SUMMARY

Web-based Instruction for Adult Learners: An Asynchronous-based Delivery Model for Formal Lifelong Learning

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1.0 INTRODUCTION

Open and Distance Education (ODE) has accelerated the formal lifelong learning (FLL) in this region. Adult learners are the main subscribers of formal lifelong learning through ODE. However, serving adult learners and conventional learners are two different extremes. According to the Council for Adult and Experiential Learning (CAEL) based in the United States, there are EIGHT principles of effectiveness for serving adult learners as given in the following figure.



Figure 1: Principles of Effectiveness for Serving Adult Learners

Among all the dimensions in Figure 1, the **Teaching and Learning Process** is the important component as it directly involves imparting knowledge to the learners. Nowadays, **Technology** ushers in fundamental structural changes that can be integral to achieving significant improvements in teaching and learning process. Technology also has the power to transform teaching by ushering in a new model of connected teaching. This research is to focus on <u>Teaching & Learning Process</u> and <u>Technology</u> dimensions (from the above figure) for the adult learners. The integration of teaching and learning and technology has led to various learning platforms such as e-learning, online learning, computer supported learning, computer assisted learning, etc. This research will look into web-based instruction (WBI) as a platform to deliver formal lifelong learning for the adult learners.

2.0 WBI: OVERVIEW

Advances in technology have been used to propagate distance education as a system of choice especially for the adult learners. This has led to terms such as e-learning and online learning. Both e-learning and online learning have been used synonymously with Web-based instruction. However, there is a clear distinction between e-learning and WBI, where e-learning refers to the use of any electronic applications and processes for instruction, including CBT (computer-based training), WBI, CDs and so on, whereas WBI is defined as an instruction via the Internet, Intranet, and Web only (Stockley 2012). For the purpose of discussion in this paper, WBI and online learning (or online instruction) will be considered synonymous. The expansion of formal lifelong learning among the adults in recent years, at least in part, due to the rapid growth of the Internet and increased availability of WBI. Web-based instruction (WBI) is becoming a favored training option in industry, government, and higher education (Sitzmann et. al, 2006). For the purpose of this study, a WBI is a asynchronous-based Web learning environment created to not only deliver course materials to learners, but also provides collaboration and interaction using asynchronous-based forum as the main platform to support learners' independent studv (http://olc.spsd.sk.ca/de/pd/instr/indepen.html) and indirect instruction (http://olc.spsd.sk.ca/de/pd/instr/indirect.html). It supports student's self-managed learning by providing an environment with the learning tools, learning materials, and opportunities for contextual and collaborative discussions. Asynchronous-based WBI (A-WBI) is widely adopted compared to synchronous-based WBI due to its flexibility, practicality and cost.

3.0 PROBLEM STATEMENT

According to Kincannon (2000), Web-based instruction is the impetus for the development of distance programs worldwide. This in turn will be a catalyst for lifelong learning activities. The challenge to educators and researchers is to meet the expectations of adult learners who are enrolled in ODE as part of their formal lifelong learning agenda and how to incorporate this Web-based instruction especially asynchronous-based WBI (which is widely adopted) into their teaching practice and still retain their personal definition of high-quality teaching in the Web-based teaching environment. Gilbert (1996) alerted that Web-based instruction requires more thoughtful attention to pedagogy and technology and to the settings in which learning can occur than with conventional education. There is great interest, therefore, in exploring how WBI especially asynchronous-based WBI (A-WBI) **can be designed and implemented** for formal lifelong learning (FLL) as there is no one fixed-way to implement a asynchronous-based WBI in order to deliver FLL to the adult learners.

Researches on online learning and web-based instruction have given more attention to the conventional learners such as work done by Sitzmann et. al (2006), , Johnston et. al (2005) and Jung et. al (2002). Most of these studies have successfully elicited the perception of the conventional learners on online learning. There were little researches done to find out the **perception and preference of adult learners** towards web-based instruction including A-WBI. Therefore there was an urgent need in the investigation of A-WBI in regard to success and perception among the adult learners in formal lifelong learning courses especially for A-WBI. **Gender** is an important factor in formal lifelong learning as learners in formal lifelong learning via ODE are well balanced between male and female. For example, 55% of the adult learners at Open University Malaysia (OUM) are male and the remaining 45% are females. Bekele's (2010) study which investigated the studies carried out on A-WBI, found that the effect of WBI on gender was not clearly demonstrated or insufficiently addressed. This is more so for the adult learners who are engaged in the formal lifelong learning. Therefore, there was an urgent need in the investigation of A-WBI with regards to gender among the adult learners in the formal lifelong learning courses.

