Enhancing Students Performance with E- Learning at the Papua New Guinea University of Technology, a Papua New Guinea Experience.

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Abstract

This paper discusses how E-learning, which is computer technology and the Internet that is used in teaching life skills, learning and research at the Papua New Guinea University of Technology. It presents preliminary results on the experiences and performances of third year accounting students in the last six years. E-learning strategies taught to third year accounting students have enabled them to perform better academically than those in the same department studying different courses and other departments of the university not involved in e-learning. From a survey questionnaire given to students to evaluate the unit at the end of semester one, on average, an overwhelming 80% of students responded that the unit helped them to thinking critically, exposed them to a variety of information sources and formats, developed better understanding and thinking, and developed information literacy skills.

1. INTRODUCTION

The current buzzword for educational activities using the Internet is e-learning. At the Papua New Guinea University of Technology (PNGUT) library, e-learning is used to support units in third year accounting by providing: information about the units, easy access to resources in the library and the internet, class and individual communication on the campus wide network, and online assignments and tests with feedback. It is described as a learning process [1]. Through e-learning, learners can communicate with their facilitators and peers, and access learning materials over the Internet or other computer network [2] similar to the student network and the e-mail system here at the PNGUT. The network and the internet provide a means through which the powerful and pervasive computing and communication technologies [3] can be applied to tertiary education in teaching and learning such as a unit taught to third year accounting students (BA 391 Problem Solving & Self-Reliance in Learning). E-learning enables the lecturer and students to exchange ideas, lecture notes and exercises through the student network and e-mail system. Multi-media are used for Internet presentations and other power-point presentations. The Internet and the library online database are used as teaching and learning tools and as primary

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[1] Chris Curran. Strategies for e-learning in universities. http://repositories.cdlib.org/cgi/viewcontent.cgi?article (18/12/2009)

[2] Ron Kurtus, *What is eLearning?* http://www.school-for-champions.com/elearning/whatis.htm (24/11/09)

[3] J.Bourne (ed.), On-line Education: Learning Effectiveness and Faculty Satisfaction. *Proceedings of the 1999 Sloan Summer Workshop.* Nashville, ALN Center, Vanderbilt 2000. http://books.google.com/books? 12/01/2010

sources of information. However, students have to master certain critical thinking, information and communication technology skills in order to communicate and make sound decisions in solving their academic problems and other problems in life.

2. WHY INTRODUCE PROBLEM SOLVING & SELF-RELIANCE IN LEARNING?

After some discussions between the Business Studies Department and the University Library in 1994, it was identified that students lack basic problem solving, critical thinking and information literacy skills in solving academic problems. As a result, the university library introduced a unit to third year accounting students titled - Problem Solving & Self-Reliance in Learning. The objective of this unit is:

> To foster the abilities of course participants to efficiently compile and utilize information in order to make and communicate sound managerial decisions.
> On completion of this subject the students will be able to:
> 1. Evaluate business problems on an analytically and rigorous basis.
> 2. Compile information such that will facilitate good business decisions.

The unit focuses on critical thinking, information literacy, time management, problem solving or decision-making skills, which are important for students. Students need to make timely decisions when searching for information, as the source of information depends on its availability and the means and type of legal access. The unit attempts to foster these skills and prepare students for the work environment. They have to interpret and analyze the academic problem, identify and evaluate the sources of information in order to make quality decisions, which can lead to attaining better grades in their unit assessments. Further more, if they can develop and make excellent academic decisions as students, this could prepare them to become effective decisions makers in the work place in order to meet the demands of modern business organizations.

3. REASONS FOR USING E-LEARNING IN A DEVELOPING COUNTRY

E-learning situation at the PNGUT is still a new era for learners and instructors. The Internet was established in the university in June 1994 mainly for e-mail service. This service was offered to staff and some other research organisations within Papua New Guinea. On March 12th 1997 Internet access was introduced and launched to the public in June 1997. The arrival of the Internet has given the University Library broader opportunities to access information sources from around the world that are available online. One of the opportunities is to subscribe to online databases that are available internationally. The advantage of this is that it gives the students and staff the option to search for more information elsewhere if the information they need is not available in the Library. This option cuts down the amount of time (and cost) that is taken up using the traditional inter-library loan. Inter-Library Loan takes a week to a month or even longer than a month. The Library catalogue has web page linkages to other information sources around the world. The introduction of Information Literacy Education aims to enable students to become information literate which includes having convenient access to electronic sources of information nationally and globally.

