Cells(o10, 4) = "Yes the answer is right" Then
```

```
    a = Sheet4.Cells(o10, 4)
    l = MsgBox(a, vbOKOnly + vbInformation)
    a = Sheet4.Cells(o10, 5)
    l = MsgBox(a, vbOKOnly + vbInformation)
    lblcon.Caption = Sheet3.Cells(j, 4)
    lblcon.Caption = Sheet3.Cells(j, 4)
    mark = mark + Sheet4.Cells(o10, 3)
    lblc.Caption = mark
    total = total + mark
```

```
  Else
```

```
    a = Sheet4.Cells(o10, 4)
    l = MsgBox(a, vbOKOnly + vbCritical)
    a = Sheet4.Cells(o10, 5)
    l = MsgBox(a, vbOKOnly + vbInformation)
```

```
        lblcon.Caption = Sheet3.Cells(j, 4)
        mark = mark + Sheet4.Cells(o10, 3)
        lblc.Caption = mark
        total = total + mark
    End If
End If
End Sub

Private Sub cmdnext_Click()

If Sheet2.Cells(j, 1) <> "" Then
    ii = j
    op.Value = True
    ref

    lblo.Caption = ""
    lblc.Caption = ""
    mark = 0

    lblless.Caption = Sheet2.Cells(j, 1)
    lblpro.Caption = Sheet2.Cells(j, 2)
    lblcase.Caption = Sheet2.Cells(j, 3)
    lblques.Caption = Sheet3.Cells(j, 2)
    lblo.Caption = Sheet3.Cells(j, 3)
    'marks

    'options

If Sheet4.Cells(k, 1) = lblless.Caption And lblless.Caption <> "" Then
```

```
op1.Visible = True
op1.Caption = Sheet4.Cells(k, 2)
o1 = k

k = k + 1
Else
  op1.Visible = False
End If
If Sheet4.Cells(k, 1) = lblless.Caption And lblless.Caption <> "" Then
  op2.Visible = True
  op2.Caption = Sheet4.Cells(k, 2)
  o2 = k
  k = k + 1
Else
  op2.Visible = False
End If
If Sheet4.Cells(k, 1) = lblless.Caption And lblless.Caption <> "" Then
  op3.Visible = True
  op3.Caption = Sheet4.Cells(k, 2)
  o3 = k
  k = k + 1
Else
  op3.Visible = False
End If
If Sheet4.Cells(k, 1) = lblless.Caption And lblless.Caption <> "" Then
  op4.Visible = True
  op4.Caption = Sheet4.Cells(k, 2)
  o4 = k
  k = k + 1
Else
  op4.Visible = False
```

End If

If Sheet4.Cells(k, 1) = Iblless.Caption And Iblless.Caption <> "" Then

op5.Visible = True

op5.Caption = Sheet4.Cells(k, 2)

o5 = k

k = k + 1

Else

op5.Visible = False

End If

If Sheet4.Cells(k, 1) = Iblless.Caption And Iblless.Caption <> "" Then

op6.Visible = True

op6.Caption = Sheet4.Cells(k, 2)

o6 = k

k = k + 1

Else

op6.Visible = False

End If

If Sheet4.Cells(k, 1) = Iblless.Caption And Iblless.Caption <> "" Then

op7.Visible = True

op7.Caption = Sheet4.Cells(k, 2)

o7 = k

k = k + 1

Else

op7.Visible = False

End If

If Sheet4.Cells(k, 1) = Iblless.Caption And Iblless.Caption <> "" Then

op8.Visible = True

op8.Caption = Sheet4.Cells(k, 2)

o8 = k

k = k + 1

Else

```
    op8.Visible = False
End If
If Sheet4.Cells(k, 1) = lblless.Caption And lblless.Caption <> "" Then
    op9.Visible = True
    op9.Caption = Sheet4.Cells(k, 2)
    o9 = k
    k = k + 1
Else
    op9.Visible = False
End If
If Sheet4.Cells(k, 1) = lblless.Caption And lblless.Caption <> "" Then
    op10.Visible = True
    op10.Caption = Sheet4.Cells(k, 2)
    o10 = k
    k = k + 1
Else
    op10.Visible = False
End If

Else
'a = total
Sheet6.Cells(30, 30) = total
a = Sheet6.Cells(30, 30).Text
asd = "Your total score is: "
i = MsgBox(asd + a, vbOKOnly + vbInformation)
ref
name_ppp = InputBox("Enter your name:")
For j = 2 To 100
    If Sheet5.Cells(j, 1) = "" Then
        Sheet5.Cells(j, 1) = name_ppp
        Sheet5.Cells(j, 2) = total
```

```
Sheet5.Cells(j, 3) = load_question_set.t1
```

```
j = 101
```

```
Sheet5.Activate
```

```
End If
```

```
Next
```

```
End If
```

```
j = j + 1
```

```
End Sub
```

```
Private Sub CommandButton1_Click()
```

```
ref
```

```
j = Sheet6.Cells(20, 21)
```

```
k = Sheet6.Cells(20, 21)
```

```
lblo.Caption = ""
```

```
lblc.Caption = ""
```

```
total = 0
```

```
End Sub
```

```
Public Sub ref()
```

```
lblless.Caption = ""
```

```
lblpro.Caption = ""
```

```
lblcase.Caption = ""
```

```
lblques.Caption = ""
```

```
op1.Caption = ""
```

```
op1.Visible = False
```

```
op2.Caption = ""
```

```
op2.Visible = False
```

```
op3.Caption = ""
```

```
op3.Visible = False
op4.Caption = ""
op4.Visible = False
op5.Caption = ""
op5.Visible = False
op6.Caption = ""
op6.Visible = False
op7.Caption = ""
op7.Visible = False
op8.Caption = ""
op8.Visible = False
op9.Caption = ""
op9.Visible = False
op10.Caption = ""
op10.Visible = False
lblcon.Caption = ""
lblo.Caption = ""
```

```
End Sub
```

```
Private Sub CommandButton2_Click()
hints = Sheet2.Cells(ii, 4)
ij = MsgBox(hints, vbOKOnly + vbInformation)
End Sub
```