Researchers studying the effect of online learning on learners had not given any attention on the impact of online learning or A-WBI on the adult learners' performance in the final examination. **Final examination** which falls as summative assessment is the evidence to which extent a learner has understood the subject matter. On the other hand, researchers studying the effect of online learning on learners had given more attention to factors such as perception and motivation among the conventional learners who are engaged in online learning such as work done by Sitzmann et. al (2006), Johnston et. al (2005) and Jung et. al (2002). The impact of WBI (and also A-WBI) on the adult learners' final examination is unknown.

4.0 **RESEARCH OBJECTIVES**

Based on the problem statements highlighted in the previous section, the objectives of this study are listed below:

- **1** To propose the framework for the asynchronous-based WBI (A-WBI) to deliver lessons for adult learners who are enrolled in formal lifelong learning;
- 2 To implement the framework proposed above;
- **3** To explore overall adult learners perceptions on A-WBI with regards to learning experience, self-managed learning and preference;
- **3.1** To explore on how gender influences learners' perceptions on A-WBI with regards to learning experience, self-managed learning and preference;
- 4 To explore the influence of this A-WBI on the overall learners' summative assessment (i.e. final exam marks);
- **4.1** To explore the influence of this A-WBI on the learners' summative assessment (final exam marks) with regards to gender; and
- **5** To analyze the relationship between learners interaction in A-WBI and the final exam marks.

5.0 SIGNIFICANCE OF THE STUDY

Lifelong learning (be it formal or informal) expands life choices and enhances people's quality of life. Thus, it is a critical thrust in ensuring the success of the nation's economic development. In our (Malaysia and ASEAN) desire to achieve Vision 2020 as a developed nation, it is imperative that lifelong learning be adopted as a New National Agenda in achieving the nation's human capital development. While formal education at universities and colleges remain an important component of the country's education system, the development of human capital can be further enhanced through formal and informal lifelong learning opportunities. Unfortunately, ASEAN nations cannot afford to provide "brick- and-mortar" setup of classrooms for all its citizens as it is too expensive and not pragmatic. Hence, A-WBI proposed in this paper becomes a viable alternative to achieve this objective. On the other hand, merely using A-WBI for teaching and learning does not guarantee effective learning will take place among the adult learners. We should understand on how adult learners perceive about A-WBI and whether it will contribute to the learners' academic performance. These issues will be answered in this paper. Another significance of this study is that it will provide a base for the following model of teaching and learning (Figure 2) in the context of social constructivist especially for formal lifelong learning that caters for adult learners. Socio-constructivist theories of learning have given importance to learners to engage in successful learning. It stresses the complex problem-solving activities for meaningful learning.



Figure 2: Model of Teaching and Learning for FLL courses

6.0 RESEARCH METHODOLOGY

The objectives (1) and (2) of this study are achieved by using design and implementation approach while the interpretive case study methodology approach has been adopted to achieve objectives (3), (4) and (5). Burns (1997) comments that the case studies have a number of purposes or functions within educational research. Due to their intense and subjective nature, he states that they are particularly suited to acting as preliminaries to major investigations by providing a "source of hypothesis for future research" (Burns, 1997, p.365) or by assisting in developing deeper understanding "of the class of events from which the case has been drawn". The methodology in this instance allowed the researchers to gain deep insights into any value the A-WBI held from the students' perspective. Interpretive case study approach had also been used by Falloon (2011) for his study concerning the WBI.

A-WBI proposed in this study had been implemented for CBOP3203-Object Oriented Programming (IT subject) in the May 2012 semester at OUM. A total of 116 learners (Male: 93; Female: 23) had taken this subject in that semester using the blended learning approach. All the adult learners were given access to the A-WBI for their online learning and a limited number of face to face (F2F) tutorials (8 hours). Self-managed learning (SML) constitutes the larger portion of the learners' study time followed by online learning and F2F tutorials. Online learning that occurs through A-WBI is an important component to support learners' SML. There were 15 weeks in a semester in which the learners were engaged in teaching and learning through WBI in week 1 to week 14 and later they took the final exam (summative assessment) in the last week. The following Table 1 shows means to achieve the objectives of this study.

