



AUTHENTIC PROBLEM-BASED LEARNING FOR INCOME TAX ACCOUNTING STUDENTS

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ABSTRACT

The study is an outcome-based education in the form of Authentic Problem Based Learning (APBL). Six guiding principles were adapted: Authenticity, Constructivist, Motivation to learn, Meta-cognitive Processing, Integration of new knowledge acquired and Multi-disciplinary. These principles formed as basis in the development of student's higher level skills in integrated knowledge, problem-solving, self-directed learning and collaborative team skills. The application of APBL was divided into three modules; (1) simulation of real tax problems for different taxpayers (2) accomplishment of Income Tax Returns (3) comprehensive computational case problem on annual income tax liability. The APBL was an experimental research and exposed the students on authentic tax cases. The level of student satisfaction on APBL using a four-point Likert Scale resulted an overall 3.34 mean ratings (between meet and exceeds expectations) across the four learning skills. The statistical measurement on ANOVA and Wilcoxon generated the following findings; (1) for ANOVA, there is no significant difference between group evaluations of student on actual application of APBL (2) While based on Wilcoxon test, there is significant difference in the results of pre-test and post-test with Asymp. Sig. = .001. Post-test of participants are significantly higher than their pre-test scores. Thus, the intervention is effective.

Keywords: *Authentic problem-based learning, Income tax accounting, ANOVA, Wilcoxon*

1. INTRODUCTION

The researcher proposed an innovative learning by placing students in a proto-type real work situation to develop their problem-solving skills, flexibility, creativity, integrated thinking and collaborative group efforts. The traditional classroom set-up based on book content is no longer sufficient. The corporate world talks about performance outcomes and competencies. Thus, academic institutions should respond to the demands of fast changing knowledge-driven world and should interact with the business community. The study aims to know the level of student satisfaction on the application of APBL modules and if there is a significant difference in the result of the pre-test and post test conducted to a closed group of income tax students.

Authentic learning is a hands-on experience of what the real-world offers to graduates, it involves encountering complex problems and solutions without the aid of nobody (Reeves 2006; Ting, Rui & Jie, 2015. According to Lombardi (2008) students are highly motivated by solving real-world problems. Elaborating learners preferred doing rather than just listening that even most educators consider learning-by-doing the most effective way to gain knowledge. While for Birmingham (2012) apprenticeship provides greater opportunities and meaningful experiences for all walks of life in learning new skills that enhance career prospects and improve productivity.

Larmer (2014) of the Buck Institute for Education in an article for Edutopia defined four ways in which a problem-based learning can be authentic: (1) meets a real business world need (2) focuses on an issue relevant to students' lives (3) sets up a scenario that may not be real, but is realistic (4) uses an effective tools and processes for teaching to be employed by professionals in their corresponding fields. To visualize in Authentic Problem-Based Learning (APBL) under the instructor's assistance in a small learning team,

learners solve problems together, acquire knowledge and skills together and through exchange of ideas and group argumentations they will transform as independent learners in the process little by little the educator fades away (Wee Keng Neo & Kek Yih Chyn, 2002).

The previously mentioned authors eloquently discussed the necessary components of APBL:

- (1) Problem Development – the closer the simulation of a problem which resembles the commonly encountered problems at workplace, the more effective it will be.
- (2) Information - in APBL the learners are not given resources to be studied, they have to look for information on their own, contest and validate what information could solve the problem hence, reiteration of information occurs resulting to integration of knowledge in the learner's mind together with other vital issues they have associated in dealing the problem and on the long-term, will be able to recall with similar problems in the future.
- (3) Self and Peer Assessment – they need to verbalize, objectify and organize what they have learned, during the process the learners generate positive and negative feedbacks as they carry out brainstorming activities at the end of every problem and at the end of the curriculum unit a student reflection will be required and formal peer evaluation will be generated to assess the level of team collaboration.
- (4) Tutor Training - the wealth of industry experience, innovative thinking and creating the right amount of challenge to students plus giving the spotlight to the learners will lead to the success of APBL.
- (5) APBL Learning Platform – the learning outcome must be defined first, followed by designing of the problem then the development of evaluation tool or rubrics.