```
Private Sub lblless_Click()
```

```
End Sub
```

3.1.2 Score

```
Dim i, j, k, l As Integer
Dim asd, a, b, sets As String
Private Sub CommandButton1_Click()
For i = 2 To 199
  If Sheet5.Cells(i, 1) <> "" Then
    If Sheet5.Cells(i, 2) > Sheet5.Cells(i + 1, 2) Then
      j = Sheet5.Cells(i, 2)
      a = Sheet5.Cells(i, 1)
      sets = Sheet5.Cells(i, 3)
    ElseIf Sheet5.Cells(i, 2) = Sheet5.Cells(i + 1, 2) Then
      k = Sheet5.Cells(i, 2)
      b = Sheet5.Cells(i, 1)
      sets = Sheet5.Cells(i, 3)
    Else

      j = Sheet5.Cells(i + 1, 2)
      a = Sheet5.Cells(i + 1, 1)
      sets = Sheet5.Cells(i + 1, 3)
    End If
  End If
Next
Sheet5.Cells(40, 40) = j
Sheet5.Cells(41, 41) = k
```

```
If k = j Then
    asd = "The Higest Score is: " + Sheet5.Cells(40, 40).Text + " got by " + a + " &
" + b
    j = MsgBox(asd, vbOKOnly + vbInformation)

Else
    asd = "The Higest Score is: " + Sheet5.Cells(40, 40).Text + " got by " + a + " in
" + sets
    j = MsgBox(asd, vbOKOnly + vbInformation)
End If
End Sub
```

3.1.3 Start

```
Private Sub CommandButton1_Click()
    menu.Show
End Sub
```

```
Private Sub Label1_Click()
```

```
End Sub
```

3.1.4 Admin

```
Private Sub CommandButton1_Click()  
menu.Show  
End Sub
```

```
Private Sub Label1_Click()
```

```
End Sub
```

```
Enter_question:
```

```
Private Sub CommandButton1_Click()  
menu.Show  
End Sub
```

```
Private Sub Label1_Click()
```

```
End Sub
```

```
Existing _ question:
```

```
Dim i, k, flag As Integer  
Dim j As String  
Private Sub CommandButton1_Click()  
cm1.Clear  
For i = 1 To 20  
    j = Sheet7.Cells(i, 1)
```

```
If j = "" Then
    i = 21
Else
    cm1.AddItem j
End If
Next
End Sub

Private Sub CommandButton2_Click()
For i = 1 To 20
    If cm1.Text = Sheet7.Cells(i, 1) Then
        flag = i
        k = i

        If flag < 2 Then
            Sheet7.Cells(k, 2) = flag + 1
        Else
            flag = flag - 1
            flag = flag * 100
            flag = flag + 1
            Sheet7.Cells(k, 2) = flag
        End If

        i = 21

    End If

Next
i = Sheet7.Cells(flag, 2)
Sheet6.Cells(20, 20) = flag
Sheet6.Cells(20, 21) = flag
```

```
Sheet3.Activate  
Sheet3.Rows(flag).Activate  
enter_question.Show  
Me.Hide  
End Sub
```

```
Private Sub UserForm_Click()
```

```
End Sub
```

3.1.5 Login

```
Dim i, k, flag As Integer  
Dim j As String  
Private Sub CommandButton1_Click()  
cm1.Clear  
For i = 1 To 20  
    j = Sheet7.Cells(i, 1)  
    If j = "" Then  
        i = 21  
    Else
```

```
        cm1.AddItem j
    End If
Next
End Sub

Private Sub CommandButton2_Click()
For i = 1 To 20
    If cm1.Text = Sheet7.Cells(i, 1) Then
        flag = i
        k = i

        If flag < 2 Then
            Sheet7.Cells(k, 2) = flag + 1
        Else
            flag = flag - 1
            flag = flag * 100
            flag = flag + 1
            Sheet7.Cells(k, 2) = flag
        End If
        i = 21
    End If
Next
i = Sheet7.Cells(flag, 2)
Sheet6.Cells(20, 20) = flag
Sheet6.Cells(20, 21) = flag

Sheet3.Activate
Sheet3.Rows(flag).Activate
```

```
enter_question.Show  
Me.Hide  
End Sub
```

```
Private Sub UserForm_Click()
```

```
End Sub
```

3.1.6 Menu

```
Private Sub CommandButton1_Click()  
TextBox1.Text = "1"  
Me.Hide  
'login.Show  
admin.Show
```

```
End Sub
```

```
Private Sub CommandButton2_Click()  
TextBox1.Text = "2"  
Me.Hide  
login.Show  
End Sub
```

