

BEST: New Lessons Module Logic

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Abstract: It is presented a project BEST for development of a virtual learning environment, focuses on didactic principles of the e-learning and the following principles: learning is an goal-directed process; teachers have opportunity to define their own logical order of learning objectives, monitor and measure the quality of their own learning process; learning is embedded in a conceptual context. The BEST is realized on the basis of famous systems Moodle 1.6 dev. The paper justifies the necessity of introduction a new functionality into Lessons module. Most of the eLearning systems don't have means for modelling a structure of the lessons and logical order the concepts are presented to learners. This paper presents a new functionality realized that and added in module Lessons

Key words: Conceptual approach, BEST, Moodle, Lessons module, Clusters, Branches, Jumps, Views and user interpretation.

INTRODUCTION

It is very important issue to capture current educational practices in e-Learning, more advanced 'learning design logic' capabilities are needed than are provided by Moodle v.1.6. dev.[6, 7] Specifically, these fall short in terms of Lessons module [6]. We present a new conceptual approach and logic. The structure and content of the Lesson module, included in BEST [2, 3], are modelled with a branches, conditional jumps, logical blocks (and, or), clusters, grading blocs etc. A lesson delivers content in an interesting and flexible way. It consists of a number of pages. Each page normally ends with a question and a number of possible answers. Depending on the student's choice of answer they either progress to the next page or are taken back to a previous page. Navigation through the lesson can be straight forward or complex, depending largely on the structure of the material being presented.

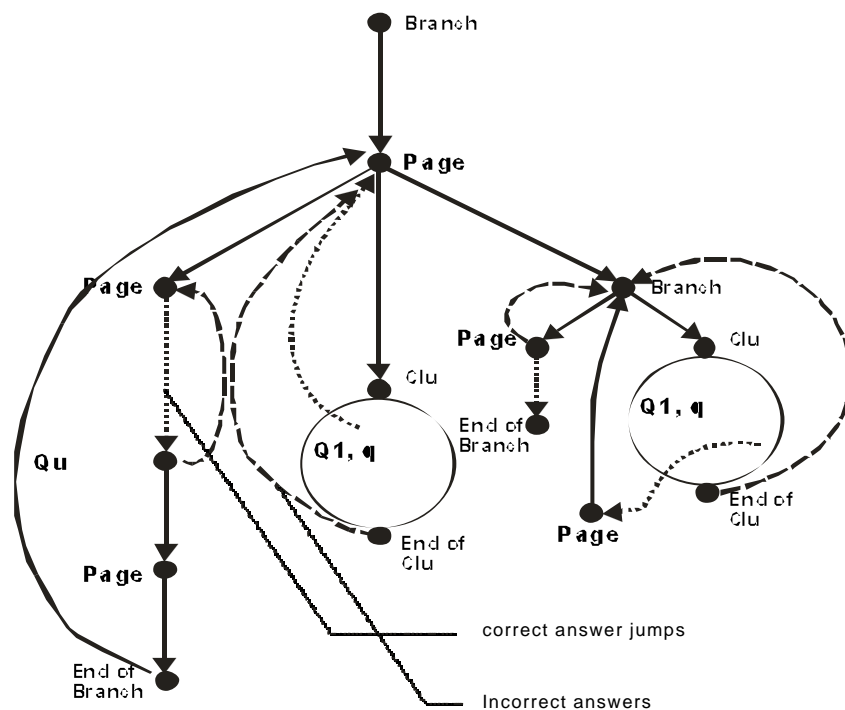


Figure 1. Lesson Diagram [6, 7]

1 METHODOLOGY OF LESSON REALIZED IN LESSONS MODULE

Adopted pedagogical approach in lessons module in BEST [2, 9] enables teacher to implement the practice principle of e-Learning, where practice is integrated with instructional material.

Pedagogically right use of lesson is when it is necessary to learn a conception from some subject domain [9]. The studying concept is broken into small chunks and shown to the student bit by bit. Each part is re-enforced by requiring the students to answer questions. The students proceed through the material only by answering the questions correctly. Wrong answers are "penalized" either by showing the same material again or going even further back in the lesson. Within the lesson these chunks are called Pages. The length of each page is arbitrary.

This module can create a series of pages which can be presented in a linear fashion, like a slide show, and **now** in non-linear, branching manner, or a combination of the two and **conditional jumps**. There are two basic modes: a flash card mode and a presentation mode. Lesson module has needed functionality to make question clustering, password protection, and time limits.

There is variety of questions types: multiple choice, multiple answer, short answer, true/false, matching questions, numerical question and essay questions.

1.1 NEW LOGICAL CONCEPTIONS- NONLINEAR CONDITIONAL ORDER

Once a lesson contains two or more pages the teacher can move existing pages around and add pages to any position within the set. This logical ordering of pages is also the default Navigation Order. In the default navigation order, correct answers show the next page and incorrect answers show the same page again, that is the student is asked the same question again. However the default logical order is possible to change the "Jump" associated with **any answer** so that a more complicated path through the lesson can be created.

