

A ROTATIONAL BLENDED LEARNING MODEL: ENHANCEMENT AND QUALITY ASSURANCE

By

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ABSTRACT

Research on blended learning theory and practice is growing nowadays with a focus on the development, evaluation, and quality assurance of case studies. However, the enhancement of blended learning existing models, the specification of their online parts, and the quality assurance related specifically to them have not received enough attention. This paper presents in detail an enhancement, implementation, and evaluation of a rotational blended learning model. This model was adopted by the UNISCO Avicenna Virtual University. Also, its impact on some quality assurance criteria of the rotational blended learning model was presented. This research is unique in the sense that it specifies clearly the online part of the rotational blended learning model with its impact on the main quality assurance criteria.

Keywords: Blended Learning, Rotational Model, Quality Assurance.

INTRODUCTION

Blended learning, in educational research, refers to a mixing of different learning models. It combines traditional face-to-face classroom model with computer-mediated support. Horn and Staker (Horn, M. and Staker, H., 2011) have identified six models of blended learning: (i) Face-to-Face driver where teachers deliver most of the curriculum in face-to-face classes. (ii) Rotation where the students rotate between a period of face-to-face tuition and a period of online study. (iii) Flex where the most learning is done in the online environment. (iv) Online lab where all course material and teaching is done online, but in a physical classroom on computer lab. (v) Self-blend which is a fully individualized approach, in this model the students take online classes a la carte. (vi) Online driver where Students work mainly online in a remote location and come into school for optional or required face-to-face classes.

The evaluation of this emerging learning approach constitutes an active topic in actual educational researches. Some researches deal with defining processes allowing its evaluation (Dziuban, C., 2012; Joosten, T., 2009), while others predict its impact on educational programmes (Joosten, T., and Barth, D., 2013). Results of its experimentation constitute a large research activity (Harding et al., 2005; Young, P. et al., 2010). The impact of

the blended learning on higher education quality assurance benefits of a particular attention in these researches (Kidney, G. et al. 2007; Magdalena, J. and Harvey, M. 2010). However, these research deal only with e-learning, in general, and not with specific blended learning models, which is the goal of the study presented in this work.

This paper presents an evaluation of an enhanced rotational blended learning model applied on a computer science programme, at Philadelphia University, and identify some quality assurance criteria which are related specifically to blended learning and not, as it is generally the case in actual researches, to e-learning. In the following we will present an experimentation of an enhanced rotational blended learning model, its evaluation, and its impact on some Higher Education quality assurance criteria.

Application of an Enhanced Rotational Blended Learning

The learning environment, of this study, has evolved through the following stages: conventional, computer aided, and enhanced rotational blended.

Conventional Learning Environment

This environment may be modeled by the following Figure 1. It takes as input a motivated low skilled learner and produces a graduate with enhanced skills. The

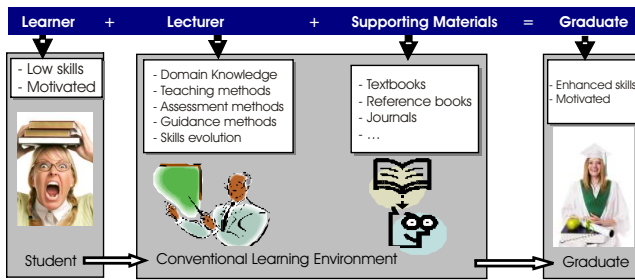


Figure 1. Conventional Learning Environment

conventional learning environment is composed by

- A lecturer having the required domain knowledge and the appropriated teaching, assessment, and guidance methods. These lecturer skills may evolve in the time.
- Supporting materials as textbooks and reference books, specialized journals, etc.