```
Private Sub CommandButton3_Click()  
TextBox1.Text = "3"
```

```
Me.Hide  
login.Show  
End Sub
```

```
Private Sub UserForm_Click()
```

```
End Sub
```

3.2 Development of Modules

Our software tool that allows creation of E-learning CDs with Incremental Thinking Questions can be divided into two modules:

- Teacher Module
- Student Module

3.2.1 Teacher Module

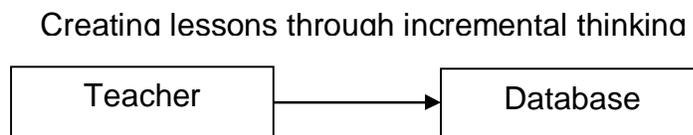


Fig 3.2.1.a: Context Diagram of Teacher Module

At first, our software tool will enable a teacher to create a database. The database created by the teacher will be consisted of the lessons given by the teacher through incremental thinking questions.

Fig 3.2.1.b: Teacher Module

3.2.2 Student Module

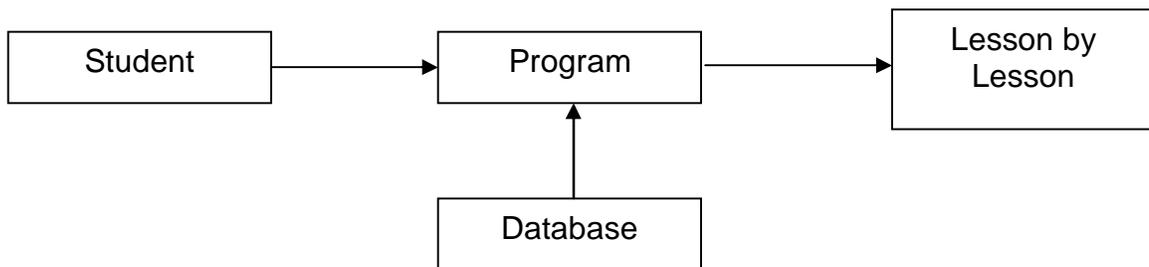


Fig 3.2.2.a: Context Diagram of Student Module

After creating the database by the teacher, the program will be conducted by the student. It will be generated from the database lesson by lesson. After giving the

exam, Student Name, Total Score and Corresponding Question Set will be saved in the database.

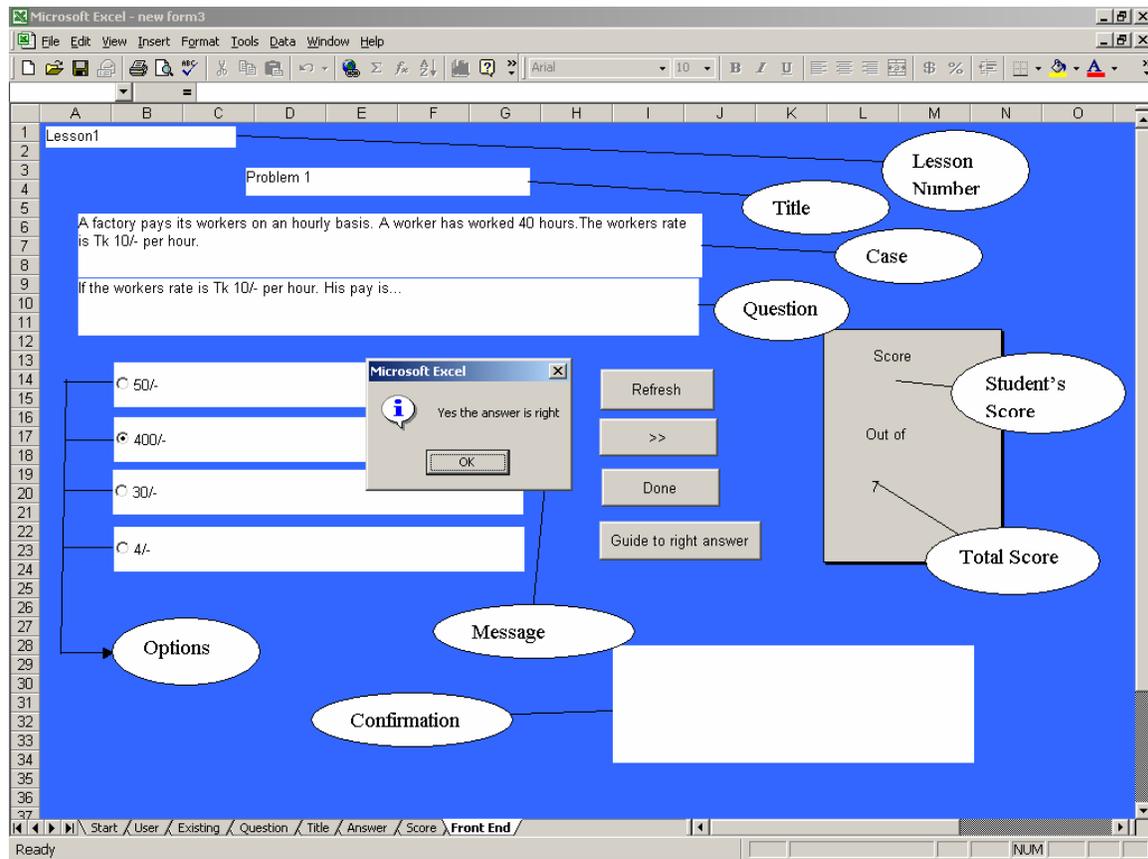


Fig 3.2.2.b: Student Module

3.3 Types of Users

There are three types of users for using our software tool. These are in the following:

- Admin
- Teacher
- Student

3.3.1 Admin

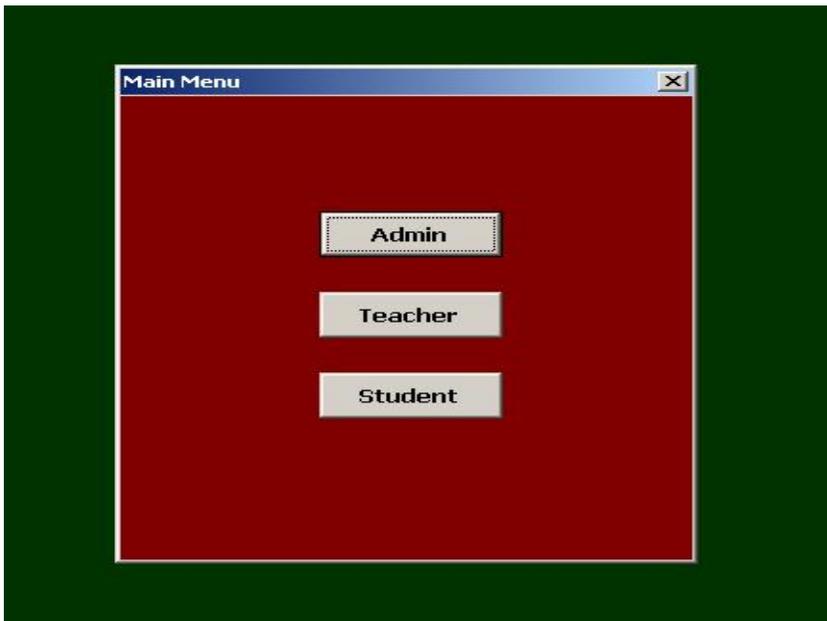
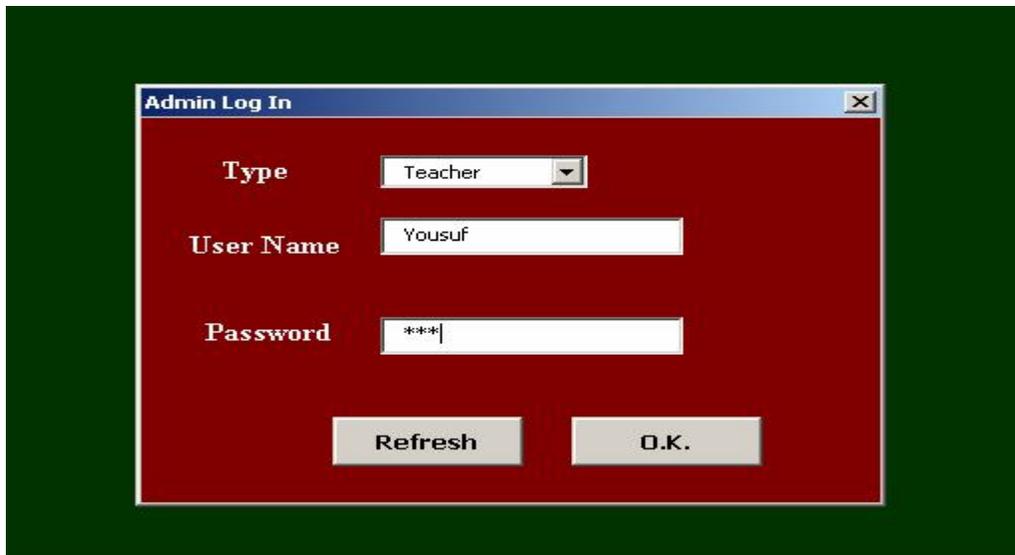
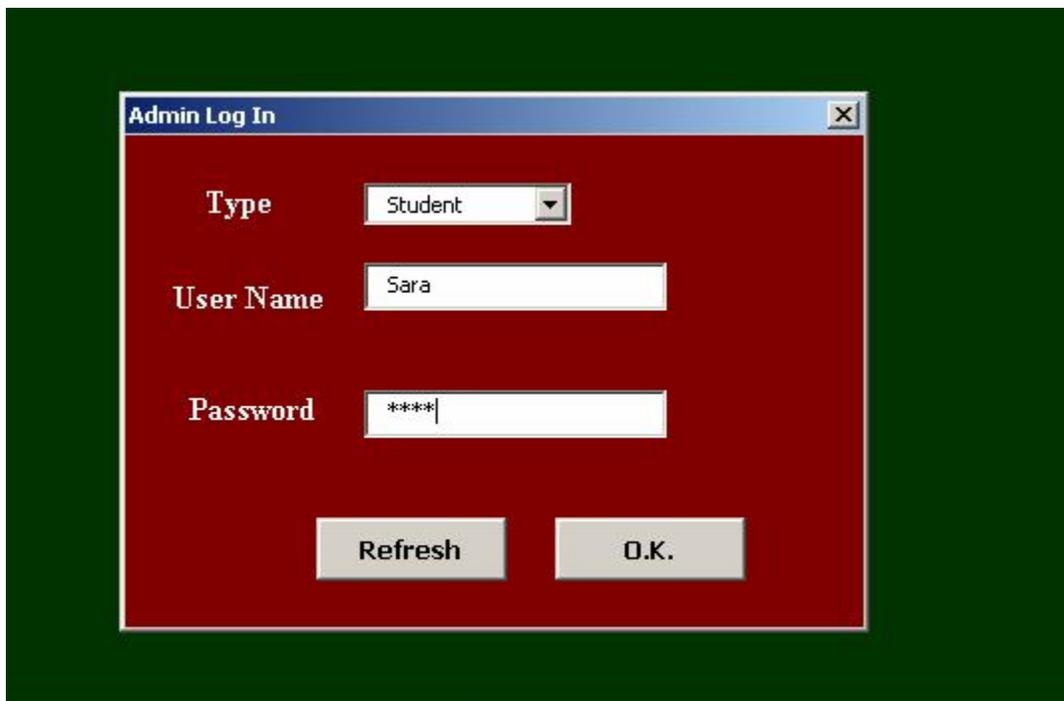


Fig 3.3.1.a: Main Menu



The image shows a screenshot of a web application window titled "Admin Log In". The window has a dark red background and a blue title bar. It contains three input fields: "Type" with a dropdown menu set to "Teacher", "User Name" with the text "Yousuf", and "Password" with masked characters "***". At the bottom, there are two buttons: "Refresh" and "O.K."

Fig 3.3.1.b: Admin Log In for Teacher



The image shows a screenshot of a web application window titled "Admin Log In". The window has a dark red background and a blue title bar. It contains three input fields: "Type" with a dropdown menu set to "Student", "User Name" with the text "Sara", and "Password" with masked characters "****". At the bottom, there are two buttons: "Refresh" and "O.K."

Fig 3.3.1.c: Admin Log In for Student

The admin creates profiles for teachers and students after getting inputs from them. Profiles contain their names and passwords. The admin creates users by

creating profiles. Without being a user anyone will not be able to use our software tool.

3.3.2 Teacher



Fig 3.3.2: Log In for Teacher

The teacher can give any number of questions as inputs with corresponding lesson number, title, case, marks, confirmation, right answer, wrong answers, messages and guide to right answer through the input scheme.