NOW these jumps have been divided into **three** types - Relative, Absolute and **Conditional** Jumps. The default navigation using the relative jumps Absolute jumps specify the actual page to show next by specifying of the page's Title. Conditional Jumps use criterions based navigation not only in current lesson frame. This is external wrapping logic. Now Lesson module has logical blocs, loops and a non-linear structure.

Answers- typically each question within a lesson will have one correct answer and several wrong answers.

Grading mechanism in lessons module is based on earned points by the user, which is divided by the total points possible. So, the point values associated with each of the user's answers are added up. That is then divided by the total of the maximum points that the user could have earned for each page answered. This number is then scaled by the grade parameter of the lesson. From Pedagogical point of view the Lessons module in BEST [2] is mainly applicable as a subsystem to get across subject domains and concepts. Testing that knowledge is something else.

Re-takes As mentioned earlier a lesson can be used as a formative assignment, imparting some knowledge while at the same time making some demands on the students.

The flash card lesson as a type of assignment. There are two very similar variants of Flash Card behaviour: "Show an unseen page" never shows the same page twice, "Show an unanswered page" which shows the student pages that may have appeared before but only if they answered the associated question wrongly.

Types of questions available within a lesson are multiple choice, multiple answer, short answer, true/false, matching questions, numerical question, essay questions (the same types as those into the test module) There no problems to add more types of questions but it will not be standardized types GIFT, WebCT (not automatically exportable/importable)

1.2 BRANCHES AND BRANCH TABLES

Branch tables are pages with a set of links to other pages in the lesson. Typically a lesson in lesson module may start with a branch table which acts as a Table of Contents. Each link in a branch table has two components, a description and the title of the page to jump to. A branch table *effectively* divides the lesson into a number of branches (or sections). Each branch can contain a number of pages (probably all related to the same topic). The end of a branch is usually marked by an End of Branch page. This is a special page which, by default, returns the student back to the preceding branch table. The "return" jump in an End of Branch page can be changed, if required, by editing the page. There can be more than one branch table in a lesson. For example, a lesson might usefully be structured so that specialist points are sub-branches within the main subject branches. Branch tables can also be used to hold content in the lesson.

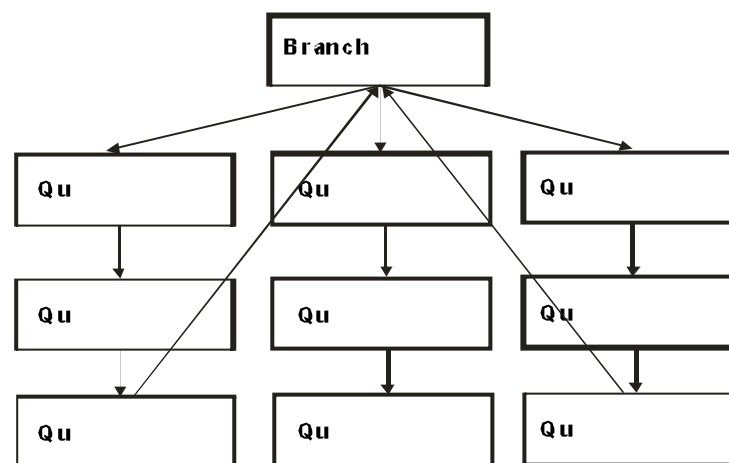


Figure 2. Branching quiz schematic

The most basic lesson structure is branching quiz. Branches [6, 7] are applicable to organize sets of questions around different topics or concepts in course. Each branch of the quiz leads to a linear series of pages and test questions and then returns to the main branch. The main-branch page acts as a table of contents for the lesson, as shown in Figure 1

The “Jump-to” link. This link can be either relative or absolute. Relative links are This page and Next page. This page means that the student sees the current page again. Next page shows the page which follows this page in the logical order of pages. An absolute page link is specified by choosing the page's title. It is obvious that a (relative) **Next page** Jump-to link may show a different page after pages have been moved.

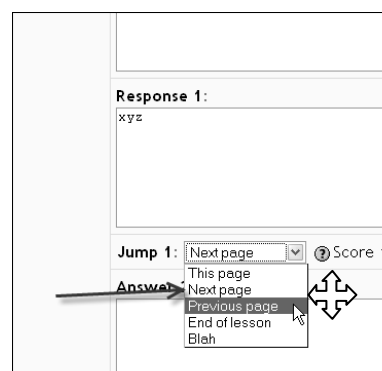


Figure 3. Lesson *next/ previous* page jump

Special jumps links to a randomly chosen unseen (attempt is criterion) question between this branch table and the End of the Lesson or the next End of Branch.

The pith and marrow of the clusters and sub-clusters. A cluster represents a set of questions from which one or more may be randomly chosen. Clusters should be completed with an End of Cluster page for best results. Questions within a cluster are randomly selected as a jump. Questions within a cluster may either link to the End of Cluster to exit the cluster, or jump to an unseen question within the cluster. This has been done for the important reason to enables the creation of scenarios with a random element. A cluster in the lesson works as if you had a random question quiz inside your lesson. If you have for example a set of 6 questions / a set of 6 pages inside your lesson AND you would like each student to go through ONLY two of these 6 pages, then you can use Cluster to arrange that. Clusters can contain sub-clusters by using Branch Tables and End of Branches.

