DEVELOPMENT AND EVALUATION OF AN ENGAGING WEB-BASED CONTENT SEQUENCING SYSTEM FOR LEARNING BASIC PROGRAMMING

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MASTER OF SCIENCE
UNIVERSITI UTARA MALAYSIA
2014
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Abstrak


Kata Kunci: Sistem kandungan berurutan, Pembelajaran berasaskan web, Pembelajaran adaptif, Perbezaan secara individu, Teori Aliran, Penglibatan, Tiada penglibatan, Kemahiran menyeimbangkan cabaran.
Abstract

Java basic programming is one of programming languages that is offered to students as a compulsory course for Information Technology or Computer Science programs. This subject requires students to learn skills and techniques of programming rather than theoretical concepts. Usually, students have problems to capture and understand the content of the course which resulted in low performance or withdrawal from the program and even the education system. In general, web-based learning can be used as a tool to improve learning including programming courses. A specific instance of web-based learning; called content sequencing systems have a high potential to provide adaptive learning for programming languages. Adaptive content sequencing systems analyze individual difference of students and sequence the learning contents based on the students’ needs. By addressing students’ individual differences, it helps students to be actively engaged in the learning process. An engagement is a key element in learning. In this research, the level of students’ engagement is measured using "flow theory". This theory suggested three cognitive conditions when one is doing a particular activity, namely flow (engaged), boredom, and anxiety. Engagement occurs when an individual has an equal level of skill with the given level of challenge. Anxiety and boredom occur when there is unequal level of challenge and skill. The fundamental concepts of the theory are represented in a user interface design by imposing a component known as "flow buttons". The used of the buttons is described as Skill-Challenge Balancing (SCB) technique and it is adapted in a web-based learning system called "LearnJava". It incorporates SCB where its main components are a user interface design and a sequencing engine. Based on this technique, the students’ level of knowledge will be evaluated and analyzed to identify their current level of skill. The technique will sequence the learning contents based on the students’ current level of skill to keep them engage in the web-based learning. An experimental study was conducted to evaluate how effective SCB in helping students to engage in web-based learning. The results suggested that the SCB technique improved students’ engagement in web-based learning.

Keywords : Content sequencing system, Web-based learning, Adaptive learning, Individual difference, Flow theory, Engagement, Disengagement, Skill-challenge balancing.
Acknowledgement

‘By the name of Allah s.w.t., the Most Gracious and Most Merciful’

Alhamdulillah and thanks to Allah s.w.t., the Most Gracious and Most Compassionate which has given me the commitment and strength to start and complete this study. With the help and permission of Allah s.w.t., I succeeded in completing this project.

I would like to express my endless appreciation and gratitude to my supervisor, Dr Norliza Katuk for her invaluable input and guidance, patient, encouragement, advices and flourish on knowledge during completing this study. Indeed, without her assistance and numerous beneficial comments and advices, this study would have never been successful.

Special thanks to all lecturers at School of Computing, Universiti Utara Malaysia for their time and commitments given to me to finish this project and to the others who gave encouragement and support me to finish this study.

Throughout the entire study process, thanks to my strongest source of motivation and inspiration due to their underlying love, support, encouragement, blessing and pray from my both beloved parents Haji Halim bin Awang and Hajjah Faridah binti Haji Omar. In addition, thanks to my beloved brother and sisters, Muhammad Zakwan, Noor Aznin, Wan Siti Mannam and Nur Iman Fayyadhah respectively for their understanding and patience.

Special gratitude goes to my colleagues and friends for their encouragement, advice and guidance in helping me with this study. Without their help and support, this project would not finish in time. Last but not least, thanks to all my friend who have contributed to the success of this study, directly or indirectly.
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<tr>
<td>BIT (Hons)</td>
<td>Bachelor of Science with Honors (Information Technology)</td>
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<td>CTT</td>
<td>Classical Test Theory</td>
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<tr>
<td>GUI</td>
<td>Graphical User Interface</td>
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<td>KS</td>
<td>Kolmogorov Smirnov</td>
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<tr>
<td>IRT</td>
<td>Item Response Theory</td>
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<tr>
<td>IT</td>
<td>Information Technology</td>
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<td>Msc (IT)</td>
<td>Master of Science (Information Technology)</td>
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<td>PAT</td>
<td>Programming Adaptive Testing</td>
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<td>PHP</td>
<td>Hypertext Preprocessor</td>
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<td>SCB</td>
<td>Skill Challenge Balancing</td>
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<td>SOC</td>
<td>School of Computing</td>
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<td>SPSS</td>
<td>Statistical Package for Social Science</td>
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<td>TBL</td>
<td>Team Based Learning</td>
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<td>UUM</td>
<td>Universiti Utara Malaysia</td>
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<td>WBCS</td>
<td>Web-based Content Sequencing</td>
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<td>WBL</td>
<td>Web-based Learning</td>
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CHAPTER ONE

INTRODUCTION

1.1 Overview of Chapter 1

Chapter 1 describes the background of the study which includes problem statement, research questions, research objectives, scope of the research, the significance of the research and a summary of each chapter.

1.2 Introduction of the Research

Research on adaptive web-based learning (WBL) has been conducted since more than a decade ago. Adaptive WBL is a learning technology that enables students to learn independently adapting to their needs. This technology aims to provide an independent learning opportunity for students through modification of activities, methods, tools, and the learning environment. It helps them to involve in a learning process that is more effective than traditional e-learning systems.

In general, students are individually different in terms of their prior knowledge, motivation, personality, and preferences (Roberts, 2010). For that reason, students need a WBL system that acts differently and adapt to their individual differences. This is because WBL can provide students the opportunity to learn in a variety of techniques and styles. This can ensure that learning content can be delivered more effectively to each student. Adaptive learning is a learning technique that uses computers as an important medium in the learning process. It considers and manipulates students learning
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REFERENCES


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