Student-Centered Learning

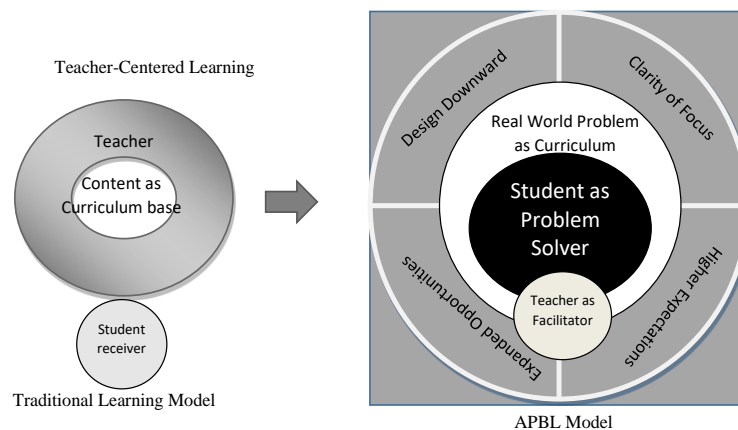


Figure 1. Traditional vs. Authentic Problem-Based Learning Model pattern from Outcomes Based Education. In APBL curricula, the student is the center of learning where they practice “just in time” learning by seeking relevant knowledge to solve the problem at hand (Wee Keng Neo & Kek Yih Chyn, 2002, pg. 26-27).

Albrecht and Sack (2002) concluded that a significant gap exists between practitioners and educators in the perceived importance of the knowledge and skills for inclusion in didactic design. Traditional approaches rely excessively on memorization and lecture, and are overly reticent to develop experimental learning prototypes that promote lifelong skill attainment. In innovative learning, the focus is on skill development using six underlying principles of; Authenticity, Constructivist, Motivation to learn, Meta-cognitive Processing, Integration of new knowledge acquired and Multi-disciplinary (Wee Keng Neo & Kek Yih Chyn, 2002). Authenticity is viewed by Grabowski and Rasmussen (2014) as a state when a person or group



or persons can apply acquired information or learning activities to their own everyday lives in a meaningful way. On the other hand, Constructivist learning calls on the creation of the student's own understanding and not merely adopting other people's thoughts and interpretations by comparing new knowledge with their own previous knowledge through continuous and progressive learning experiences (Morshead 1995; Milner2008). While Motivation to learn flows fluidly when confronted with real work problems enticing students to solve as they sense the relevance of these problems in preparing them to be real work ready (Wee Keng Neo & Kek Yih Chyn, 2002). In addition, Meta-cognitive thinking induces students to formulate questions, explore possible ideas, challenge their own ideas or criticize the ideas of other group members, reflecting on the process and most importantly, appraise the learning outcome (Sun, 2013; O'Malley & Chamot, 1990; Oxford, 1990). Further, Integrated Knowledge occurs after a learner performed numerous rounds of reiteration till confidently satisfied with their own solutions (Wee Keng Neo & Kek Yih Chyn, 2020). Lastly, Multi-disciplinary in the context of linked learning approach refers to instructional method of a teacher to organize learning process so that students are encouraged to make meaningful connections across subject areas (as published by the California Center for College and Career, 2010).

2. MATERIALS AND METHODS

The study is quantitative in nature and experimental. ANOVA was used for the analysis of student's evaluation of APBL modules. Then, Wilcoxon test of ranks was employed to determine the effectiveness of APBL on the pre-test and post-test analysis. The actual application of APBL was facilitated to 40 students. Wherein a Likert Scale Student evaluation form was utilized to assess the effectiveness of APBL modules/activities conducted. The instrument was pattern to the adapted from the 21th century skills standards rubrics. The students evaluated the effectiveness of the three modules using a Likert Scale across the four targeted skills; (1) Development of self-directed learning skills (2) Development of problem solving skills (3) Development of integrated knowledge (4) Development of team collaboration. The ratings for the Likert Scale are 1 to 4 and 4 as the highest or equivalent to exceed expectations while a rating of 1 denotes student's assessment on APBL modules "needing major improvement". The average student group evaluation served as an input for ANOVA.