3.3.3 Student



Fig 3.3.3: Log In for Student

The student can give the exam after selecting the name of the question set on which he/she wants to give the exam.

3.4 How does our software tool work?

Step1: The software will take input of a question with all required information like its corresponding lesson number, title, case, marks, confirmation, right answer, wrong answers, messages and guide to right answer through the input scheme.

Step2: Title Table will take Lesson Number, Title, Case (Background Text) of questions and Guide to right answer.

Step3: Question Table will take questions with marks (allocated by the teachers for each question) and confirmation of right answers which will be printed in label box.

Step4: Answer Table will take corresponding answers (both right and wrong) with marks (got by the students) and two messages, one is initial and another one is hints.

Step5: Each answer will be in individual row including corresponding marks and messages no matter whether it is right or wrong. The wrong answer will contain “-2” that will be added in total mark and the right answer will add its original mark.

Step6: By this way the input scheme will take the input of questions and answers by step 1 to step 5 until the end of questions queue.

Step7: Score Table will contain Student Name, Total Score and corresponding Question Set. The button “Highest Score” will find out the name who has got the highest score.

Step8: The front end is the interface of the question paper. It will show the Lesson Number, the Title as the Problem Number, the Case and the corresponding Question.

Step9: The answers will appear in option buttons.

Step10: The Lesson Number, the Title, the Case (Background Text) and the Guide to right answer are linked with Title Table. The Questions are linked with the Lesson Numbers in Question Table.

Step11: The answers are also linked with the Lesson Number in Answer Table.

Step12: If the student chooses any wrong answer then an initial message will appear “No the answer is wrong”. Then another message will appear which will contain the hints.

Step13: The wrong answer will deduct 2 marks from the total mark.

Step14: If the right answer is chosen then a confirmation message will appear containing “Yes the answer is right”. Then the right answer will be printed in a message box.

Step15: The right answer will add the original mark which is linked with the Marks (Questions) column of the Question Table.

Step16: Then the right answer will be printed in “lblcon” named label box.

Step17: The “Refresh” button will clear all the label boxes and all the option boxes.

