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THE IPAD: A TABLET TOOLKIT SUPPORTING BLENDED AND FLEXIBLE LEARNING

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ABSTRACT

Learning has shifted from the traditional face-to-face classroom into interactive ICT-supported environments. The 'cone of learning' assists in understanding this learning shift. Merging portable ICT content management systems (CMS) such as the iPad offers new student-empowered, interactive, non-linear, self-learning opportunities. These new environments enable testing for the effectiveness (and value) of the iPad as a mobile student CMS across blended and flexible learning environments. This environment enables testing for improved student personal interactivity (and recognition), and for improved student learning outcomes (measured (i) quantitative student-perceptions, and (ii) qualitative achieved-results).

Key Words: Blended, e learning, flexible, interactive, dynamic, instruct, iPad, avatar, virtual world.

INTRODUCTION

Learning has shifted from traditional or face-to-face instructional approaches and may now be positioned depending on circumstances and time along a continuum. Traditional learning is moving into blended learning, a small degree of student interactivity and recognition, and for improved student learning outcomes (measured (i) quantitative student-perceptions, and (ii) qualitative achieved-results).

Simple blended-enabled approaches may just add blackboard or WebCT delivery systems as a means to add a small degree of student interaction. Higher level of blended-enabled learning may add video, podcasts, or ICT supported tasks [13]. Blended-enhanced learning is far more interactive and engaging. Here, student behaviors may be negotiated, and individualize aspects of their learning programs in conjunction with their instructor or institution.

Fully flexible learning involves in individually constructed complex mixes of time, degree of student interaction, content and flexibility; entry requirements; instructional and resources deployment approaches, and delivery of logistics [9], along with the delivery of facts, the 'what', the 'where', the 'when', the 'how' and aspects of the 'why' associated with the learning processes that may be en gaged. These potential contributors to the individual student-agreed learning processes [17].

Biggs [7], Bonk and Graham [8], Cybinski and Michinov [10], Michinov and M ichinov [22] support the 'cone of learning' continuum [14]. Here, a student's increased learning outcomes are directly related to the complex mix of targeted learning situations/activities that engage the student (factors) and contribute to their learning situation.

These complex multi-pronged learning offerings are moderated by the instructional mode engaged, with traditional face-to-face learning being the least engaging, and flexible learning being the most interactive and engaging. For first year tertiary students progression from traditional to blended learning yields around a 60% increase in learning outcomes, with flexible learning delivering an additional 15% increase [13]. Thus movement into blended learning is desirable.

The ‘Cone of Learning’ widens a student's additional learning capture and delivery processes are added to optimize student learning outcomes. Here, new learning tools (often technology-based) continue to emerge and when added to the existing learning systems further up the learning continuum. This transition may result in jagged (and not smooth) expansion in cone breadth as an adopted change in the learning system may be great or small.

![Figure 1: The Cone of Learning Reconstruction, adapted from Hamilton and Tee [13].](image-url)

The ‘Cone of Learning’ also displays blurred boundaries between different teaching and learning modes. Michinov and M ichinov [22] support the 'cone of learning' boundaries between the face-to-face and blended teaching and learning modes, and Georgouli, S kalkidis, and Guerreiro [11] indicate a similar situation between blended and flexible teaching and learning modes.
As most learning mode approaches are now blended we concentrate this study on blended learning.

**BLENDING LEARNING**

Blended learning typically incorporates information and communication technologies (ICT) into its learning exchange environment. It often involves the student in interactive information ‘give-and-take’ situations [2]. Here, an established learning content management system (CMS) such as a simulation or gaming learning program or an interactive on-line classroom responds contingently to the student’s specific actions [4]). Thus, the student contributes individually to aspects of the learning environment, and so participates in blended-enhanced learning.

Interactivity through ICT empowers students to learn, and better prepares them to effectively participate in the evolving global knowledge economy [5].

Interactivity in a blended learning environment enables and engages students in their knowledge building. Here, students are often self-directed and must accept both greater autonomy and responsibility for their own learning [3][6][18].

Self-directed learning directly contributes to the student’s life-long learning process of learner control, learner self-management, personal autonomy and autodidaxy [3]. It enhances the student’s readiness to take responsibility for their own learning activities.