2. NEW LOGIC IN LESSONS MODULE- DEPENDENCIES

New logic allows this current lesson to be dependent upon a student's performance in another lesson that is in the same course. If the performance requirement(s) is not met, then the student will not be able to access this lesson [9].

2.1 CONDITIONS FOR THE DEPENDENCY INCLUDE:

- **Time Spent:** the student must spend this set amount of time in the required lesson.
- **Completed:** the student must complete the required lesson.
- **Grade better than:** the student must earn a grade in the required lesson that is better than the one specified here. Any combination of the above can be used if needed.

Access control

Password protected lesson: No

Conditions Password: (Leave blank to keep current password)

Dependent on: None

Condition(s) for the dependency:

Time Spent (minutes)	Completed	Grade better than (%)
<input type="text" value="0"/>	<input type="checkbox"/>	<input type="text" value="0"/>

Available from: 1 April 2006 - 14 40

Deadline: 10 May 2006 - 16 40

Figure 4. Dependences

2.2 NEW TABS

The new tabs make Lesson module helps teachers to navigate around, add consistency and unity to the different Lesson pages, and are a step towards the question type class integration. The tabs are as follows: Edit, Preview, Reports, Grade Essays and High Scores. Edit tab has sub-tabs Collapsed and Expanded. Collapsed is equivalent to Lesson's Tree view setting and expanded is the original view for editing a Lesson. Preview tab is the equivalent of the Check Navigation link. Grade Essays tab is the only tab that will not display if you do not have teacher-editing privileges. It is used to access essays to be graded. Reports tab has sub-tabs Overview and Detailed Statistics and on hover displays the number of attempts that have been made on the Lesson. High Scores tab only appears if high scores is turned on in the Lesson settings. This is new ways to access pages/views. [7, 8]

2.3 NEW LAYOUT EDITOR

A new layout editor has been added to lesson module. It can copy lessons between courses. Now there is opportunity any lesson from another courses to be copied, and any lesson with "[PUBLIC_COPY]" in the name from any course [8, 9].

2.4 BEST course in Lesson module environment

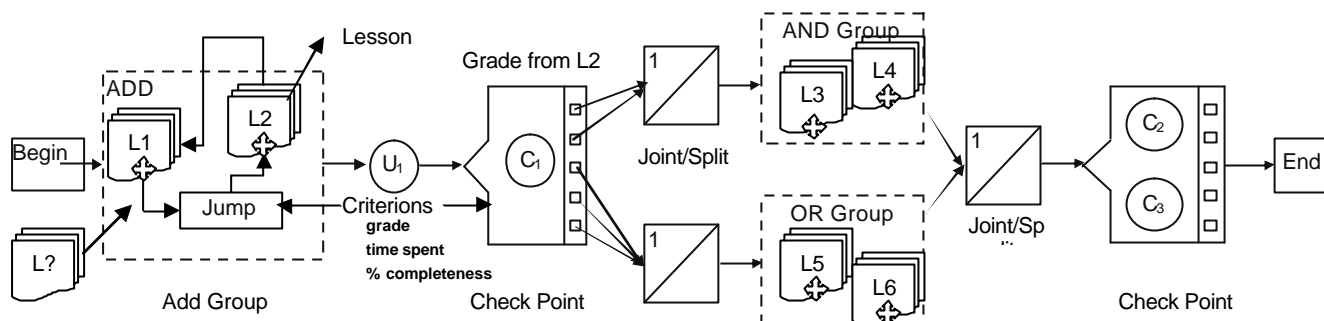


Figure 5. BEST course in Lesson module environment

BEST [2, 9] has wrapping external functionality to present learning course (based on concepts and relations between them) in Lesson module [6] environment. Learning is built on the base of concept approach. The concepts can be presented in different pages of lessons or clusters [7]. Each concept, and therefore the lessons connected with it, has characteristics, called resources [9]. For each concept in a learned subject domain there is a view point (user interpretation- learner, teacher) and a list of couples (page, value). The structure and content of the lessons, included in BEST are modelled with a directed graph, whose nodes are learning materials (lessons and assignments, groups of them) or controlling ones, and the edges – relations of type predecessor_of. (Fig. 5) [9].

CONCLUSIONS AND FUTURE WORK

New functionality is added. While branching quizzes and flash cards are interesting applications, there is a hidden potential in the lessons module that makes it much more interesting than it at first appears. If we take advantage of the ability of each answer in a question page to link to any other page, we can create branching Choose Your Own Adventure -style simulations or case studies. Lessons can be an interesting change of pace for your students. They may require more upfront development time than many other types of tools, but they do provide some benefits. To Lesson module has been added functionality to make question clustering, password protection, time limits, conditional jumps, grade criterion, logical blocs etc. It is planed the visual editor interface to be developed.

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