However, most lecture halls in the university don't have Internet access and ninety percent of lectures are chalk and talk. The library was in a better position to introduce e-learning as most rooms had internet connection and also the newly established APEC Digital Opportunity Centre (ADOC) setup in the library in 1996 provided a viable option for teaching the unit electronically. Students are taught electronic databases and the internet search by every word or single character indexed. This means that it will take a while to find the appropriate information. It is important that students have to master certain information searching skills. They have to be smart learners, and analyze the subject they are studying in relation to its objectives. The students are taught to identify from the objectives of their other third year accounting units the main keywords for searching and focus in their learning.

Using participatory observation over a six-year period, on average, an alarming eighty percent (80%) of students did not focus their learning programs around the unit objectives and the university's course hand book. For an assignment on defining learning and how they have learnt how to learn here at the university in their last two years, seventy-five percent (75%) didn't really know the definition of learning and what learning is about. Further more, eighty-percentage (80%) did not have a good set of strategies that they had mastered in the learning process.

The objectives of the units should guide students in their learning and studying either by searching on the internet, using the library online public access catalogue or other sources to search for information. Student's study habits and other decisions should be objective driven.

To demonstrate the importance of unit objectives, an electronic copy of the university's course hand book is used to show the objectives of BA 391(Problem Solving & Self-Reliance in Learning) and other third year accounting units. As an exercise, students discuss, analyze and interpret the unit objectives. This exercise enables them to search for information on the Internet and on the library database. In an accounting unit – BA341- Business Organizations in Papua New Guinea, the objectives are:

To provide students with an understanding of the various statutory and common law as they apply to corporations and businesses of Papua New Guinea, and to familiarize them with the operative and clinical aspects of the corporate/business laws with which they will have to deal in their professional careers.

On completion of the subject, the students will be able to:
1. Demonstrate knowledge of the legal requirements of the Partnership Act, and with the case laws developed by the courts, in such a way as to be able to advise clients of the essential provisions of those requirements.
2. Demonstrate knowledge of the provisions of the Lands Groups Act and the Business Groups Act to such an extent as to be able to render independent professional advice to those seeking such assistance.
3. Demonstrate understanding of the statutory provisions of the laws relating to incorporated and unincorporated associations, savings and loans societies, charitable organizations, and co-operative societies, their aims and objectives, and the legislative purpose underlying their formations.
4. Apply provisions of the Companies Act in the commercial/business sector of Papua

New Guinea.

In analyzing the objectives of BA 341 unit, students are taught that the unit is intended to help them understand the various statutory and common law as they apply to corporations and business of Papua New Guinea. Students are further asked to demonstrate understanding and knowledge and are taught that what they read (published work) or what they hear, (oral work), relate to data, information, knowledge, understanding and wisdom. And what are these words? Using them as keywords to search the internet return a link that gave the meaning to data, information, knowledge, understanding and wisdom[4]. According to Russell Ackoff [5], a systems theorist and professor of organizational change, the content of the human mind can be classified into five categories:

1. **Data**: symbols

2. **Information**: data that are processed to be useful; provides answers to "who", "what", "where", and "when" questions

3. **Knowledge**: application of data and information; answers "how" questions

4. **Understanding**: appreciation of "why"

5. **Wisdom**: evaluated understanding.

The above clarification by Ackoff on what the mind perceive as data and information, and how students can apply them to knowledge and understanding would enable them to come up with well informed decisions in their learning process. For example, understanding as defined above is appreciation of "why" and this should be important to the student as they analyze and interpret the objectives of the unit. The students must search sources in the library and the Internet for information that is asking and answering "why" questions. This is a critical thinking question. Moreover, as the outcome is on knowledge and understanding which are about rational thinking, the application of Russell Ackoff's definition of terms above is important as stated previously. The Internet was used again as an instruction and demonstration tool to help students find sources on how they can condition their mind to think rationally, think smarter and not harder. Following the demonstration, students are given an exercise question to find sources on the Internet on how they can stimulate their brain to learn and think smarter. Firstly, they have to understand the question and identify keywords. Following a discussion on the topic, students come up with the following keywords: stimulate, brain, learn, think, smarter. This exercise led to a site at the James Cook University in Australia [6] as shown on the diagram below. This is perhaps a good demonstration site for students in order to enable them to have some clear basic

[4] *Gener Bellinger and Durval Castro.* Data, Information, Knowledge, Wisdom.
http://www.systems-thinking.org/dikw/dikw.htm (16/02/2004)
[5] R. L. Ackoff. "From Data to Wisdom", Journal of Applies Systems Analysis, Vol.16 (1989), pp. 3-9.
[6] James Cook University Study. Skills Online: *Energise your brain.*
http://www.jcu.edu.au/office/tld/learningskills/studysmart/energise (16/12/2009)

idea of how their brain functions and learns in order to enable them to think and focus better academically.

