PROJECT-BASED APPROACH INCORPORATING ICT COMPONENT AND SOFT SKILLS

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ABSTRACT

How can lecturers at institutes of higher learner incorporate the ICT component effectively into their teaching? This paper offers an acquiescent means of achieving that through a project-based approach to teaching with a touch of ICT based on an Intel Teach Program. A project entitled "Improving Oral English Proficiency among Secondary School Students" was assigned to fifty TESL students at UMS. As future English Language teachers in secondary schools, they carried out a series of tasks, such as designing a questionnaire, conducting a survey in schools, reporting findings, preparing a proposal, and conducting a classroom speaking activity. The ICT support was utilised in creating student multimedia presentations, publications, web page, website and evaluation tools. The Intel Teach Program also provided templates for planning the entire project and production of student and teacher support materials. This paper provides clear evidence that instructors can make creative use of technology to impart knowledge to their students and engage them in learning.

Keywords: project-based learning, multimedia, information and communications technology

1. INTRODUCTION

Majority of the institutions of higher education in Malaysia are satisfactorily supported with technology infrastructure and electronic equipment, and well connected to the internet service provider. Instructors and students can reap innumerable benefits from these facilities. As noted by Hawkins, 1997 [1], instructors face problems concerning chronic shortages of time, materials, and professional development. She envisaged that technology holds great potentials that enable the education community to address these problems in new ways. For instance, with the advent of Information and Communications Technology (ICT), the web provides access to an immense amount of information and a virtual world for participants to exchange opinions and ideas, accomplish a task, collaborate in research, or improve global understanding. In addition, today's technology can enhance teaching and learning when it is utilized meaningfully and productively in a project-based approach to teaching and learning.

1.1 Statement of Problem

The most common application of computer technology in teaching is the use of PowerPoint when presenting curriculum contents. This limited application can be expanded with the availability of better internet facilities. Instructors can go beyond the walls of the classroom by connecting students to the real world via the internet. However, if instructors lack the enabling skills in ICT for teaching, the computer or multimedia laboratories may well function as non-technologically equipped classrooms. The technology and electronic equipment lay idle while students wait eagerly to work on the computers in front of them. Unfortunately this enthusiasm may not be met because the instructor may not be adequately equipped with the knowledge and skills in integrating ICT into their current teaching practices.

It is also a common practice among instructors to designate students the routine theoretical assignments that require students to seek secondary data alone. The potentials of students should be challenged sufficiently so that their learning meets the objectives of the course they are studying. As experience is the best teacher, students should be guided to seek first-hand or primary data so that they can compare and contrast their findings with established data. They will then have the possibility to put theory into practice.

The third issue concerns students who are not engaged in their learning, that is they do not spend enough time in their studies due to the hive of activities enticing them and distracting them from their studies. Consequently, their academic performance suffers. These are a few scenarios that may be familiar to both instructors and students. As an effective solution to these problems, a project-based learning approach incorporating ICT is proposed in this paper.

1.2 Aim and Objectives

The general aim of this paper is to share the project-based learning with multimedia (PTBL+MM) experience in the Teaching of Listening and Speaking Course at UMS. The implicit objectives are as follows:

a) to reinforce the potentials of PTBL+MM in promoting the soft skills at institutions of higher education;
b) to emphasise the importance and necessity of training instructors in using PTBL+MM; and
c) to reflect on the effectiveness of PTBL+MM for tertiary education

1.3 Reflective Questions

This paper encourages reflection on the problem-based approach and the use of multimedia in teaching and learning for tertiary education as encapsulated by the following questions.

a) Is PTBL+MM an effective teaching and learning approach for tertiary education?
b) Does PTBL+MM allow the amiable incorporation of soft skills?

1.4 Definition of terms

To avoid confusion over the abbreviation of PBL in the literature, it is suggested that PBL is the abbreviation which refers to problem-based learning and PTBL refers to project-based learning.

The terms, project-based learning with multimedia, information technology, multimedia, and instructor are defined in accordance to the specific context of this paper. To begin with, project-based learning with multimedia (PTBL+MM) is “a method of teaching and learning in which students acquire new knowledge and skills in the course of designing, planning, and producing a multimedia product” [2]. Characteristics of exemplary PTBL+MM include intra or interdisciplinary, student decision-making, student involvement in sustained effort over time, teamwork, connection with the real world, progressive and summative assessments, and use of multimedia as a communication tool [2]. Examples of multimedia products are web page or site, hypermedia stack, computer presentation, computer generated movie, and video program [2].