Step18: The button “>>” will go to next question and show all answers of it and load the marks as well as messages.

Step19: The button “Done” will confirm the clicked answers and add or deduct marks and show confirmation, initial and hints messages.

Step20: The answering process will be continued from step8 to step19.

Step21: After finishing all the questions, an input box will appear to take the student's name and the mark and store it in Score Table with corresponding Question Set.

3.5 How to use our software tool?

At the beginning, before being users the teachers and the students will get a Start button. After pressing the Start button, they will get an UserForm named "Main Menu" containing three buttons Admin, Teacher and Student. At first, the admin will create users by creating profiles for the teachers and the students after getting user names and passwords from them. Without being a user anyone will not be able to use our software tool.

After pressing "Teacher" button the teachers will get an UserForm named "Start" containing two buttons "Existing" and "New".

After pressing "Student" button the students will get an UserForm named "Loading of Question Set" containing two buttons "Load" and "Select and Start". If the teachers want to give input of the questions, they have to press "New" button. Then they have to enter the name of the question set after pressing the refresh button. After entering the name of the question set, they have to press "Add" button.

After adding the name of the question set, the teachers have to press "Existing" button. Then they will get two buttons named "Load" and "Select and Start" there. After pressing "Load" button, they have to select the name of the question set what they have entered before. Then they have to press "Select and Start" button.

After pressing “Select and Start” button, the teachers will get an UserForm named “Addition of Question” containing Lesson Number, Title, Case, Question, Marks, Confirmation, Right Answer, Wrong Answers, Messages and Guide to Right Answer.

If the students want to give the exam, then at first they have to load the question set on which they want to give the exams and then they have to press “Select and Start” button. After getting the interfaces, they have to press “>>” after pressing “Refresh” button.

After that the interfaces will be shown containing all the questions of the current question set on which the students are giving the exams. The questions will arise one after the other maintaining the sequence with corresponding answers including right and wrong, lesson number, title, case, marks, confirmation, messages and guide to right answer. After answering the question, they have to press “Done” button. If the answer is right, then