Energise Your Brain

Cross-section

Higher

Middle
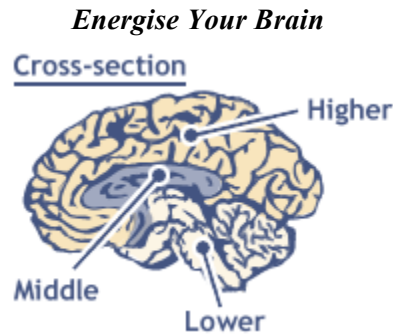
Lower

According to the brain anatomy diagram above, somewhere in the brain is the lower part, which controls instincts, basic survival and is dominated by petty trivial things. It has a natural tendency to behave in a certain way without much of reasoning. Reasoning is an important academic tool and is the basis of much of human thinking, according to Mathew Allan [7]. Mathew Allan further points out that 'reasoning is often described simply as the process of thinking through and communicating our reasons for holding certain views or conclusions'. Reasoning has also been describe as a 'complex wave of abilities that help you get someone else's point, explain a complicated idea, generate reasons for your viewpoints, evaluate the reason given by others, decide what information to accept or reject, see the pros as well as the cons and so fort'[8]. In academic life, reasoning and thinking are inter-connected. According to the James Cook University Study Skills Online site, when trivial things and emotional matters are dominating thinking in the academic environment, a person is unable to have access to the brain which controls the ability to reason, set goals, develop language and conceive abstract ideas. Ninety percent (90%) of students acknowledged that they don't really know much about how their brain thinks and learns. Perhaps a major reason why they don't do well academically is because they don't devote enough time to think and reason through what they are learning or other personal experiences are dominating their thinking.

Michael E. McCullough and others offer an explanation in relation to the ability to think rationally. Regarding brain and forgiveness in relation to some personal experience by a person named John, John could not forgive his father for some childhood experience that lasted through his entire life. Un-forgiveness was dominating his thinking. Perhaps this can happen in the academic environment and students need to be made aware of this kind of thinking behavior and attempt to avoid it. Michael E. McCullough and others discussion on brain and forgiveness supports the brain anatomy illustration and explanation by James Cook University Study Skills site on how to get the best out of ones brain. They assert that 'the brain is made up of three parts: the brain stem, which govern basic survival; the midbrain limbic system, a web of structures that govern emotions, motivation and much of the memory; and the cortex (of two hemispheres), which directs sensation, motor behavior and higher order thinking. The differing physical structure of the different parts of the brain is responsible for rational thought, images and

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[7] Mathew Allen. Smart thinking: skills for critical understanding and writing. Oxford University Press, Melbourne, 1997, p. 2.
[8] Stephen Toulmin, Richard Rieke, & Allan Jack. An Introduction to reasoning. Macmillan, New York, 1984, p.6.

emotions'. Students must know and make sure that to get the most out of their brain, the special cells and structures that connect the different parts of the brain must allow free communication [9,10]. The students must energize their brain to think smartly, access and evaluate the information they have before them to make sound academic decisions. On average, eighty percent (80%) of the students responded that the unit helped them to focus better and improve in their thinking ability. These are skills that an information literate student must possess.

"4. E-LEARNING AND INFORMATION LITERACY FOR SELF-RELIANCE IN LEARNING"

To be information literate, the unit offers exercises and notes on effective searching of the internet and the library database. The notes are presented using multi-media power-point presentation and later sent through the student network. As stated earlier, the ADOC, the digital opportunity centre in the library, offers great potential for the unit to be taught electronically. There are twenty working computers connected to the Internet and staff network. Students are instructed to do practical hands-on exercises using the computers in the ADOC for Internet searching. Students are asked to search the Internet for information and links on competencies of information literate students and study them. This is about self-evaluation. At the end of three weeks practice exercise on effective searching of the Internet, they are given an exercise for assessment on how they have developed effective searching skills and information literacy skills. To test their competency skills, an exercise on this unit is given to students on a topic to search on and e-mail the result to the lecturer for assessment. Below is a sample e-mail exercise.

