Lecture Notes in Educational Technology

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Innovations in Smart Learning

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ISSN 2196-4963 ISSN 2196-4971 (electronic)
Lecture Notes in Educational Technology
ISBN 978-981-10-2418-4 ISBN 978-981-10-2419-1 (eBook)
DOI 10.1007/978-981-10-2419-1

Library of Congress Control Number: 2016952822

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Printed on acid-free paper

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The registered company is Springer Nature Singapore Pte Ltd.
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Preface

Smart learning environments are emerging as an offshoot of various technology-enhanced learning initiatives that have aimed over the years at improving learning experiences by enabling learners to access digital resources and interact with learning systems at the place and time of their choice, while still ensuring that appropriate learning guidance is available to them there and then.

The concept of what constitutes smart learning is still in its infancy, and the International Conference on Smart Learning Environments (ICSLE) has emerged as the platform to discuss those issues comprehensively. It is organized by the International Association on Smart Learning Environments and aims to provide an archival forum for researchers, academics, practitioners, and industry professionals interested and/or engaged in the reform of the ways of teaching and learning through advancing current learning environments towards smart learning environments. It will facilitate opportunities for discussions and constructive dialogue among various stakeholders on the limitations of existing learning environments, need for reform, innovative uses of emerging pedagogical approaches and technologies, and sharing and promotion of best practices, leading to the evolution, design and implementation of smart learning environments.

The focus of the contributions in this book is on the interplay of pedagogy, technology and their fusion towards the advancement of smart learning environments. Various components of this interplay include but are not limited to:

- Pedagogy: learning paradigms, assessment paradigms, social factors, policy
- Technology: emerging technologies, innovative uses of mature technologies, adoption, usability, standards, and emerging/new technological paradigms (open educational resources, cloud computing, etc.)
- Fusion of pedagogy and technology: transformation of curriculum, transformation of teaching behavior, transformation of administration, best practices of infusion, piloting of new ideas.

ICSLE 2016 received 52 papers, with authors from 18 countries. All submissions were peer-reviewed in a double-blind review process by at least 3 Program Committee members. We are pleased to note that the quality of the submissions this

year turned out to be very high. A total of 13 papers were accepted as full papers (yielding a 25 % acceptance rate). In addition, 8 papers were selected for presentation as short papers and another 7 as posters.

Furthermore, ICSLE 2016 features 2 distinguished keynote presentations. One workshop is also organized in conjunction with the main conference, with a total of 4 accepted papers (included at the end of this volume).

We acknowledge the invaluable assistance of the Program Committee members, who provided timely and helpful reviews. We would also like to thank the entire Organizing Committee for their efforts and time spent to ensure the success of the conference. And last but not least, we would like to thank all the authors for their contribution in maintaining a high quality conference.

With all the effort that has gone into the process, by authors and reviewers, we are confident that this year's ICSLE proceedings will immediately earn a place as an indispensable overview of the state of the art and will have significant archival value in the longer term.

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July 2016

Online Test System to Reduce Teachers' Workload for Item and Test Preparation

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Abstract. An online test system has been designed and implemented to provide teachers with end-to-end solution to streamline student assessment process as well as saving them time and efforts of preparing test questions – the system can automatically generate items, based on the knowledge map teachers created, for teachers to pick-up and form their tests. Moreover, students can take advantage of the system to do self-assessment at anytime and anywhere. This paper focuses on providing insights on the features available for the uses of the system.

Keywords: Knowledge Map. Item Generation. Hierarchical Concept Map. Concept Schema. Online Assessment.

1 Introduction

Many researchers in the literature have used different techniques and architectures (e.g., Client/Server [1-3] [5] and Web Service [4]) to develop assessment generation systems. The intention has primarily been to reduce the time and efforts that teachers spend in preparing the tests, in particular, multiple choice questions, and to mark students' answers. Most of these systems, however, have been developed without considering modular design, which makes it difficult for various components of these systems to be further enhanced and tested. Furthermore, most of these systems provide features for users to only enter test questions to item banks instead of generating questions automatically to populate the item banks. The research solution proposed in this paper leverages HTML5 and JavaScript to design and implement an Online Test System that can automatically generate items according the knowledge maps created and associated to a course by teachers. Teachers can choose the generated items from the item bank and create their own favorable tests for students to do self-assessments and to undertake quick quizzes to analyze how much they have learnt from the classes.

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E. Popescu et al. (eds.), *Innovations in Smart Learning*,
Lecture Notes in Educational Technology, DOI 10.1007/978-981-10-2419-1_29

The rest of this paper is organized as follows. Section 2 details the features available to the teachers and explains how to use them. This is followed by Section 3, which discusses the benefits of the systems for teachers and possible future directions of the project.

2 System Features for Teachers

The Online Test System developed in this research has the following features available for teachers (as shown in the menu on Fig. 1): checking courses assigned to them, creating knowledge maps for their courses, importing knowledge maps created by themselves or others, creating accounts for students, creating tests for their courses, and reviewing students' answer sheets of the tests.