The second quantitative statistical method is the Wilcoxon test of ranks between pre-test and post-test. The Wilcoxon signed rank test is used within-subjects design with data that are at least ordinal in scaling. It is the equivalent nonparametric test of paired samples t-test. It is usually used when there is a violation of the normality assumption or when the data are not of appropriate scaling. Clearly, the assumptions are: (1) The scale of measurement within each pair must be at least ordinal in nature (2) the differences in scores must also constitute an ordinal scale.

The actual application of APBL was divided into three modules; (1) simulation of real tax problems of taxpayers for sole proprietor, partnership and corporation (2) accomplishment of Income Tax Returns (3) comprehensive case problem and situational computation on annual income tax liabilities. The success of APBL is highly dependent on the creation of "authentic situational income tax problems" similar to what is encountered in the real business world, a problem based that would entice student to create their own learning experience, gather and validate their own information and not dependent on what the teacher feeds, connects and applies previous knowledge, identify the real problem and resolve the dilemmas not on their own but as a team just like how the real working environment works.

All through-out group discussions or brainstorming a video recording was required as form of transcribing tool. Lastly, the observations of the tax educator during the implementation of APBL were documented including the summarized results of activities/exams/caselets and simulated application of real-life tax problems. Findings and conclusions gave substance on this research paper.



3. RESULTS AND DISCUSSION

3.1 Results on the level of student satisfaction on the application of APBL module

It can be gleaned from the ANOVA table that the null hypothesis that there is no significant difference in the student self-evaluation based on APBL among the eight groups, thus H_0 is not rejected all sigma across the four targeted learning skills are higher than 0.05 ($p < .05$) for self-directed learning ($S1=0.648, S2=0.423, S3=0.139$), problem solving skills ($P1=0.057, P2=0.116, P3=0.058$), integrated knowledge ($K1=0.070, K2=0.920, K3=0.440$) and team collaboration ($C1=0.085, C2=0.115, C3=0.802$).

Table 1. Summary of 40 students evaluation results on the application of APBL using ANOVA, wherein S=self-directed learning skills, P = development of problem solving skills, K= acquisition of integrated knowledge, C= development of team collaboration.

		Sum of Squares	df	Mean Square	F	Sig.
S1	Between Groups	1.336	7	.191	.730	.648
S2	Between Groups	2.206	7	.315	1.041	.423
S3	Between Groups	3.842	7	.549	1.728	.139
P1	Between Groups	3.024	7	.432	2.251	.057
P2	Between Groups	3.936	7	.562	1.835	.116
P3	Between Groups	4.340	7	.620	2.239	.058
K1	Between Groups	4.442	7	.635	2.127	.070
K2	Between Groups	.853	7	.122	.357	.920
K3	Between Groups	2.906	7	.415	1.015	.440
C1	Between Groups	3.659	7	.523	2.017	.085
C2	Between Groups	3.353	7	.479	1.837	.115
C3	Between Groups	1.259	7	.180	.534	.802

3.2 Results on the Assessment on the pre-test and post-test

A pre-test was conducted at the beginning of semestral school year 2016-2017 to third year Accounting Technology students and at the end of the said semestral a post-test was also conducted . Based on the results of Wilcoxon rant test, $N(35) = W(12)$ critical value is less than the value of N or the number of participants excluding zero results. Thus, there is significant difference in the result of pre-test and post-test. The critical value is the lower between the positive and negative ranks. Further, based on Wilcoxon signed rank test based on negative ranks, there is a significant difference in the pre-test and post-test with Asymp. Sig. = .001. Post-test of participants are significantly higher than their pre-test scores. Thus, the intervention is effective.

4. CONCLUSION

Learning is a two way process, in the experimental study, the student became the lead actor in the classroom and as learning drifted the educator shifted as a mere facilitator. Discussions shifted from the educator to the student and authentic learning transpired based on the acquisition of high level skills on integrated knowledge, problem-solving, self-directed learning and collaborative team skills. The APBL generated a high level of satisfaction from the student participants based on 1 to 4 ratings, 4 as the topmost rate; Development of self-directed learning skills (3.60), Problem Solving Skills (3.45), Acquisition of integrated knowledge skills (3.28) Development of Team Collaboration (3.01), and there is a significant difference in



the result of the pre-test and post test conducted to a closed group of income tax students, with Asymp sigma of .001 the intervention is effective.

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