Secondly, information technology (IT), as defined by the Information Technology Association of America (ITAA) [in 3], is "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware". IT is concerned “with the use of electronic computers and computer software to convert, store, protect, process, transmit and retrieve information, securely” [3]. ICT (Information and Communications Technology) has become a popular term to extend IT to overtly include the field of electronic communication [3]. In this paper IT refers to the support and utilisation of computer-based information systems as well as software applications to assist the preparation of the assessment rubrics and survey instruments, to document the project and to create multimedia products.

Thirdly, the term multimedia means “the integration of media objects such as text, graphics, video, animation, and sound to represent and convey information” [2]. Another closely related term is hypermedia, coined by Ted Nelson in 1992, [in 3]. Hypermedia is the extension of hypertext to include other media - sound, graphics, and video. Ted Nelson in 1965 [in 3] initially used the term hypertext to refer to a collection of documents (or "nodes") with cross-references or "links" that allow the user to shift easily from one document to another with the assistance of an interactive browser program [3]. Since the advent of the World-Wide Web and HTML, "hypertext" is more commonly used than “hypermedia” [3]. The difference between multimedia and hypermedia is the existence of hyperlinks in hypermedia. The former term is preferred in this paper to include products that may or may not utilise hyperlinks.

Last but not least, the term instructor includes all teaching personnel, such as teachers, tutors, lecturers, etc. who are actively involved in generating positive changes among students or learners through education.

2. LITERATURE REVIEW

2.1 Project-based learning

Esch,1998 [4], ascribes the following features to project-based learning. It is a student-centred approach that engages students in authentic, real-world tasks to optimise learning. The tasks stimulate professional situations and take the form of open-ended projects or problems with more than one approach or solution. The instructor plays the role of facilitator or coach while the students work in cooperative groups for extended duration of time. To accomplish the task, students need to acquire information and / or collect data from diverse sources. At the completion of the project, students reflect and evaluate their work. The approach emphasizes on authentic, performance-based assessment.

2.2 Similarities and differences between problem-based and project-based learning

The similarities and differences between these two approaches are discussed due to their same orientation as authentic, constructivist approaches to learning, and conceptual similarity. Although project-based learning is similar to problem-based learning in the many aspects mentioned in the project-based learning section, Esch, 1998 [4] points out that these approaches may be differentiated by the subtle variations in the degree to which an end product or a problem dominates the project. Firstly, project-based learning generally starts with an end product, whereas problem-based learning begins with a problem. Hence, the end product in the former approach is more sophisticated (e.g. a computer animation

piece) and it mobilises the planning, production, and evaluation process. It should be noted that the content knowledge and skills acquired during the production process are equally vital as the end product. On the other end of this continuum, the end product in the latter approach is simpler and more summative (e.g. report on findings) as the learning process emphasis the inquiry and research involved. Secondly, the problem is not explicitly stated in project-based learning and students will acquire problem-solving skills as they try to overcome the problems they face. On the other hand, students focus on the problem given in the problem-based learning approach and devise a solution or a set of recommendations. Therefore the product is the more dominant factor in project-based learning, whereas the problem is more central in problem-based learning.

There are instructional strategies that merge these two approaches, which in fact complement each other. As a result, the boundary between these approaches is frequently indistinct. An illustration of this combination is the TESL project presented in this paper. The students were given a problem regarding the poor oral English proficiency among upper secondary school students at the start of the project. They were required to investigate the causes and propose solutions on how to improve these students' oral English. This adheres to the problem-based learning. However the end product did not stop at presenting the findings of the research carried out by the students to identify the causes of poor oral English proficiency. The students were also required to devise a proposal, create a brochure and a website to publish their work using computer technology (MM). Since the emphasis is on these end products as well, the task is also project-based. Merging the two approaches makes learning come alive and more meaningful to the students. In addition, students are able to apply theories learnt more relevantly to real-life situations.