Computer Aided Learning Environment

This environment may be modeled by the following Figure 2. It takes as input a motivated low skilled learner and produces a graduate with enhanced skills. The computer aided learning environment is composed by

- A lecturer having the required domain knowledge and the appropriated teaching, assessment, and guidance methods. These lecturer skills may evolve in the time.
- Supporting materials as textbooks and reference books, specialized journals, etc.
- Supporting materials provided by Moodle (Modular Object-Oriented Dynamic Learning Environment) as course syllabus, slides, precedent exams with marking schemes, homework, students marks, and lecturer-student or student-student communications.

Enhanced Rotational Blended Learning Environment

Horn and Staker (Horn, M. and Staker, H., 2011) have

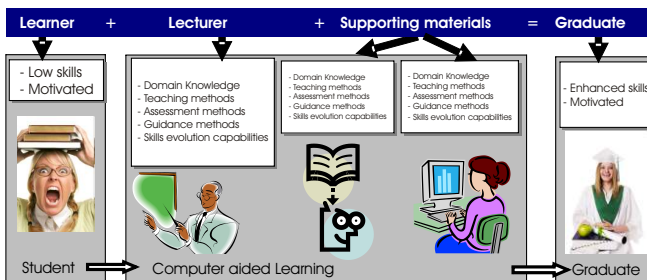


Figure 2. Computer Aided Learning Environment

defined the common feature, in the rotation model, is that “within a given course, students rotate on a fixed schedule between learning online in a one-to-one, self-paced environment and sitting in a classroom with a traditional face-to-face teacher. It is the model most in between the traditional face-to-face classroom and online learning because it involves a split between the two and, in some cases, between remote and onsite. The face-to-face teacher usually oversees the online work.”

This environment may be modeled by the following Figure 3. It takes as input a motivated low skilled learner and produces a graduate with enhanced skills. The computer aided learning environment is composed by

- A lecturer having the required domain knowledge and the appropriated teaching, assessment, and guidance methods. These lecturer skills may evolve in the time.
- Supporting materials as textbooks and reference books, specialized journals, etc.
- Supporting materials provided by Moodle computer system as course syllabus, slides, precedent exams with marking schemes, homework, students marks, and lecturer-student or student-student communications.
- Online learning supported by an expert computer system simulating the physical lecturer: his knowledge, and his teaching, assessment, and guidance methods. It also allows the evolution of these skills, information retrieving, and communications between lecturer-student and student-student.

The domain knowledge is organized in online learning sessions. Each session has the following architecture (Figure 4): title, overview, references and links, a quick revision of the precedent session, the knowledge presented in the

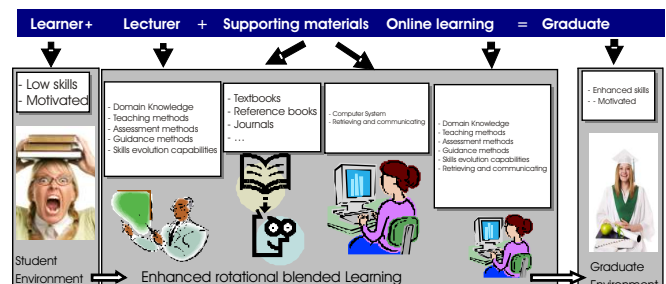


Figure 3. Enhanced Blended Learning Environment

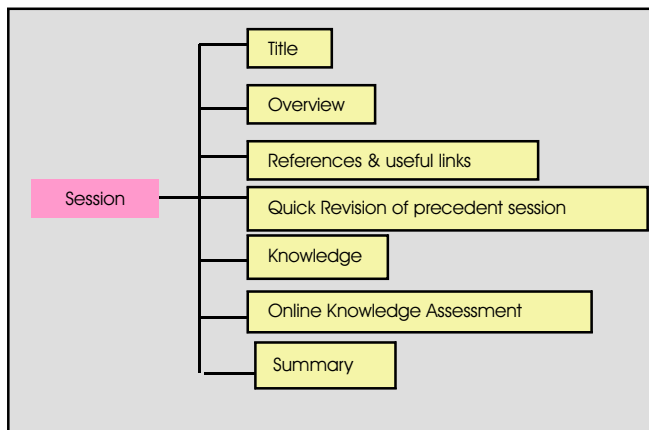


Figure 4. Domain Knowledge Organization

session, an online assessment, and a summary. The affectation of student to a session might be explicit (by the lecturer or by the student) or implicit (automatically by the expert computer system according to its online assessment or to student guidance plan).

