Can Problem Based Learning Improve Academic Performance?

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This study delved into the effectiveness of Problem-Based Learning (PBL). Specifically, it attempted to find out if the adoption of PBL can do better than other methods, in enhancing academic performance and an experiment, in which 56 first year Economics students of Kampala International University (KIU) were categorised into experimental and control groups, was used. Before the treatment, a pre test on what the students knew about unemployment was administered to all. The mean score of the experimental group in the pre-test was slightly higher than that of the control group. But the difference was not statistically significant. Using the PBL approach, the experimental group learnt about unemployment for a month. The control group was also lectured for a month on the same topic. At the end of the treatment, a post-test was administered to the two groups. The mean score of the experimental group went up by 22.61 marks while that of the control group increased by 20.96 marks. The difference in academic gains of the experimental over the control group was evaluated using the t-test. The difference was found not to be significant at 0.05% level of significance. Implications are that Economics teachers should not regard the PBL approach—the new fad in teaching methods—as the "magic wand" that could raise the level of academic performance, but to always discern the most suitable method(s) for one to adopt under different situations.

Introduction

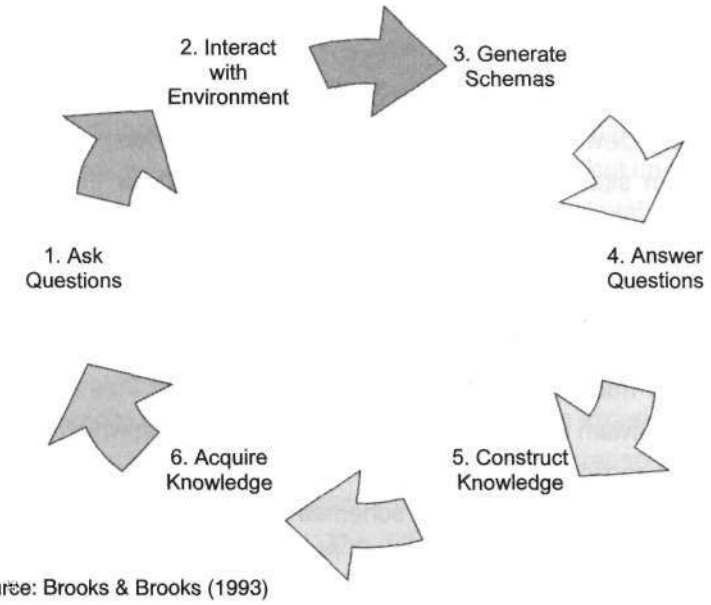
Problem Based Learning, or learning based on what one experiences, is a method of knowledge acquisition in which the learner constructs knowledge, not from what he/she is taught, by a teacher, but from what he/she personally experiences in his/her attempt to solve real life problems. It is underpinned by the theory of constructivism. According to Vico cited by Edward & Mercer (1987), human beings can only clearly understand what they have themselves constructed. John Dewey (1859-1952) contends that knowledge and ideas emerge only from situations in which learners have to draw them out of experiences that have meaning and importance to them (Devries et al., 2000).

Psychologist Jean Piaget observed that people tend to remember more whatever is learnt from the experiences of what they have themselves put together. Constructivism views learning as an active process in which learners actively construct knowledge as they try to comprehend their world. Each of us generates his own mental models or schemas through which he/she makes sense of his/her experiences. According to Piaget, learning is just adjusting our mental models to accommodate new experiences (Schmidt, 1983).

The radical constructivists hold that cognition serves to organise the learner's experiential world rather than to discover the ontological reality. This is to say that it is not the nature of existence per se that is important for cognition to take place but the way the learner perceives that existence. To a constructivist, the leaner asks questions on a given problem, he/she then begins to interact with the environment. This could be free or structured interaction. In his/her interaction, the learner begins to sense relationships. According to Owolabi (2000: p.68) the realisation of these relationships constitutes a landmark in the process of concept formation. The leaner then begins to generate mental models, schemas, of how to resolve a given problem, interprets his experiences to answer his/her questions and by so do doing, constructs and acquires new knowledge.

Indeed, the Stone Age people must have been developing schemas, when interacting with their environments, for answering questions bugging their minds. This is the idea on which PBL is based.

Figure 1: Constructivist Model of how Knowledge is acquired



Source: Brooks & Brooks (1993)

If the learner wants to know how the prices of maize are determined in the market, for example, he/she visits the market to observe the selling and buying of maize over a period of time. He/she sees how the supply of maize increases more than demand in season and how the price drops. When the supply of maize is more than what the buyers need, there will be a glut in the market. Some sellers would compete for selling by reducing their prices. Other sellers would follow suit, for every seller is desirous of selling out and returning home. The learner also notices how the supply reduces more than demand out of season and how the price rises. He/she then realises that the prices are determined by the market forces of demand and supply. He/she constructs the knowledge him or herself and internalises it. This process resembles the systemic approach to resolving problems or meeting challenges that are encountered in life and career

The test statistic has a t-value of 1.03 and, with (N1+N2-2) 54 degrees of freedom, the critical value of t was found to be 2.00. To be significant, the obtained from the data must be equal to greater than 2.00. Therefore, the difference between the post-test gains in academic performance was not statistically significant. The researchers had to accept the null hypothesis. This indicates that no difference will be noticed in the mean scores of the experimental and control groups in 95 out of 100 replications of the experiment. This suggests a 95% probability that any difference observed was not due to experimental treatment but due to sampling error.

Discussion

The process of knowledge acquisition involves both students and teachers. There is interplay of teacher activity and student activity. These two types of activities can be placed along a continuum. At one end teacher activity is dominant and at the other end student activity dominates (Tamakloe et al., 1996). At the end of the continuum where the student-dominated activity is located is where **PBL** could be placed. **PBL** is a method of knowledge attainment. An extensive body of literature shows that it can be an effective way of acquiring knowledge (Barrows & Tamblyn, 1980; Brown, Collins & Newman, 1989; Finkle & Torp, 1995; Omstein, 1995; Boud & Feletti, 1991; Wilson et al, 1996; Engel, 1997; Samford, 1998; Aggarwal, 2000; Savin-Badin, 2000; McDonald & Isaac, 2001; Kachhar, 2002; Bransford & Brown, 2002; and Yoakan & Samposon, 2002).

In this study, PBL proved to be effective. After employing the method, the post-test gains in students' academic performance was positive—the score increased by 22.61. Even though some people claim that students do react to the idea of PBL with shock, anger, denial and resistance (Schmidt, 1993) for they might be taking it to be a ploy of the teacher to shrink his or her responsibility of teaching, not many studies have found the method to be counter productive. Cooper & Sweller (1987) only found that if the method is introduced too early in the learning process it becomes a less effective instructional strategy. But can we conclude that because it has generally been found effective then it is a better than any other method? This study did not find it significantly better.

There appears to be no basis for

topic to be learnt. To discern the most suitable method for a teacher to adopt under different situations is the art that should be acquired by the trained teacher.

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