Self directed learning necessitates information literacy and this may involve in teraction with a range of content management systems.

New forms of ICT such as Tablet PC’s have built expectations of significant enhancement in teaching and learning outcomes [23]. The Apple iPad offers tertiary blended learners an other entertainment tool and a creative learning tool that links the le arning to tools in to a dynamic interactive learning environment.

Social networks and other tools accepting 3D virtual world avatar instructors are adding further practical and training dimensions to interactive blended learning [25].

3D virtual worlds instruction is well suited to students involved in experiential or interactive learning where high knowledge and skills are required [20]. However, educators lack understanding of how environments and their applicability across geographic boundaries. Role-play sessions with individual virtual characters interacting across various scenarios can provide rapid understanding regarding a situation [19] and can generate broad interactivity between avatars. This also builds new rules for student collaboration and social interaction [25].

The pedagogy of 3D virtual worlds allows the instructor to recreate the traditional classroom into a blended one that leverages the unique characteristics of the technology platform. Chat logs, learning artifacts, post activity semi-structured interviews and instructor observations cumulatively generate rich experiences a nd deliver pedagogy in action [12].

By eating ed ucational s paces, a vatar cl othing, non-verbal communication tools and visualisation situations in a blended learning environment. Andreas et al. [1] found they could augment face-to-face in interactions, improve distance learning and communication and enhance aspects of collaboration within their virtual learning space. Hence, ICT related tools can deliver valuable blended learning experiences, better preparing students to effectively participate in the evolving global knowledge economy [5].

The Apple iPad offers tertiary blended learners an other emerging ICT-based interactive learning system. Its touch-screen tablet in conjunction with its user-selected (or user-developed) apps, plus e-books, Google Earth (with some GPS functionality) and other accessories delivers both an entertainment tool and a creative learning tool that links the learning to tools in to a dynamic interactive learning environment.

The iPad allows students and/or users to develop their own apps, and to tailor their iPad to specifically suit their own requirements. For example, the student may build business utilities, entertainment components, shopping advertising and new connections into their interactive marketing course. The student can also overlay additional sketch/draw figures and add them between their inbuilt keyboard’s inserted lecture notes. Here, keyboard entries are continually linked (pegged to the last type-entered word) and coincide with words recorded at that point in time in the lecture or discussions. When connected to 3G further downloads may also be incorporated. Finally, with the appropriate apps stored PowerPoint slides may also be appropriately pegged into this information integration systems delivering a comprehensive learning program with each student tailoring these combinations to their individual learning requirements.

This complex interlinked package may be further student modified to incorporate connections to relevant videos whilst still allowing the learner/user to jump between email, video, internet browsing and other data-heavy apps, or to read iBooks, plot GPS destination paths, and then to store their complete lecture notes, integrated media materials and sound tracks package as one unlinked file.

Thus, the iPad breaks new ground in portable computing and is a platform for instructors and/or developers to create new and innovative apps. USB ports, WiFi 3/4G, HDMI, a micro-SD slot and a front-facing webcam further expand existing connectivity and learning power, supporting non-linear student knowledge absorption from its multi-sensory environment ( multimedia text elements, graphics, animation, sound, video, experience/learning avatars) supported by cloud computing information syncs.

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Such on-linear learning ICT supported environments allow the student to move around their acquired content in a manner best-suited to their particular learning requirement and/or skill level. This self-directed approach caters for the student’s individualistic needs in learning, and typifies the higher levels of blended-enhanced learning.

Chou, Peng, and Chang [4] consider such ICT approaches (3D virtual worlds and/or the iPad) as a learner-centered CMS capturing five learner-centered interaction types: (1) student-interface in interaction via iPad screen; (2) student-self interaction via reflections, or iPad lecture pages; (3) student-content interaction via multi-media engagement in 3D worlds; (4) student-instructor interaction via selected digital communication channels or iPad connections; and (5) student-student interaction via digital encounters, forums or via selected digital/iPad peer-to-peer communication engagements.

Thus, tablet PC’s such as the iPad have CMS capabilities that may enhance student learning outcomes. Hence, this article develops a model to test the iPad and other tablet PC’s as a CMS capable of integrating delivered interactive learning approaches and delivering positive blended-enhanced learning outcomes.