| | Objective | Means to achieve the |
|-----|--|--------------------------------|
| | | objective |
| 1 | To propose the framework for the | Literature Review |
| | asynchronous-based WBI (A-WBI) to | |
| | deliver lessons for adult learners who are | |
| | enrolled in formal lifelong learning; | |
| 2 | To implement the framework proposed | Platform Development |
| | above; | |
| 3 | To explore overall adult learners | Questionnaire |
| | perceptions on A-WBI with regards to | |
| | learning experience, self-managed | |
| | learning and preference; | |
| 3.1 | To explore on how gender influences | Questionnaire (as above) |
| | learners' perceptions on A-WBI with | |
| | regards to learning experience, self- | |
| | managed learning and preference; | |
| 4 | To explore the influence of this A-WBI | Final Examination Marks |
| | on the overall learners' summative | |
| | assessment (final exam marks); | |
| 4.1 | To explore the influence of this A-WBI | Final Examination Marks (as |
| | on the learners' summative | above) |
| | assessment (final exam marks) with | |
| | regards to gender; and | |
| 5 | To analyze the relationship between | Content analysis using Rubrics |
| | learners interaction in A-WBI and the | |
| | final exam. | |

Table 1: Objectives and the means to achieve those objectives

6.0.1 Context of Study: Open University Malaysia (OUM)

This study uses adult learners who were enrolled in the Bachelor of Information Technology Program at Open University Malaysia (OUM) for the course CBOP3203- Object Oriented Programming in the May 2012 semester. As epitomized by its name, OUM has embarked on offering formal lifelong opportunities for self-development of adults while focusing on education, training and development activities. OUM uses the "blended approach" to deliver its teaching and learning activities for the formal lifelong learning. The blended learning in OUM encompasses the face-to-face tutorials, online learning and self-managed learning (Mansor Fadzil & Latifah Abdol Latif, 2010).

6.0.2 Research questions

The following research questions shown in Table 2 guided the data collection process for this study in order to achieve the objectives of this study:

| | Objective | Research Question | |
|---|--|---|--|
| 1 | To propose the framework for the asynchronous-based WBI (A-WBI) to deliver lessons for adult learners who are enrolled in formal lifelong learning; | • What is the effective framework for asynchronous- based WBI to deliver lessons for adult learners enrolled in formal lifelong learning? | |
| 2 | To implement the framework proposed above; | Not applicable | |
| 3 | To explore overall adult learners perceptions on A-WBI with regards to learning experience, self- managed learning and preference; To explore on how gender influences learners' perceptions on A-WBI with regards to learning experience, self-managed learning and preference; | LEARNING Do the adult learners experience a higher level of understanding of the lesson through A-WBI? Do the adult learners managed to achieve the learning outcomes for this course by using A-WBI? Do the adult learners experience learning the subject in a new mode through this A-WBI? Do the adult learners' knowledge increase after going through A-WBI? SELF-MANAGED LEARNING Does A-WBI supports self- managed learning? PREFERENCE It is possible for the A-WBI to become the primary learning source? | |

Table 2: Research questions

| | | Is it interesting to learn the subject through A-WBI? Can Face-to-face tutorial be eliminated as a result of having this A-WBI? Does A-WBI encourage participation from lifelong learners? Is A-WBI in blended pedagogy an ideal way to deliver courses on the lifelong basis? |
|-----|---|---|
| 4 | To explore the influence of this A- WBI on the overall learners' summative assessment (final exam marks); | • Does A-WBI enables the adult learners to perform better in the final exam? |
| 4.1 | To explore the influence of this A- WBI on the learners' summative assessment (final exam marks) with regards to gender; and | • How A-WBI influences adu learners' gender in the fina exam performance? |
| 5 | To analyze the relationship between learners interaction in A-WBI and the final exam. | • Is there a relationshibetween adult learners interaction in A-WBI and the final exam? |

Gender is the independent variable in this study while mean scores of perception for WBI, rubrics and the final examination scores are the dependent variables.