2.3 Previous Research on PTBL+MM

Findings from past research have revealed the effectiveness of the PTBL+MM in engaging students in their learning, reducing absenteeism, enhancing cooperative learning skills, and elevating test scores [5]. One example is a three-year 1997 study conducted by Jo Boaler [in 5] on the teaching of mathematics at two British secondary schools; one conducted open-ended projects while the other utilised more conservative, direct instruction such as rote learning. The number of students who achieved the top grade at the project-based school tripled that of the other school in a national examination in mathematics. These students were observed to be more analytical and could apply the mathematical concepts in solving problems in mathematics. In another study conducted by the Centre for Research in Educational Policy at the University of Memphis and University of Tennessee at Knoxville in 1999 [in 5] disclosed that the experimental schools where students were taught via the project-based learning and technology out performed the control school students by 26 percent. The students gained higher test scores in all subject areas over a period of two years on the Tennessee Value-Added Assessment System. Furthermore, the findings of a five-year study by the Centre for Learning in Technology researchers, led by Bill Penuel [in 5] showed that students working on a multimedia project exhibited greater responsibility for learning, increased collaboration skills among peer, and higher achievement gains although they were labeled as low achievers prior to the project [5]. The multimedia project involved completion one to four interdisciplinary multimedia projects a year that incorporate real-world issues and practices. These studies and many others have validated the potentials of PTBL+MM and provided concrete evidence to its effectiveness as a teaching approach to enhance learning among students. This is particularly so at the tertiary level of learning due to the dire need to strike a healthy balance between theory and practice.

2.4 Incorporating soft skills in PTBL+MM

In response to the vision of the Prime Minister of Malaysia, YAB Dato' Seri Abdullah Ahmad Badawi, 2006 [6] for the education ministry to produce citizens with first-class mentality, much emphasis has been placed on soft skills at tertiary level. The soft skills encompass aspects such as life long learning and information management; communication skills; thinking and scientific skills; management skills and entrepreneurship; technical/practical/psychomotor skills; knowledge; leadership and team spirit; social skills and sense of responsibility as well as professionalism, values, attitudes and ethics [6]. A PTBL+MM approach renders itself readily to the integration of all these soft skills, the extent of each depends on the content of the curriculum. For instance, students work in teams to solve authentic, challenging problems by deciding the means to solve them and identifying activities to pursue [7]. Students learn to seek information from multiple sources, synthesise, analyse, and acquire knowledge from it [7]. They are assessed by "how much they've learned and how well they communicate it" [7]. Furthermore computer technology is incorporated in achieving the end product. Hence, the skills sought by today's employer comprise many of the soft skills learned through PTBL+MM, including the ability to function well in a team, making thoughtful decisions, taking initiative, and solving complex problems [8].

2.5 Planning and implementing PTBL+MM

Approaches to planning and implementing a successful PTBL+MM project may vary according to the learning contexts which includes the learning goals and objectives, the types of learning activities, as well as the technical support available within the learning environment. A simple six-basic step model advocated by San Mateo County Office of Education [2] can provide a useful and practical framework to realise a beneficial learning experience. These steps are as follows:

1. Decide on the project
2. Draft time frame
3. Plan activities
4. Plan for assessment
5. Begin project with students
6. Finish project and reflect

The initial four steps can be implemented by the instructor alone or discussion with the students prior to the start of the project. The latter is advocated in a learner-centred approach which empowers students to make decisions concerning their learning. When making decisions on the project, several factors need to be considered including the content of the course or programme to be incorporated in the project, scope and major goals of project, multimedia component, as well as any constraints that may hinder or limit the project. Secondly, drafting the time frame includes deciding on the duration of the project and arranging a schedule or setting deadlines to monitor the project. The time frame should be sufficiently flexible to accommodate growth and changes in the project. Thirdly, activities drawn from own experience, selected or adapted from other sources should befit the project and duration. The planned activities should be specified within the schedule so that students can know the appropriate time to carry out the activities. The fourth step involves identifying assessment goals, tools and incorporating the assessment(s) into the time frame.

The fifth step is the implementation of the project which begins by discussing the entire project with the students if they have not been involved in the planning at the initial stage.

While monitoring the students' progress, the instructor should be aware of the feasibility of the activities and schedule so that apposite adjustments could be made to bring the project to completion and help to overcome students' predicaments if any. The final step comprises presentation of product or outcome of project and self-reflection by both instructors and students. The completed product can be presented in class or a special forum and / or published in a website, newsletter or brochure. Self-reflection should focus on the strengths / highlights of the project and suggested improvements for future projects.

2.6 Intel Teach Essential Course

This 40-hour course seeks to train instructors how to apply project-based learning and incorporate the use of technology into their existing curriculum to enhance their students' learning and achievement through research, communication, and productivity strategies and tool [9]. The course includes instructions on devising the unit plan; locating resources; creating student multimedia presentations, publications, support materials for students and instructors, websites; and developing plans for implementation [9].