> Information Literacy - CRITICAL THINKING & SMART THINKING EXERCISE
> TOPIC: Do a cross-cultural study on financial accounting issues in commercial lending institutions.
> Instruction: E-mail your answers to the questions below to: rtopagur@lib.unitech.ac.pg
> 1.   What are your search strategies?
> -My search strategies are; - **cross culture + study + financial issues + institution**
> **- cross culture AND study AND financial institution**
> **- cross culture AND study AND financial lending institution**
> 2. Which search engine or directory on the Internet did you use?
> -Search engine is **Google**
> 3. What is the best search strategy that led you to the correct search result or article on the topic?
> **cross culture + study + financial issues + institution**
> **4. What is the best search result**
> [Financial Accounting Issues in Commercial Lending Institutions: A ...](#)
> > File   Format: PDF/Adobe   Acrobat   -   [View   as   HTML](#)
> > **Financial** Accounting **Issues** in Commercial Lending **Institutions**: A. **Cross-Cultural Study**. Nasrollah Ahadiat. California State Polytechnic University
> > **Submitted By: Student Name**

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[9] James Cook University Study. Skills Online: *Energise your brain.*
http://www.jcu.edu.au/office/tld/learningskills/studysmart/energise (16/12/2009)
[10] See also. Michael E. McCullough and Stevens J. Sandage. *To forgive is human: how to put your past in the past.* InterVarsity Press, Illinois, 1997.

The best search strategy and link are verified. Search strategy exercises using keywords and Boolean searching are necessary to access the right information quickly. The search results on the first page should have all the valuable information and links in relation to the question and the search strategy. Marks gained from the exercise given showed how well the students had interpreted the topic and formulated search strategies. In 2009, out of eighty-five students, thirty-one got full mark (36.4%) and nineteen students scored the second highest. A semester project on a major essay was poorly done. Out of a total mark of 40%, forty-nine students (57.6%) scored twenty-six percent and below. They may have found the right information but were unable to communicate effectively in writing. However, academic performance at the end of the year by final year students in 2005 that had studied the unit showed that thirty-two students out of forty-two (76%) had a weighted average of seventy points and above. This is 'C 'grade and above.

"5. E-LEARNING AND ACADEMIC PERFORMANCE"

E-learning as a teaching and learning strategy has provided a lot more opportunities for students in the learning process and may have contributed to their academic performance. Timothy Rodgers [11] confirms that research demonstrates that e-learning can be used to boost academic performance, but it must be well geared to student abilities. How students have become familiar with this mode of teaching and learning here at the PNGUT has not been ascertained. More in-depth research may reveal the relationship between e-learning and student's performance in the various units in the second semester of third year and final year semesters. It is interesting to note that among forty-one students who had taken this unit in 2007, eight students (19.5%) graduated with merit on the 26th of March 2009 as compared to other academic departments. In 2009, thirty-one students out of fifty-five (56.3%) scored a weighted average of seventy points and above whilst in their final year. It is too early to speculate that e-learning has contributed to student's success. However, e-learning shows merit for the future. The university should start to plan for e-learning and if feasible and affordable, adopt it campus wide. Rodgers also confirms that some studies suggest that online teaching methods have a positive impact on performance, for example, through the promotion of greater student centered learning. However, he also points our that other studies suggest that a high level of online teaching can have a negative impact on performance, as it can result in students becoming alienated from the subject matter.

Conclusion

This is an attempt to introduce e-learning to the teaching and learning environment here at the PNGUT. Students need the right information and expect it at the speediest and shortest time possible. However, they have to know exactly what they are looking for by analyzing the unit objectives and choosing the appropriate keywords they can use in searching for additional information to enable them to get a better understanding of the subject matter. The Internet and

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[11] Timothy Rodgers. *A question of style and substance: early learning age, Mar 2009*
http://findarticles.com/p/articles/mi_qa5402/is_200903/ (18/04/2009)

the library online catalogue offer students a variety of information sources and formats. However, without mastering certain information literacy, information technology, critical thinking and decision making skills, searching is futile. This is what BA391(Problem Solving & Self Reliance) unit is offering to the students. They have to master a variety of skills in order to be smart learners and be successful. Further research needs to be undertaken to ascertain whether e-learning contributes to student performance. However, on average, 80% of students over the six year period have responded that the unit has helped them to think better and enhance them with information literacy skills.

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