**MODEL DEVELOPMENT**

The iPad engages supporting ICT platforms, captures and stores diverse CMS data, frames around delivered pedagogy and is likely to contribute to the blended-enhanced or flexible learning system.

We now combine these components into our "blended interactive and dynamically changing learning system. We note Sabry and Barker [26] also recognize dynamic interactive learning as a system.

We adopt the extensively studied Biggs 3P learning system model [7] to operationalise our blended interactive and dynamically changing learning system. We present this research framework as Figure 2 - our interactive 3P learning system.

**Student Factors**

Student factors house prior-knowledge, abilities, intelligence, personality and home background, motivation and other skills brought to the learning environment.

**Teaching Context**

Teaching context encompasses instructional mode, subject area, course structure and learning tasks as enablers of the learning environment. Here, interactivity may be incorporated as content (course databases, CMS, online resources and simulations), technology (CMS support), pedagogy (blended enhanced delivery) and other skills brought to the learning environment.

**Teaching Context**

Objective, assessment, climate, teaching, institutional procedures

**Learning-Focused Activities**

Deep/Surface learning

**Interactive Course Design**

Learning-context interaction

**Deep learning activities**

**Measures**

- Study/Process Questionnaire
- SPQ 1987 approach
- Achievement

**Learning Outcomes**

Quantitative (facts & skills)

- Learning value
- Knowledge-recalled
- Self reflection journal
- GPA

**RESEARCH ASPIRATIONS**

Learning-focused activities typically involve surface learning and/or deep learning and/or achieving strategies approaches. Here, interactivity is actioned through iPad integration, and is measured by survey (an adapted Biggs SPQ 1987 approach) results a nd a cheivement around learning outcomes.

**Learning Outcomes**

Student learning outcomes may be the quantifiable measures of academic achievement and/or the qualitative measures of how well material is learned or experienced, and may result in a net grade or set of graduate attributes. This is measured by a series of qualitative and quantitative measurement scales.

**Figure 2: Interactive 3P Learning System.**

**Learning-Focused Activities**

- Deep/Surface learning

**Measures**

- Study/Process Questionnaire
- SPQ 1987 approach
- Achievement

**Learning Outcomes**

- Quantitative (facts & skills)
- Qualitative (structure, transfer)
- Affective (involvement)

**Figure 2: Interactive 3P Learning System.**

**Learning Outcomes**

- Learning satisfaction
- Learning quality
- Learning experience
- Learning value
- Knowledge-recalled
- Self reflection journal
- GPA

In this paper we aim to (1) explore whether two specific virtual world learning environments – each operating at a different learning level, and with different iPad application sets (one a few flexible mode delivery and one a blended enhanced mode delivery), can produce enhanced student acceptance of the learning derived through a virtual world environment.

Along with [25] we suggest that the iPad allows student learning to advance considerably. Hence, we also test for (2) improved student personal interactivity (and recognition), a long with (3) improved student learning outcomes (measured (i) quantitative student-perceptions, and (ii) qualitative achieved-results).
RESEARCH SETTING AND METHODOLOGY

This study is implemented through an experimental design approach using a pre-e-course questionnaire to assess participant knowledge of blended-learning concepts and their engagement with learning devices. The study involves two groups of participants: one group using iPads and the other using traditional learning devices. The experimental design includes pre- and post-assessment phases to evaluate learning outcomes.

All Postgraduate and Undergraduate participants are provided with iPads, and offered pre-course iPad training to allay fears of working in such a learning environment. This also offers participants sufficient capabilities to manage the work/learning demands when engaging within this virtual world environment.

A virtual world teaching avatar developed by the authors for medical intern training is used to deliver the interactive instructional component of the learning activity. Here, course slides, video lectures, and interactive models are drawn and explained sequentially, interactive student-student tasks, and instructional guidance are embedded throughout the learning experience. This delivers a comprehensive learning environment, and we suggest along with others that the iPad allows student learning to advance considerably. We test for this by gauging whether improved individual student interaction and recognition, along with improved student learning outcomes actually arise.

REFERENCES