Although the course generates a variety of products with characteristic features, two unique products will be highlighted, namely the unit plan and the technology tools. Firstly, the unit plan states the learning objectives which are aligned to curriculum specifications. It also specifies the essential, unit and content questions [9]. The essential questions focus on the central theme or issue of a discipline [9]. These subtle questions resurface naturally in the life of the discipline and raise other related questions that lead to fruitful research as answers become increasingly complex [9]. On the other hand, the unit questions comprise more subject- and topic-specific questions that are necessary in framing particular content and inquiry to introduce and provide guidance to the work of the unit [9]. These questions, without an obvious "right" answer, should stimulate thinking and sustain student interest [9]. The content questions are related to the instructor's input and they can be answered specifically. The project should be formulated by focusing on these questions. In other words, the project should be designed to lead students to discover the answers to these questions. When students implement the project, learning occurs simultaneously. The unit plan should possess a goal for students to achieve, specify a certain role to be taken up by students and a multimedia product.

Secondly, the use of the computer as a research tool, a publishing tool, and a communication device should be integrated into the Unit Plan [9]. The selection of the appropriate technology tool depends on the type of content to be presented and the mode of presentation. For oral presentation, various multimedia elements (possibly images, sound, video, hyperlinks to Websites or other files) can be incorporated [9]. Adequate attention and time should be given to content that achieves learning objectives when students use multimedia presentation software [9]. For written communication, publication can take the form of a newsletter or brochure with a combination of text and images, possibly charts and graphs [9]. As a means of communication with a worldwide audience, publication of current information or research via the website would be a most appropriate option. This technology tool enables students to connect to the real world; share their expertise and display their work; communicate with peers, mentors, experts; and even conduct surveys or collect data [9].

3. METHODOLOGY

A five-week unit plan was designed for the Teaching of Listening and Speaking course to teach the speaking component to fifty first-year TESL students of the School of Education

and Social Development, Universiti Malaysia Sabah. The unit plan was developed during a four-day Intel Teach to the Future Essential Course conducted at the school.

3.1 Curriculum-Framing Questions

a) Essential question
   - How can you help learners to speak Second Language (ESL) fluently and accurately?

b) Unit questions
   - What problems do low English Language proficiency learners face when they are asked to speak in English?
   - What classroom speaking activities can be devised to help these learners to overcome their problems and motivate them to speak in English?
   - What short-term and long-term programmes would you propose to improve the speaking skills of low English Language proficiency learners?

3.2 Project Guidelines for PTBL+MM / Teaching of Speaking

The current scenario is that students in most secondary schools are not conversant in English, especially those located in rural areas. As future English Language teachers in secondary schools, you and your team members have been assigned to identify the problems faced by these students and to prepare a proposal on how to improve the oral English proficiency among secondary school students. To achieve this goal, follow the steps listed in the procedure below.

Procedure:

1. Form a team comprising five members.
2. Construct a **questionnaire** to find out the problems faced by low English Language proficiency students in speaking in English and a set of **interview questions** for English Language teachers on teaching oral English.
3. Conduct a **survey** at two secondary schools, one in an urban area and the other in a rural area, to identify the problems using the questionnaire and interview questions. Select fifty form four students who fail their oral English test at each school as respondents for the questionnaire. Interview the English Language teachers teaching English to the selected form four students.
4. Analyse the **data** obtained and identify the **problems** faced by these students.
5. Provide **solutions** (based on the theoretical input on speaking skills) to these problems.
6. Design one **classroom activity for speaking,** and **two programmes**, one short term and one long term, to be implemented in secondary schools in Malaysia.
7. Present the survey conducted, the analysis of data, and recommendations (solutions, suggested classroom activity for speaking, and two programmes) in the form of **PowerPoint**.

8. Create a **web page** for this project to publish the data concerning the problems or the oral English Language needs of secondary school students with low oral English proficiency and proposed soutions. You need to include the questionnaire and interview questions, and later upload your findings as well as proposed solutions, classroom activity for speaking, and the two programmes in a joint-website with other teams.
9. Produce a **brochure** to publicise your project website and distribute copies of the brochure to all secondary schools in Sabah.

3.3 Tools

The tools for this PTBL+MM included Intel Teach to the Future Essentials Course CD-Rom, Microsoft Word, and Microsoft Internet Explorer, Microsoft PowerPoint, and Microsoft Excel. Microsoft Encarta and Microsoft Publisher are optional.