after showing the initial message in the message box, how the answer is right will also be shown in or the confirmation will be shown in the message box and then the confirmation will be shown in the below. If the answer is wrong, then after showing the initial message in the message box, the hints will also be shown in the message box for making them understand how to get the answer right. In case of the right answer, the score will be the same as the out of. In case of the wrong answer, “2” will be deducted.

3.5.1

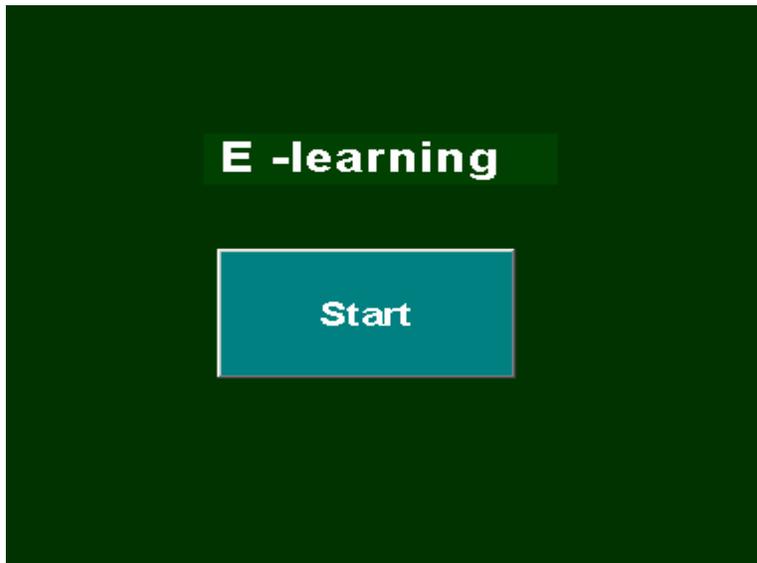


Fig 3.5.1: Beginning of our E-learning Software Tool

3.5.2



Fig 3.5.2: Starting for a teacher

3.5.3

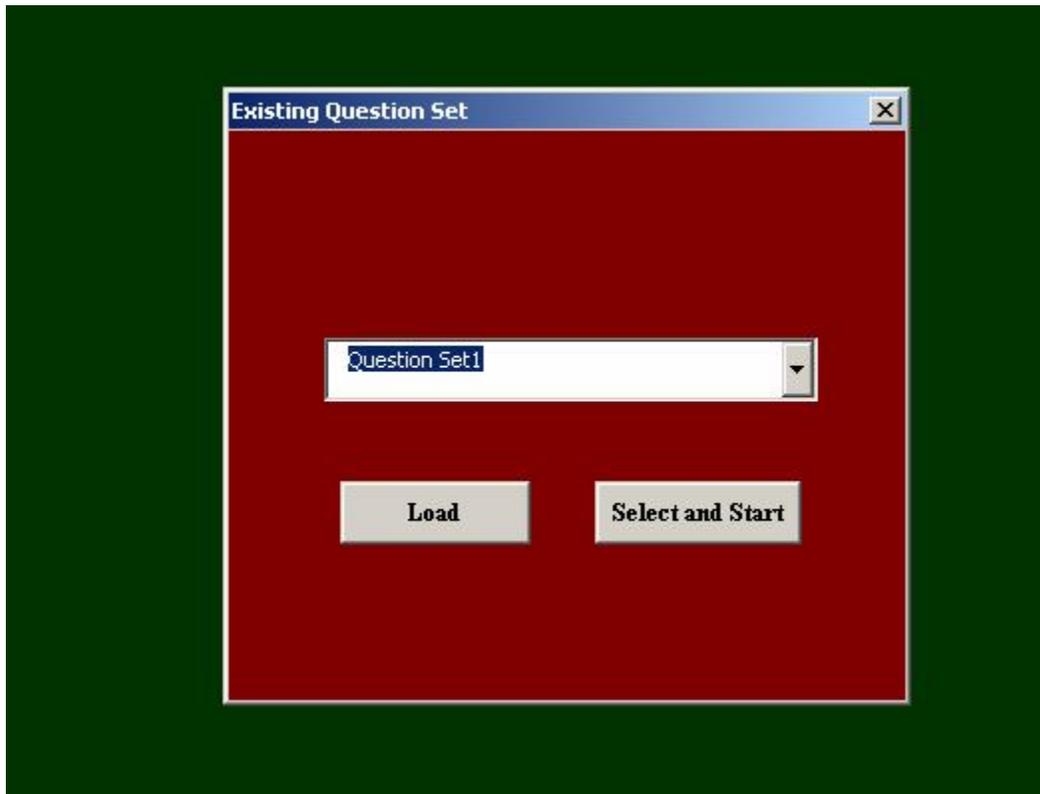


Fig 3.5.3: Existing Question Set

3.5.4

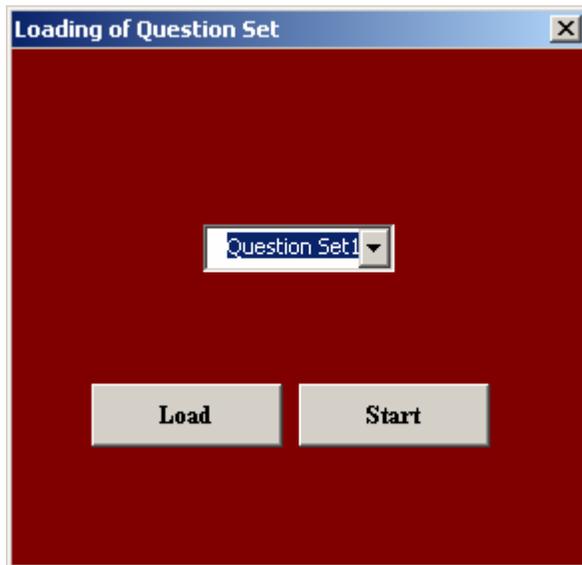


Fig 3.5.4: Loading of Question Set

3.5.5

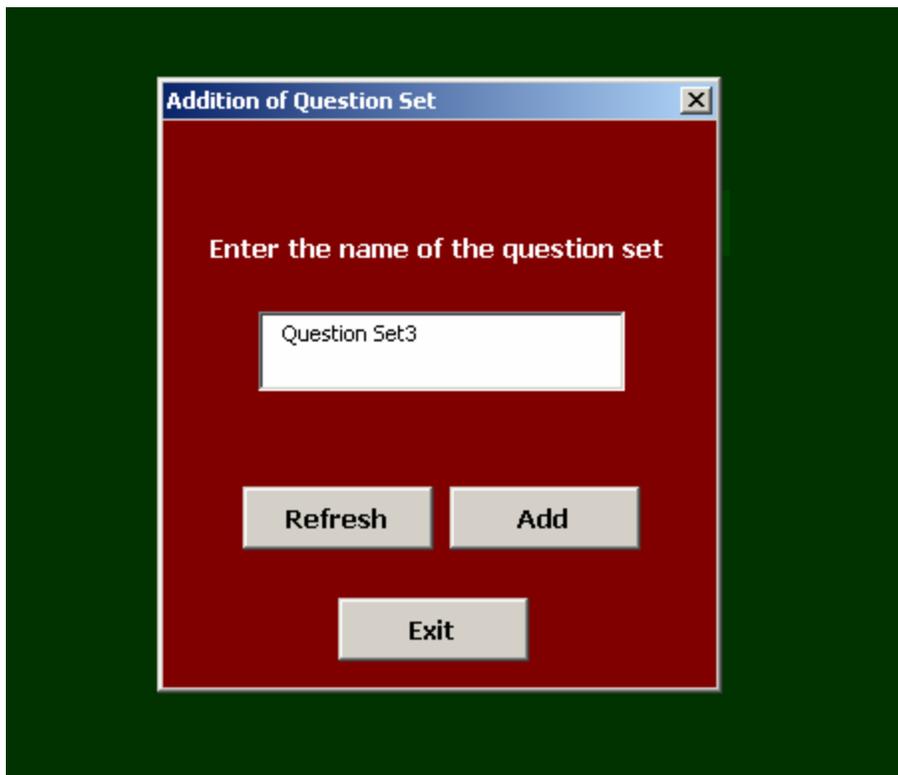


Fig 3.5.5: Addition of Question Set

3.5.6

A	B	C	D	E	F	G	H	I	J	K	L	M	N
Lesson1													
			Problem 1										
			A factory pays its workers on an hourly basis. A worker has worked 40 hours. The workers rate is Tk 10/- per hour.										
			If the workers rate is Tk 10/- per hour. His pay is...										
			<input type="radio"/> 50/-				Refresh				Score Out of 7		
			<input type="radio"/> 400/-				>>						
			<input type="radio"/> 30/-				Done						
			<input type="radio"/> 4/-				Guide to right answer						

Fig 3.5.6: Interface

3.5.7

The screenshot shows a web-based interface for a math problem, overlaid on a Microsoft Excel spreadsheet. The spreadsheet has columns labeled A through N and rows numbered 1 through 19. The interface is set against a dark red background.

Problem 1

A factory pays its workers on an hourly basis. A worker has worked 40 hours. The workers rate is Tk 10/- per hour.

If the workers rate is Tk 10/- per hour. His pay is...

Options:

- 50/-
- 400/-
- 30/-
- 4/-

Buttons:

- Refresh
- >>
- Done
- Guide to right answer

Microsoft Excel (pop-up window):

Use the formula: $\text{Total Payment} = \text{Hours} * \text{Rate}$

OK

Score

Out of

7

Fig 3.5.7: Interface

3.5.8

The image shows a screenshot of a Microsoft Excel spreadsheet with a dark red background. The spreadsheet has columns labeled A through N and rows numbered 1 through 27. In cell A1, the text "Lesson1" is visible. In cell D4, the text "Problem 1" is visible. In cell A6, the text reads: "A factory pays its workers on an hourly basis. A worker has worked 40 hours. The workers rate is Tk 10/- per hour." In cell A9, the text reads: "If the workers rate is Tk 10/- per hour. His pay is...". Below this text are four radio button options: "50/-", "400/-", "30/-", and "4/-". The "50/-" option is selected. To the right of the options are four buttons: "Refresh", ">>", "Done", and "Guide to right answer". In the top right corner, there is a "Microsoft Excel" dialog box with a red 'X' icon and the text "No the answer is wrong" and an "OK" button. In the bottom right corner, there is a "Score" box containing the text "Out of 7" and the number "7".