First of all, a teacher can see his or her courses by clicking the Assigned Courses link on the menu. For each of his or her courses, he or she can associate one or more knowledge maps to the course. Two ways a teacher can have a knowledge map for his or her courses are as follows: (1) creating by himself or herself; and, (2) importing existing ones created by other teachers.

The teacher can click "Knowledge Maps" option on the left side menu to display a list of knowledge maps he or she has created. A knowledge map is composed of a hierarchical concept map and concept schema [6]. He or she can manage the items on the hierarchical concept map on the left by clicking an item and using the Add, Update, and Delete functions. When the teacher clicks "Root" item on a knowledge map (Fig. 1), the corresponding concept schema is displayed for him or her to review and edit.

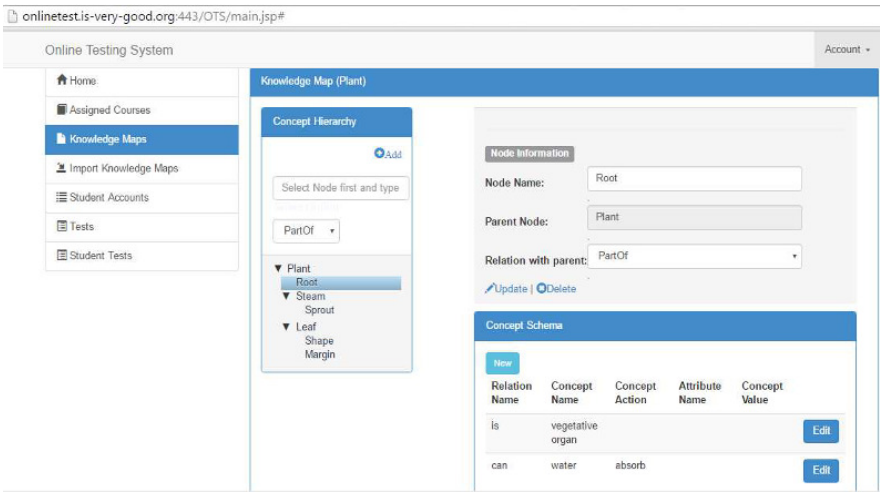


Fig. 1. Knowledge Map Editor

Alternatively, a teacher can click on "Import Knowledge Maps" from the left side menu to see a list of knowledge maps that have been created by others, as shown in Fig. 2. Then he or she can select one or more knowledge maps and click on "Import"

button to have a copy. He or she can then modify the imported copies freely and associate them to his or her courses.



Fig. 2. Teacher Importing Knowledge Maps

Next, the teacher can manage tests for his or her course by clicking on "Tests" link on the left side menu. Fig. 3 shows that the teacher has selected the course "Introduction to Botany" from the drop down list and three existing tests associated to the course are listed. He or she can click the "New" button to create another test for the course. Once teacher has entered all necessary details, including test name, marks, start date and time, as well as end time, the new test will be shown on the list.

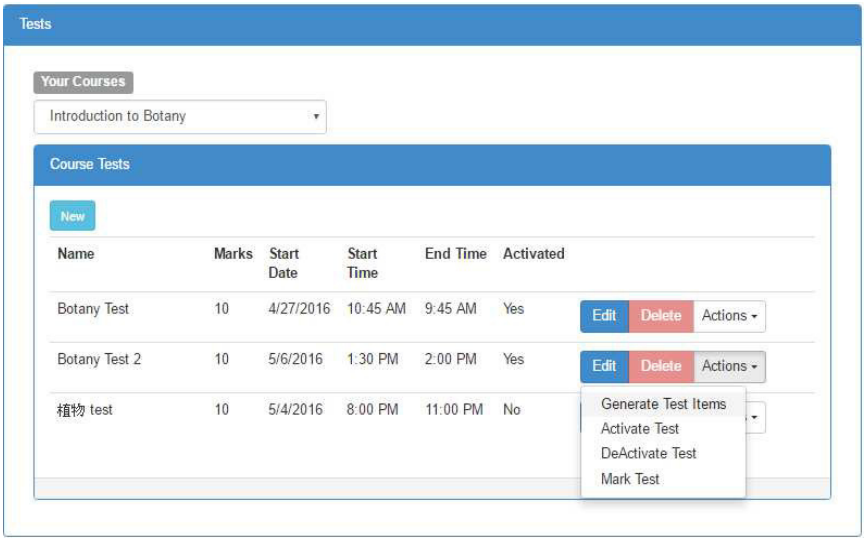


Fig. 3. Teacher created new test "Botany Test 2" for course

The teacher can then ask the system to generate items for him or her to include in the test by choosing "Generate Test Items" via clicking its "Action" button. Fig. 4 shows the Test Generation Editor where the teacher can select a particular concept from the knowledge map at left side and choose different cognitive levels (two levels have been implemented at the moment, namely Classify and List) and different item type (true/false and multiple choices have been implemented at the moment) as well as decide the item's nature (i.e., if he or she wants the item to ask students to identify

correct or incorrect concepts) so that the system can generate possible relevant items for him or her to consider. The generated items are added to “Test Question Bank”.