6.0.3 Data collection

At the end of the semester, a questionnaire was distributed to all the 116 adult learners taking this subject in Malaysia. This represents 100% of the population registered for the course throughout Malaysia. 47 learners (40.5% of the population) responded to the survey. The questionnaire had three sections. The first section elicited adult learners' perception of their learning experience in the A-WBI. There were four items in this section. All the items in this section were based on the courseware assessment instrument developed by the Center of Instructional Design and Technology (CIDT) at OUM. The second section has one item which measured adult learners' perception on whether the A-WBI helped their self-managed learning. The third section elicited adult learners' perception of their preference for A-WBI over the face to face interactions. There were five items in this section. All these items were measured in the Likert scale of 1 (strongly disagree) to 5 (strongly agree). Note: The complete questionnaire is given in the full report. In addition, adult learners' final examination marks (summative assessment) were obtained from the Examination Unit of Open University Malaysia. The final exam consists of two sections. The first section (Section A) has five short subjective knowledge-based questions and learners need to answer all the questions. The second section (Section B) consists of five long subjective application-based questions in which they need to

answer any three questions. Data was analyzed with SPSS v14 software using descriptive statistics (mean (M), standard deviation (SD)), Pearson correlation test, one-sample T-test and Independent-samples T-test.

7.0 A-WBI FRAMEWORK FOR FORMAL LIFELONG LEARNING TO CATER FOR ADULT LEARNERS

Based on the authors' own experiences of conducting online courses for almost 10 years and through reference to the work done by Jochems, Merrienboer, Jeroen, and Koper (2003) and Garrison, Anderson and Archer (2001a), online learning in the form of the A-WBI will be effective if it is implemented in an integrated manner that incorporates the following six critical principles so that it empowers the adult learners' learning:

- 1. A-WBI has to take pedagogical and technical aspects into account.
- 2. A-WBI has to be learner-centered whereby learners would be the primary focus of attention as opposed to the traditional emphasis on the instructors.
- 3. The best approach to teaching and learning is the bi-instructional method where online learning is utilized for **independent study** to support self-managed learning (SML) and **indirect instruction** to support peer collaboration, interaction and eliminate isolation.
- 4. Assessment must become an integral part of the A-WBI so that the learners would be able to self-assess themselves and think of ways to improve their assessment
- 5. A successful A-WBI must support instructor presence, social presence and cognitive presence as proposed in the Community of Inquiry (CoI) model.
- 6. A successful WBI must support learner-learner, learner-instructor and learner-content interactions.

Thus, the following framework for A-WBI in Figure 3 is proposed and its implementation is given in Figure 4. (Refer to the full report for detail explanation for Figure 3 and Figure 4)



Figure 3: The Framework of the WBI



Figure 4: A-WBI implementation via myVLE (OUM's Learning Management System)

8.0 **RESULT: ADULT LEARNERS' PERCEPTION OF A-WBI**

As stated earlier, data was collected to elicit the adult learners' perceptions of their learning, self-managed learning and preference using a questionnaire. 47 learners (Male: 34 (represent 37% of the male population), Female: 13 (represent 57% of the female population)) who took this CBOP3203 course in May-2012 semester responded to this questionnaire. This sample represents 40.5% of the entire population. The average age of the respondents was 30.5. The maximum age of the respondents was 41. The reliability level for the items in the questionnaire is high which is 0.901 based on Chronbach's Alpha test. The mean score for all the items (Q1-Q10) in the questionnaire is given below.

| Item in the questionnaire | (| Std. deviation |
|--|----------|----------------|
| | Mean (M) | (SD) |
| Q1 [I experience a higher level of understanding of the lesson through WBI for this subject] | 3.7021 | 0.88256 |
| Q2 [I managed to achieve the learning outcomes for this subject through WBI] | 3.4894 | 0.80413 |
| Q3 [I experience learning the subject in a new mode through WBI] | 3.6809 | 0.86241 |
| Q4 [My knowledge increased after going through WBI for this course] | 3.7660 | 0.83958 |
| Q5 [WBI for this subject supports my self-managed learning] | 3.6383 | 0.81895 |
| Q6 [It is possible for WBI for this subject to become the primary learning source] | 3.4565 | 0.95932 |
| Q7 [It is interesting to learn the subject through WBI] | 3.5532 | 0.92803 |
| Q8 [Face-to-face tutorial can be eliminated for this subject as a result of having this WBI] | 1.9574 | 1.23284 |
| Q9 [WBI such as for this subject encourages participation from lifelong learners like me] | 3.6087 | 0.93043 |
| Q10 [WBI in blended pedagogy is an ideal way to deliver courses on the lifelong basis] | 3.7273 | 1.01989 |



The above table is presented in the graph format in Figure 5 below.