Fig 3.5.8: Interface

3.5.9

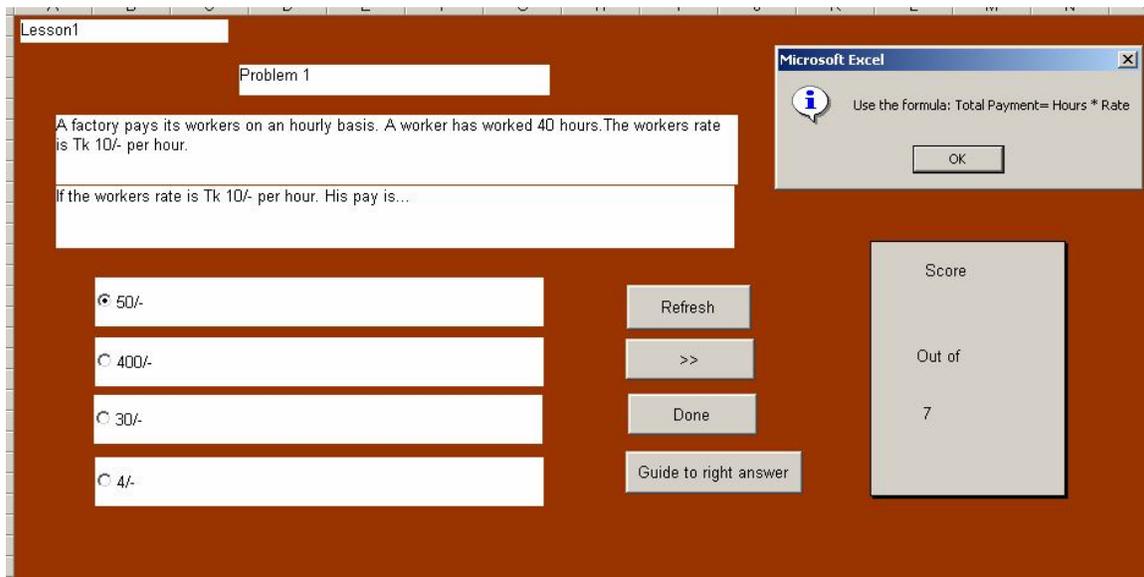


Fig 3.5.9: Interface

3.5.10

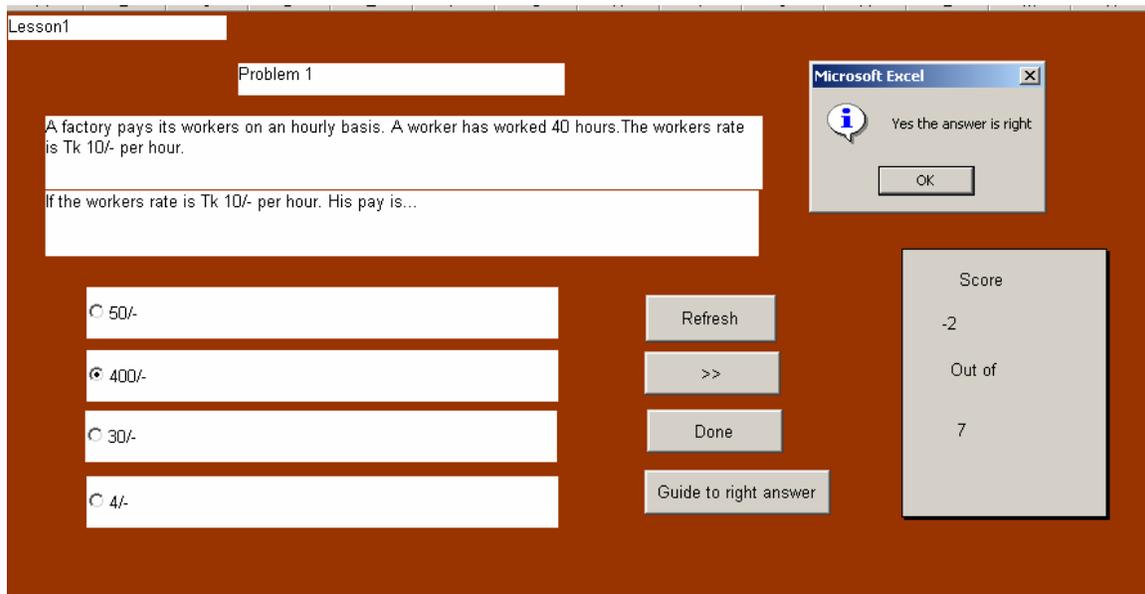


Fig 3.5.10: Interface

3.5.11

Lesson1

Problem 1

A factory pays its workers on an hourly basis. A worker has worked 40 hours. The workers rate is Tk 10/- per hour.

If the workers rate is Tk 10/- per hour. His pay is...

50/-

400/-

30/-

4/-

Refresh

>>

Done

Guide to right answer

Score

-2

Out of

7

Microsoft Excel

Yes! The Answer is 400/-

OK

Fig 3.5.11: Interface

3.5.12

Lesson1

Problem 1

A factory pays its workers on an hourly basis. A worker has worked 40 hours. The workers rate is Tk 10/- per hour.

If the workers rate is Tk 10/- per hour. His pay is...

50/-

400/-

30/-

4/-

Refresh

>>

Done

Guide to right answer

Score

5

Out of

7

Yes! The Answer is 400/-

Fig 3.5.12: Interface

3.5.13

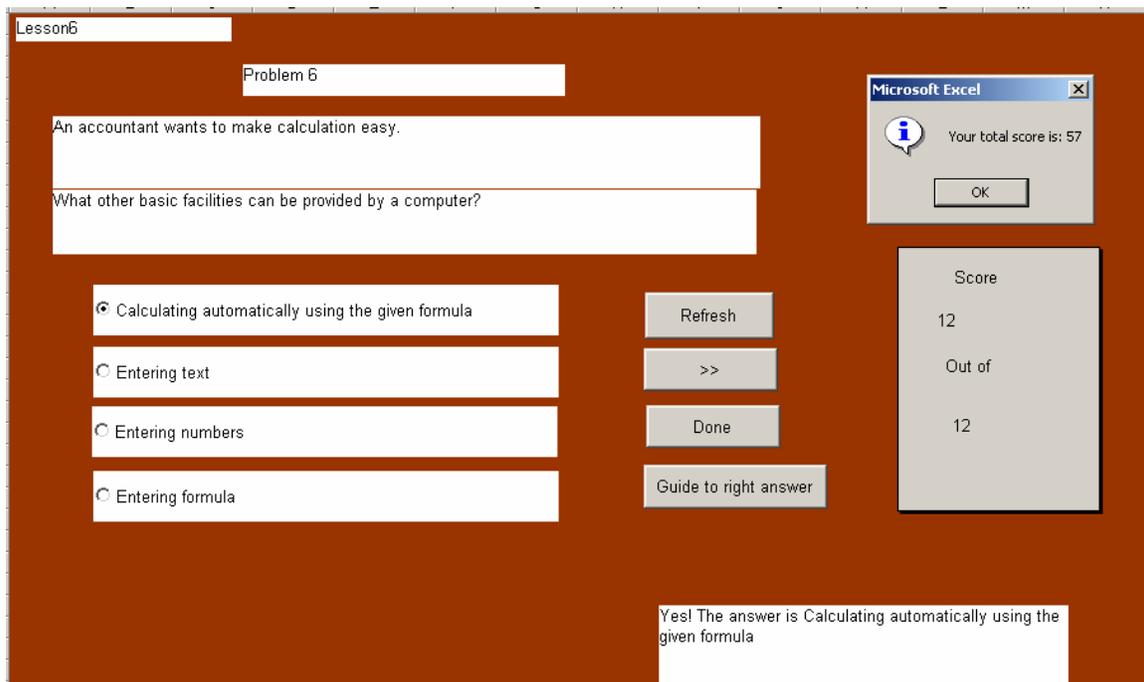


Fig 3.5.13: Interface

3.5.14

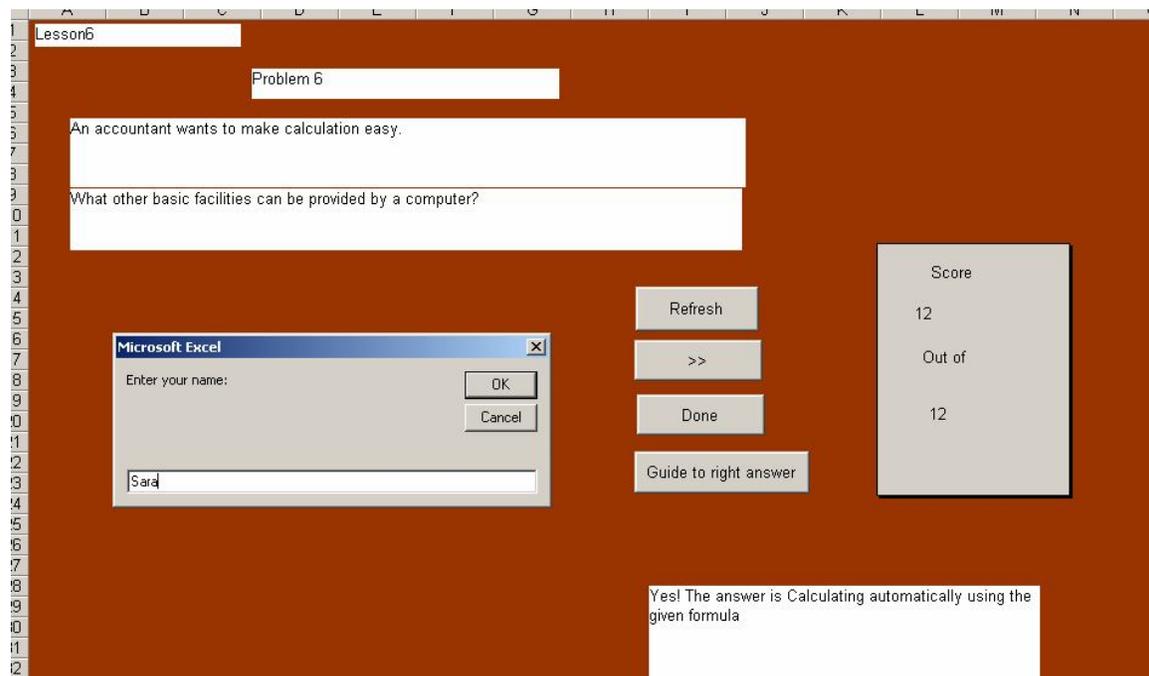


Fig 3.5.14: Interface

CHAPTER 4

BENEFITS

1.By using our software tool, interfaces will be generated automatically lesson by lesson through incremental thinking questions after getting required information from the teachers.

2.Incremental Thinking Questions will deliver well- structured lessons.

3.Each question will be case (background text) based, so that the students can be able to get the answers right without being taught the topics by the teachers.

4.Case based questions will increase the thinking capabilities of the students.

5.The students will get feedback immediately through hints and guide to right answers.

6.The students will be more motivated to follow the lessons and answer the questions correctly.

7.The students will be able to evaluate their performance levels and also get to know how much they are prepared and how much they should be.

CHAPTER 5. LIMITATIONS

5.1 Storage Related

If the teachers want to add the questions in the existing question sets, then they cannot give the inputs with all required information through the input scheme. They have to give the inputs with all required information in each required database table.

5.2 Running Program Related

5.2.1

If any student's Total Score is negative, then the system does not show the Highest Score as well as who has got it.

5.2.2