The teaching method consists of dividing each online course into several parts. Each part is composed of (Figure 5) a set of learning sessions, its tutorials, assignments, and online exams.

The skills of the expert computer system might evolve by evolving the teaching method: the online courses architectures and sessions' architectures, the student profiles and guidance plans, and the virtual lecturer decisions making.

The student assessment is achieved by: Quick revision at the beginning of each session, online assessment at the end of each session, tutorials and assignments, and final online exam at the end of the course.

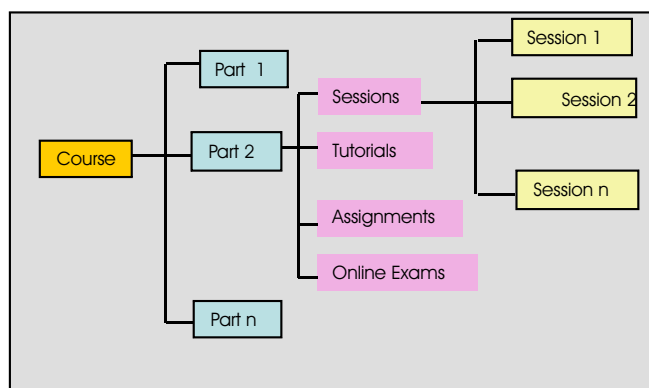


Figure 5. Online Course Architecture Organization

Evaluation

The evaluation of this works covers its main contribution, its academic applications, its implementation issues, and its comparison with similar works.

Contribution

This work has two mains contributions

- Enhancing the rotational blended learning model defined by Horn and Staker (Horn, M. and Staker, H., 2011). This enhancement was obtained by combining the rotational model with Moodle. Moodle is a Course Management System, Learning Management System, or Virtual Learning Environment (VLE). As of December 2011 it had a user base of 72,177 registered and verified sites, serving 57,112,669 users in 5.8 million courses. This enhanced learning model was evaluated "excellent" by the UNISCO European Union (EU) which supported this study. This led to select Philadelphia as a Jordan representative in Avicenna project. The online learning developed model is accredited by the UNISCO for its Avicenna virtual university and used through a large part of the world.
- The face-to-face learning model has well defined quality assurance norms and benchmarks by the international higher education quality assurance institutions. However it is not the case for the rotational blended learning model with all its variations. This study has revealed the following impacts of a rotational blended learning model on quality assurance norms.
- Curriculum design. The quality assurance norms requires, mainly, for the conventional face-to-face curriculum of a higher education programme, to fix the courses provided by this programme with the prerequisite for each course, its accredited hours, and its nature (compulsory, elective, supporting, etc.). However, for the rotational blended it might be important to revise the concept of accredited hours. Is it the total hours/week required for the course (face-to-face mode + online mode)? Is it only the hours/week required for the face-to-face mode (because the online mode may be at home)? We propose to define

it as the hours/week in classroom (face-to-face + online) and to specify for each course, in the curriculum, how many hours are face-to-face, how many are online in the classroom, and how many are at home.

- Syllabus design. The quality assurance norms requires for the conventional face-to-face syllabus of a higher education programme course to fix, among others things, the used teaching method, assessment instruments, and the academic calendar.

For the rotational learning model the teaching methods should include the online ones (one to one, many to one, self learning, or assisted by lecturer) along with the face-to-face teaching methods. There is no criteria guiding the choice of an online teaching method, because it depends on local constraints, but may be important to encourage the self learning which develop the long life learning capability for students.