Figure 5: Mean score for all the items in the questionnaire

The result shows that the adult learners gave mean (*M*) scores between 1.96 to 3.77 on the Likert scale of 1 - 5 (1: Strongly disagree; 5- Strongly agree) which indicates moderate responses for all the questions/items in the questionnaire. In addition, all the mean scores shown in Figure 5 are significantly lower than the highest mean score that can be attained (at the p <0.05). Q8 was not encouraging as it was rated 1.96 on the Likert scale. All these mean scores of Q1 to Q10 are significantly lower than the highest mean score that can be attained (at p <0.05). This indicates that there are areas for improvement in the dynamics of the A-WBI and adult learners still preferred face to face tutorials over the A-WBI. This could be in line with the Asian culture where attendance in a classroom is considered a must in the teaching (Miliszewska, 2007).

The analysis of the perceptions according to the gender for all the questions in the questionnaire shows that male has higher mean scores than the female adult learners except for Q8 in which the female learners has higher mean score than the male adult learners. These mean scores (for Q1-Q10 for gender-based analysis) did not differ significantly at the p < 0.05. Detail analysis on the effect of Q1-Q10 with regard to the gender is given in the full report.

8.0.1 Discussion

Overall, the adult learners have moderate perception on A-WBI. Possible reasons for this are discussed below.

The nature of the subject

CBOP3203 is a technical subject which requires problem solving and critical thinking skills with many pre-requisite knowledge chunks (McGill et al., 1997). A-WBI for such subject may need to have support to address these concerns.

No synchronous support

The exclusion of synchronous support in the A-WBI may have prohibited real-time interaction among the learners and between the instructor and learner. Learners may have had problems or enquiries that require urgent and immediate attention from the peers or instructor. Asynchronous tools currently available in the A-WBI do not support such interactions. We hypothesize that A-WBI may need to have certain level of synchronous communication.

General perception on face-to-face interaction

Media Richness Theory (Daft & Lengel, 1986) opined that face-to-face communication is considered to be the richest, while other forms of media are thought to be less leaner based since they have fewer contextual cues and slower feedback compared to face-to-face (Daft & Lengel, 1986). Thus, students even in the online learning environment naturally perceived face-to-face discussion to be faster, easier, and more convenient. In order to get views from the learners on how A-WBI for this subject can be improved, we have randomly interviewed 10 learners. All these learners have highlighted the need to have synchronous communication between learners and instructors in the form of live classroom.

It is also interesting to note that male learners have higher preference for A-WBI than their female counterpart. Learners' viewed A-WBI as supplementary learning and classroom learning as the primary learning method. Nevertheless, female students have less tendency to have face-to-face (f2f) interactions than their male counterpart. Even though the female students have less tendency to have f2f interactions than their male counterpart yet they still have lower perception on A-WBI than their male counterpart. It shows that the female learners prefer to engage in "self-managed learning". This may due to their family commitment. Thus, A-WBI needs to consider this factor and learning through WBI need to be structured so that it motivate the female learners to take part in the learning process via A-WBI.

9.0 RESULT: A-WBI AND ADULT LEARNERS' PERFORMANCE IN SUMMATIVE ASSESSMENT

In order to determine whether A-WBI in this study has contributed effectively towards adult learners learning process with regard to their final examination, we have analysis the adult learners from entire learners' population who took this course. Figure 6 shows the performance of adult learners (overall and based on gender). It can be concluded from the diagram that male and female exhibit similar pattern in the performance in which both of these groups fare badly in the final exam [76% of the male and 90% of the female learners fare badly in the final exam. On the other hand, only 5.6% of the male and 5% of the female learners obtained excellent scores

in the final exam]. Majority of the adult learners are skewed towards left and it is not normally distributed, indicating poor performance of the majority of the learners. This is a reflection of the moderate perception by the learners on A-WBI for the learning outcome and understanding of the subject matter (Q1, Q2 and Q4 of the questionnaire discussed in Section 8.0).



Figure 6: The overall and gender based performance in the final exam (summative assessment) [Entire population]

Overall (from Figure 6), the average (*M*) final exam marks was 23.6% (SD: 24.36). On the other hand, male learners achieved higher mean score (M=24.03%; SD: 24.04) than the female learners (M=19.53%; SD: 23.98) and the means did not differ significantly at the p < 0.05 (p = 0.41). Levene's test for homogeneity of variance was not significant. In order to determine whether there is a correlation between the adult learners perception on the achievement of the learning outcome and understanding of the subject matter, we have conducted a correlation test between the final exam marks with Q1, Q2 and Q4 of the respondents in the questionnaire survey (Section 8.0). The result of the correlation test is shown in the Table 3 below.