If more than two students get the same Highest Score, then the system does not show all students' names who have got the Highest Score except the names of the two students who have given the exams at last among them and got the Highest Score.

5.2.3

If one student gets the Highest Score, then the system shows the Highest Score, who has got it and in which Question Set. But if more than one student get the same Highest Score no matter in which Question Set, then the system does not show the Question Set.

CHAPTER 6

FUTURE DEVELOPMENTS

The E-learning engine/template should provide the required guidelines for the teachers to design Incremental Thinking Questions. Though it is not an on-line based software, It should be used in a network system in future. If the students can be able to give the exams under the network system, then Student Name, Total Score and Corresponding Question Set will be saved under the same database. It also should be distributed in CDs for installing in PCs & then it will be ready to run for the teachers.

CHAPTER 7

CONCLUSION

An E-learning system should provide educational access to students not enrolled in educational institutions and augment the learning opportunities of current students. It is meaningful to students when it is easily accessible, well-designed, student-centered, affordable, efficient, flexible and has a facilitated learning environment. It should be meaningful not only to students, but also to all teachers, support services staff and the institution. A successful E-learning system should involve a systematic process of planning, design, development, evaluation and implementation of meaningful learning environment where learning is supported. The implementation of E-learning is a process which should use available resources and progress to include promising technologies. Thus, our E-learning engine/template can be an instructional delivery system which will connect students with educational resources.

REFERENCES

[1] Mawdudur Rahman, Nishikant Sonwalkar. "Multidimensional assessment of online learning – A pilot study".

[2] Andy Stone¹, Jonathan Briggs², "SMS and Interactivity – Some Results from the Field, and its Implications on Effective Uses of Mobile Technologies in Education", Craig Smith Learning Technology Research Group, Kingston University.

[3] Forsyth, R. (2002) WebCT at Manchester Metropolitan University: progress and possibilities. Learning and Teaching in Action, vol 1(2).

[4] E-Learning 1.0, Wearing Four Pairs of Shoes: The Roles of E-Learning Facilitators, By Ed Hootstein

[5] Joshua Angrist and Victor Lavy. "New Evidence on Classroom Computers and Pupil Learning"

[6] www.BlogHog.biz

[7] <http://bdld.blogspot.com/2004/12/elearning-methodology.html>

[8] www.compare-to-choose.com