The face-to-face teaching mode uses the first, second, and final exams instruments, along with homework. However, the introduction of online learning might introduce new assessment instrument: the online exam which is an important assessment instrument.

The face-to-face course calendar arranges the content of the course by sessions. However, the online mode will introduce the used teaching methods for each session: face-to-face, online in room, mixed, online at home, etc.

- Student progression. The student progression in an educational programme is defined as the (number of graduated students / number accepted students), for the same batch during the programme time. This is a valuable indicator which may be used for different quality assurance purposes. The comparison of this indicator in the face-to-face model with that of the rotational blended model will help in balancing the combination of the two models
 - Learning resources. The blended learning model necessitates additional resources to those of face-to-face:

- Online course development center equipped with appropriated technicians, hardware, and software.
- Trained staff members in online courses development. This requires scientific skills along with educational online courses development skills.
- Special course rooms supporting the rotational blended learning environment: face-to-face and online learning.
- Student blended learning handbook.
- Quality assurance processes and practices. All the actual quality assurance processes and practices are designed and evaluated in a face-to-face environment. It will be essential to adapt them, in the near future, to the blended learning models. This is a perspective of this study.

Application Area

The first part (enhanced rotational blended learning model) of our study was already applied in Avicenna virtual university, and may be used in any higher educational system. The second part (quality assurance of the rotational blended learning model) is not dissociable from the first part.

Implementation Issues

We have implemented the enhanced rotational blended learning model at Philadelphia University in the Faculty of Information Technology and in other faculties. So, it may be implemented in any educational institution providing the above learning resources.

Related Works

The blended learning benefits are of high interest in the educational research community. Several recent experimentations were presented in the literature (Horn, M. and Staker, H., 2011; Young, P. et al., 2010; Sharpe, R. et al., 2006). However, none has presented the rotational blended learning model specification as we did or any enhancement to the known models.

The evaluations of blended learning (Joosten, T., 2009; Joosten, T., and Barth, D., 2013; Harding, A. et al., 2005; Young, P. et al., 2010) are many, various, based on real experiences, and leading to important conclusions concerning its importance, cost, impact on students and

on education systems, etc. The impact on quality assurance (Kidney, G. et al., 2007; Magdalena, J. and Harvey, M., 2010) deals mainly with e-learning and not specifically with rotational blended learning as our work did. Kidney and colleagues (Kidney, G. et al., 2007) identify eight quality assurance strategies in use at the University of Houston-Clear Lake. The eight strategies are reviews of instructional design, web development, editing, usability and accessibility, maintainability, copyright, infrastructure impact, and content and rigor. Magdalena and Harvey (Magdalena, J. and Harvey, M., 2010) state that the study of the effectiveness of procedures to assure and enhance quality indicated that the main strategies for collecting student feedback (module evaluations and student representation) were strongly affected by features of the on-line delivery of the course. So, our work completes the similar ones by taking in depth quality assurance criteria into account.

Summary and Perspectives

The blended learning theory and practice researches are growing nowadays. This paper presents in, a full way, an enhancement, implementation, and evaluation of a rotational blended learning model. This model was adopted by the UNISCO Avicenna virtual university. Also, its impact on some quality assurance criteria was presented. This work is somehow unique in the sense that it specifies clearly the online part of the rotational blended learning model with its impact on main quality assurance criteria. It may be valuable to evaluate it with statistics collected from students' feedback, lecturer feedback, industrial societies which employ these students, students' progression, etc. The development of quality assurance processes and practices for this learning model, as it was done for the face-to-face model, is essential.

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Prof. Said Ghoul has obtained his Master and Ph.D Degrees, in Software Engineering, from University of Grenoble, France. He has over thirty years experience in higher education teaching. He was member of the UNISCO EU Avicenna project (Jordan) consisting in designing and developing e-courses. He has produced and used in a rotational blend model way some e-learning courses since 2004. He is Professor at Philadelphia University, Faculty of Information Technology, Jordan.