Table 3:Correlation test between the final exam marks with Q1, Q2 and Q4of the respondents in the questionnaire survey

| Correlation between Q1 [<i>I</i> | Pearson Correlation | -0.106 |
|---|----------------------------|--------|
| experience a higher level of understanding of the lesson | Significance | 0.500 |
| through WBI for this subject] and | | |
| Final Exam Marks | | |
| Correlation between $Q2$ [I | Pearson Correlation | 0.184 |
| managed to achieve the learning outcomes for this subject through WBI] and Final Exam Marks | Significance | 0.237 |
| Correlation between Q4 [<i>My</i> | Pearson Correlation | 0.046 |
| knowledge increased after going through WBI for this course] and Final Exam Marks | Significance | 0.770 |

It can be concluded in the table above that there is a very weak correlation between the final exam marks with Q1, Q2 and Q4 items of the questionnaire.

The final examination paper for this subject consists of two sections, knowledgebased and application-based sections (as explained in section 6.0.3). Thus, we also conducted further analysis by considering the Section A of exam paper (Knowledgebased questions) and Section B of exam paper (Application-based questions). Figure 7 shows the performance of adult learners (based on gender) for the knowledgebased questions. It can be concluded from the diagram that male and female exhibit similar pattern in the performance in which both of these groups fare badly in the final exam [62.4% of the male and 56.5% of the female learners fare badly in the final exam. On the other hand, only 4.3% of the male and 8.7% of the female learners obtained excellent scores in the final exam]. Majority of the adult learners are skewed towards left and it is not normally distributed, indicating poor performance of the majority of the learners even for the knowledge-based questions.

The average marks for this knowledge-based section was 31% (SD: 24.3). On the other hand, male learners achieved lower mean score (M=30%; SD: 23.5) than the female learners (M=32%; SD: 27.6) and the means did not differ significantly at the p < 0.05 (p = 0.75). Levene's test for homogeneity of variance was not significant.



Figure 7: The gender based performance of all the adult learners in the population for the final exam (*knowledge section*)

Figure 8 shows the performance of adult learners (based on gender) for the application-based or higher-order questions. As in Figure 7, it can be concluded from the diagram that male and female exhibit similar pattern in the performance in which both of these groups fare badly in the final exam [80% of the male and 91% of the female learners fare badly in the final exam. On the other hand, only 6.5% of the male and 4.3% of the female learners obtained excellent scores in the final exam]. Majority of the learners are skewed towards left and it is not normally distributed, indicating poor performance of the majority of the learners even for the application-based questions.

The average (*M*) marks for this application-based section was 19.4% (SD: 27). On the other hand, male learners achieved higher mean score (M=21%; SD: 27) than the female learners (M=13%; SD: 25) and the means did not differ significantly at the p < 0.05 (p = 0.22). Levene's test for homogeneity of variance was not significant.





In order to determine whether there is a correlation between the learners' scores for the knowledge-based questions and application-based questions, we have conducted a correlation test. The result of the correlation test is shown in the Table 4 below.

Table 4:Correlation test between the scores of the knowledge-
based and application based questions.[Entire population
of learners who took this course]

| Correlation test between the scores of the knowledge-based and | Pearson Correlation | *0.642 |
|--|------------------------|--|
| application based questions | Sig. | 0.000 |
| | N | 116 [Entire population of learners who took this course] |
| * Correlation is significant at the 0.0 | 1 level | |

It can be concluded in the table above that there is a strong and significant (at p < 0.001) correlation between these two scores. This is not surprising as the knowledge is the enabler for the higher-order thinking such as application/synthesis of a problem.