4. RESULTS

4.1 Products

The products by each of the ten groups included a questionnaire for students and a set of interview questions for teachers, analysis of survey data, PowerPoint for problems identified, speaking activity, a short-term programme, a long-term programme, a web page, and a brochure. The website, http://geocities.com/ums.speaking, was a joint-effort among the ten group leaders.

4.2 Students' Reflections

Majority of the students found PTBL+MM interesting, stimulating and challenging. It had offered them an opportunity to visit their future workplace, interact with the secondary school community, and apply theories learnt. They were very enthusiastic when teachers and principals had actually requested them to share the outcome of their survey. There was a minority who commented that it involved much work and time. However these students also realised the significance of carrying out the project when they stated that the exercise was to prepare them for their teaching in the future. In addition, the students found that the multimedia component had given them the opportunity to learn how to use various technologies effectively as tools in the planning, development, or presentation of their project. Furthermore, students had gained more confidence in negotiating their communicative and academic intentions, improved their social skills and learnt to work as a team by practising collaborative skills, such as "group-decision making, providing thoughtful feedback to peers, integrating peer and instructor's feedback, and working with others as student researchers" [8]. The students' reflective feedback was encouraging and motivating despite the problem of time constraint in conducting the survey in the schools due to public holidays, school break, school examination, and Lower Secondary Assessment (Penilaian Menengah Rendah).

4.3 Instructor's Reflections

Throughout the PTBL+MM, the instructor's role was to provide guidance and advice to students. The PTBL+MM had engaged students in many hours of autonomous learning and

practical application of soft skills beyond the limited weekly three contact hours for the course. It was indeed rewarding to learn how students independently overcame the problems they faced while conducting the multi-tasks and a joy to review the products of their labour. The integration of the multimedia component with the course content was realised in the authentic production process. Instead of merely teaching core content of a course from a purely theoretical perspective, PTBL+MM had raised a greater awareness of the issues related to the course and enabled students to "take complex global issues and break them down into specific local action steps" [7]. This PTBL+MM experience in itself was the best teacher. For improved achievement of objectives, it is recommended that the duration of the project should be extended to six weeks or more because a longer period of time is required to bring the project to greater maturity and to validate the effectiveness of the students' proposals.

CONCLUSION

The reflections from both students and instructors provide affirmative responses to the two inquiry questions in this paper. Firstly, PTBL+MM is an effective teaching and learning approach for tertiary education. Secondly, PTBL+MM allows the amiable incorporation of soft skills. The project-based learning with multimedia essentially bridges theories learnt with experience in practical applications which are construed to be more valuable to the learners. Utilising computer technology in education is literally having "the world at your fingertips" to advance information at quantum leaps and bounds. The merging of two approaches, namely project-based learning and problem-based learning, together with the incorporation of technology tools and assimilation of soft skills resulted in an insightful teaching experience for the instructor and an enriching learning experience for the students.

Last but not least, three recommendations are proposed to realize the goal of incorporating four important strands in enhancing teaching and learning, namely project-based learning, problem-based learning, multimedia, and soft skills. First and foremost, Barrett, 2005 [9] emphasised the importance of training instructors by stating "… all the educational technology is worth nothing if teachers don't know how to use it effectively. Computers aren't magic, teachers are." A well trained instructor can further develop their own creativity and that of their students beyond the walls of the classroom by using the capacity of computer technology to stimulate student imagination, and spur them toward better-quality learning [9]. Futrell, 2007 [10] strongly advocated that today's instructors must be equipped with the confidence and competence to effectively integrate technology into the teaching and learning process to keep the flame of students' enthusiasm for learning alive and to fan it to greater heights. It is proposed that instructors be trained via the Intel Teach to the Future Essential Course which is sponsored by Intel as a service to the community [11].

Secondly, coordinators of programmes or courses should synchronise the implementation of PTBL+MM by identifying a minimum of one or a maximum of two PTBL+MM for each semester. In this manner, students would not be overly burdened and the quality of the products can be safe-guarded. As quality is more important than quantity, students would be able to focus specifically on one or two projects without neglecting other courses.

Thirdly, with computer technology, students' work can be compiled electronically as an ongoing portfolio of their creations [7]. The best from this collection can be selected and reviewed by peers and instructors [7]. Other students can further improve on the 'best' and attain higher levels of achievement. Errors would not be repeated and the time gained can be focused on further development. Hence progress can be accelerated. In view of these benefits, a portal for students' projects should be created on the website of every institution

of higher learning so that model pieces of work can be displayed and reviewed by real audiences, not merely a single instructor, class, or school. Students would have the sense of pride over their work and would strive to do better in the future.

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