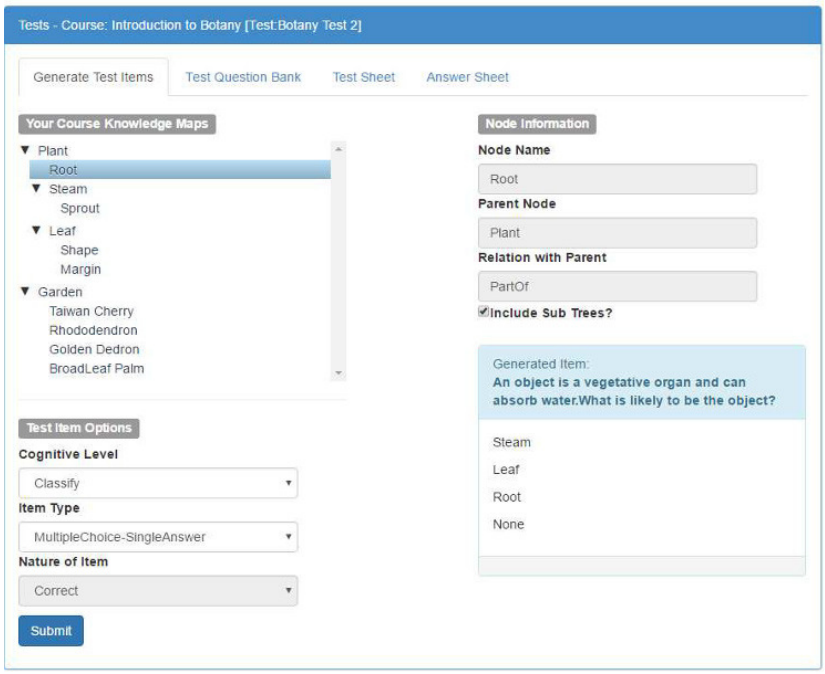


Fig. 4. Teachers ask the system to generate items for particular concept for them

Finally, the teacher can select generated items from the question bank, add them to the “Test Sheet”, and set the mark and correct answer for each test item, as shown in Fig. 5. He or she can also select items and remove them from the test sheet at any time. After he or she presses “Submit” button, the system generates a benchmark “Answer Sheet” that will be used by the system to mark student answer sheets.

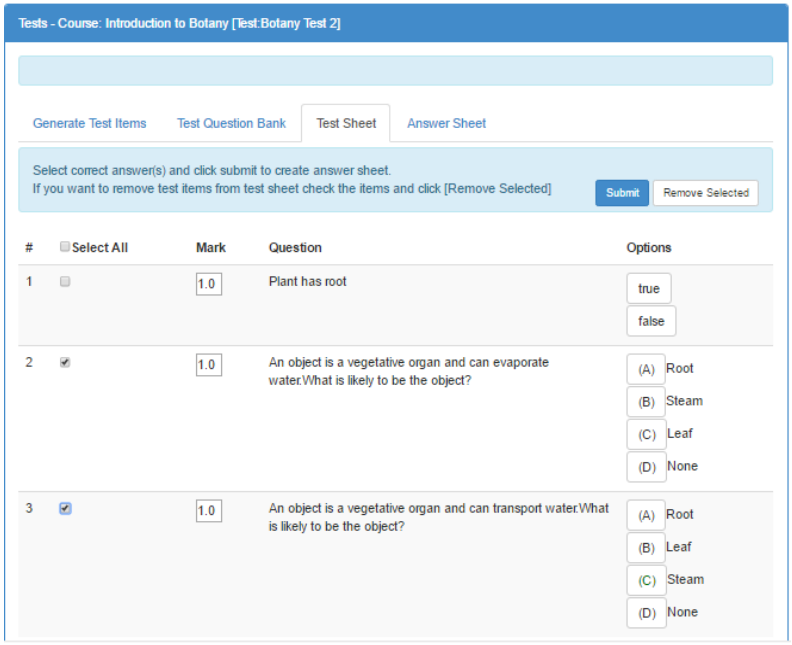


Fig. 5. Items selected by teacher will be added to the Test sheet when he or she clicks “Submit”

3 Conclusion

The Online Test System[1] is a responsive system implemented for teachers to automate the student assessment process. The research team would like to collaborate with teachers and schools to test the usability of the system as well as obtaining users perceptions and comments to help us enhance the system. The hope is to extend the system to generate higher order thinking question to help teachers assess students' critical thinking.

Acknowledgements. The authors wish to thank NSERC for partial support.

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