9.0.1 Discussion

The main conclusions that can be made from the previous findings in section 9.0 are listed below:

- Adult learners poor performance in the final exam (summative assessment) was a reflection of the earlier moderate perception on A-WBI
- Male and female adult learners have similar performance pattern
- However, male learners have higher mean score for the final exam marks
- The learners score in the knowledge-based questions are strongly correlated with their scores in the application-based questions

We believe the adult learners' performance in the final exam can be increased if we can elevate the learners' perception on the A-WBI. This can be done by increasing the level of knowledge that they will gain in A-WBI as it is capable to influence their higher-order thinking and eventually make the adult learners to be more confident with A-WBI. Based on discussion in Section 8.0.1, we believe that A-WBI can be upgraded by incorporating minimal synchronous communication in the form of live classroom to promote learning experience among the adult learners. Learning is experiencing of a kind. To learn to think, one needs to go through certain processes of inquiring, analyzing and concluding instead of becoming familiar with the conclusions from someone else's investigation. To extend the scope of learning is to create situations which make possible such experiencing in an active state. These processes are usually either completely absent or inadequately developed in the education process which is demonstrated by the ideal of the standardized product and is a concept of learning which emphasizes the acquisition of the right answer through feedback rather than creative inquiry. Learning consists of content that is learnable or adaptable to the students' experiences. When one considers learnabilities it is the adjustment of the curriculum content and the forms of learning experiences in line with the abilities of the learners. For effective learning and suitable activities for students, one must take into account at every point the selection and organisation and also relevant experiences designed to develop the power to discover general ideas and concepts. Students need to learn beyond their powers to master by themselves. Thus it is appropriate that experiences are used as stepping stones towards the end outcome. Live classroom is well positioned to address these issues. On the other hand, in order to be effective, A-WBI must also support Piaget's idea of assimilation and accommodation. Assimilation means kind of matching between the learners cognitive structure and the physical environment. Having only assimilation is not effective as the learners are only assimilating the experiences into their existing cognitive structure. Second concept which is important for the learners intellectual growth is accommodation which is the process by which the cognitive structure is modified. We hypothesize that the inclusion of assimilation and accommodation factors in A-WBI can further boost the learners learning process in A-WBI which incorporation of synchronous communication in the form of live classroom.

10.0 RESULT: INFLUENCE OF ADULT LEARNERS' PARTICIPATION IN THE A-WBI'S FORUM ON THEIR SUMMATIVE ASSESSMENT

Adult learners' interaction with their peers and instructor in the A-WBI takes place in the discussion forum. In order to determine whether learners interaction in the forum have influence their final exam marks, we have randomly selected postings of 40 learners (Male: 31 (represent 33% of the male population), Female: 9 (represent 39% of the female population)) and analyzed the contents of the posting. We are particularly interested in the quality of the posting. The analysis of these posting was done using a quality rubrics which emphasize on the quality of the posting (refer to the full report for the explanation about this rubric). Each learner who is selected in this content analysis will get marks in the range of 0 - 10. 0 indicates poor performance while 10 indicates and excellent participant in the forum. The results of this content analysis is shown in the following Figure 9.



Figure 9: The performance of the respondents (gender-based) in the quality of the postings in the forum

Based on the above figure, 77% of the male and 89% of the female learners fail to post quality messages in the forum. On the other hand, only 8% of the male and 12% of the female learners managed to post quality messages in the forum. The mean score of male adult learners was, M = 20.3%, SD = 28.0, was higher than female adult learners, M = 14.8%, SD = 32.9 and the means did not differ significantly at the p < 0.05 (p = 0.62). Levene's test for homogeneity of variance was not significant.

An interesting discovery was the Figure 9 exhibits similar pattern of those of Figure 6. Thus, we have conducted Pearson correlation test between learners rubric score for the forum's posting and the final examination marks. Result shows that there is good and significant (at p<0.005) correlation between these two dependent variables (r=0.65, p=0.00).

10.0.1 Discussion

Based on the Figure 9, it can be concluded:

- Most of the adult learners (both female and male) did not contribute effectively in the discussion forum available in A-WBI in regard to the "quality of posting"
- Male and female adult learners exhibit same pattern in the quality of the posting
- However, male learners contributed more for the quality discussion. Hence they have higher mean score for the rubric
- An interesting discovery was the Figure 9 exhibits similar pattern of those of Figure 6. Thus, a correlation test was conducted. There is strong correlation between learners' performance in forum (in regard to the quality of posting) and their performance in the final exam.

These findings reaffirm the importance of discussion forum as an important component in A-WBI. However, forum needs to be structured in a way that it can promote meaningful interaction and creative inquiry. This eventually will help adult learners' performance in the summative assessment. Instructors need to give special attention to the female learners so that they can be attracted to engage actively in the forum's discussion. In order to make forum as a platform for creative inquiry and promote higher order thinking, forum needs to be viewed as a "community of Inquiry" as proposed by Garrison (2001) (Figure 10).



Figure 10: Community of Inquiry (CoI)

An educational community of inquiry is a group of individuals who collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding. The Community of Inquiry theoretical framework represents a process of creating a deep and meaningful (collaborativeconstructivist) learning experience through the development of three interdependent elements - social, cognitive and teaching presence.

11.0 IMPLICATION OF THIS STUDY

In today's age of information communication technology, it can be observed that many traditional practices are being tried and replaced with modern alternatives that are perceived as more convenient and effective. It has been indicated by the proponents of the new technologies that it will enable work to become faster and more accurate and studies more interesting and motivating. In countries where access to formal education at universities and colleges is limited, the development of human capital has been further enhanced through lifelong opportunities provided by the rapid growth of the Internet and increased availability of WBI. This current study on the effects of WBI has been limited to a case study at the Open University Malaysia. Though it is difficult to draw implications and form generalisations from one study, we believe the findings from this study do lead to some broader ramifications. Three broad implications can be concluded from this study in the context of A-WBI to deliver formal lifelong learning for the adult learners.

First, the study has shown that the female sample was the high risk group in A-WBI as compared to the male counterparts. The proliferation of information technology presents implications on the issue of access to education. Adult learners whose homes are beyond any commutable distance to college or university have found the real enrolment options. For these students, particularly women, time available for study comes only in the middle of the night where new technologies present a breakthrough access. Thus their preference for participation in online forums and any face-to-face activities was lower than what was accorded by the males.

Secondly, Asynchronous WBI as envisioned in this study must also support synchronous communication (Live Classroom) to reinforce assimilation and accommodation of the adult learners. Many educators make commitments to the Vygotskian (1978) notion of a zone of proximal development (ZPD) (Puntambekar and Hubscher 2005). The ZPD is defined as the "distance between the child's actual developmental level as determined by independent problem solving and the higher level of potential development as determined through problem solving under adult guidance and in collaboration with more capable peers" (Vygotsky 1978). Enabling the learner to bridge this gap between the actual and the potential requires the provision of support structures, which need not necessarily be in the form of a more capable person (e.g., a teacher, expert) but may also include tools such as WBI. It is not surprising then that the concept of A-WBI was eventually linked with the notion of ZPD.

Third, the learners' high-order thinking is strongly influenced by the knowledge they have on the subject matter. Thus, A-WBI should position itself as a knowledge creator. Finally, discussion forums remain as an important tool in A-WBI. It is the predictor that can determine upfront the prospect learners' performance in exam. Thus, early intervention can be done by the instructor. This will reduce the attrition rate. John Keats once stated that nothing becomes real until it is experienced. Thus the pursuit of education should be pursued as a means to a practical end which is

translated in different ways by the students according to their education, environment and career goals.

Summary

In this paper, an A-WBI that supports three modes of interaction, namely peer-peer, student-instructor and student-content was introduced capitalizing on the asynchronous mode of communication. A-WBI with its egalitarian environment of open access provides greater opportunities for the learner particularly the adult learner. Learner-centered educational opportunities through the use of A-WBI could satisfy learners' need for convenient offerings and at the same time maximize the use of online learning. This will invariably reduce the physical presence in the classroom environment. A-WBI also implies that there is less dependence on rote learning, repetitive tests and a 'one size fits all' type of instruction and more on experiential discovery, engaged learning, differentiated teaching and the building of character through innovative and effective teaching approaches and strategies (http://www.moe.gov.sg/about/yearbooks/2005/teach.html). In doing so, the elements of content, interactivity, collaboration and assessment become the pillars to realize the concept of the A-WBI.

For effective implementation, the various technological features must function efficiently and furthermore should be used effectively by the students. Students need to know how and when to use these technological features and they need to see a perceived benefit when using them. It must also be noted that in formal lifelong learning courses, design and assessments are new factors to be considered. But invariably the key factor in any teaching learning situation is effective instruction based on grounded pedagogical theory. In this article on the use of the A-WBI environment for the teaching and learning in formal lifelong learning, this would be possible as indicated by the learners' evaluation. However, the model needs to be further refined and defined so that A-WBI becomes the primary source for learning and subsequently classroom learning can be considered an alternative for the both male and female adult learners. This can be achieved if recommendations given in this paper are incorporated in A-WBI. This will be our focus for the future research work.

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