

EFFECT OF PROBLEM-BASED LEARNING ON SECONDARY SCHOOL ECONOMICS STUDENTS CRITICAL THINKING AND COLLABORATIVE SKILLS IN BAUCHI LOCAL GOVERNMENT AREA, BAUCHI STATE

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Abstract

This study was carried out to examine the effect of problem-based learning on secondary school Economics students critical thinking and collaborative skills in Bauchi Local Government Area, Bauchi State. One objective, research question and hypothesis were formulated to guide the study. The research design for this study was quasi experimental, pre-test and post-test, experimental and control group design was used for the study. The population comprised all 1809 senior secondary school Economics students in Bauchi Local Government Area and a sample consisting of 118 students were randomly selected from two coeducational schools was used for the study. The experimental group was taught Economics concepts using problem-based learning while the control group was exposed to teacher-centered method. Social Science Problem Based Learning and Collaborative Skills Test (SSPBL CST) adopted by the researcher was validated by experts and pilot tested for reliability. T-test statistic was used to analyze the data collected. The results of the study revealed that SSII secondary school students who were exposed to treatment (PBL) had positive behaviour change towards critical thinking and collaborative skills than those who were not exposed to treatment. Based on the research finding, it was recommended that the use of problem-based learning should be encouraged among teachers of Economics to improve students' critical thinking and collaborative skills.

Keywords: Effect of PBL, Critical Thinking, Collaborative Skills

Introduction

Traditional education, which is based on and described as teacher-centered has been criticized for its failure to assist students in the development of skills necessary for success in the 21st century. These skills include critical thinking, problem solving, creativity, communication, and problem solving, among others. According to Abdullaeva et al. 2020 and Overton (2011), these are essential abilities for learners to possess in order to be successful in the professional and business environments of the 21st century.

When students are taught using a method that is teacher-centered, the instructor maintains authority over the students' educational experiences, including what they learn, how they learn it, when they learn it, and for how long they learn it (Febriana et al., 2017). The curriculum and the schedule of lessons are determined by the instructor (Tang et al., 2020). When employing this approach, there is a possibility that some students will be overlooked either because their requirements might not be addressed by the topics that are being covered or because they might require more assistance than can be provided during regular class hours (Overton, 2011). When students are not given the opportunity to have influence on their own work or to learn at their own pace, they are more likely to become bored in the classroom, which can result in more disruptive and aggressive behaviour (Suryaningtyas et al., 2020). Traditional teacher-centered classrooms typically centre their curricu-

lum around lectures, which offer students few opportunities to acquire knowledge through hands-on experience or collaborative endeavours.

Students' centered methodology like Problem-based learning (PBL) incorporates more active, collaborative learning strategies and encourages students to apply their knowledge to real-world scenarios in order to solve problems, which helps them retain information better and develop critical thinking skills (Kasemsap, 2021). The fact that PBL can be implemented by educators across grade levels and subjects makes it an attractive option for teachers looking to shake up the way they teach.

Learning through problem-based learning, or PBL, is an alternative to learning through listening to lectures. Students are given the opportunity to use their creativity while also giving serious consideration to the manner in which they intend to solve the issue at hand (Lemke, 2001). Everything a student learns through PBL can be applied in some way to real-world situations; there is no time wasted, and there are no shortcuts (Tang et al., 2020). Because an individual cannot just look up an answer online and claim that they already know it, there are less options for cheating as well. Learning is also made more entertaining by using PBL. Learners are not required to passively take in lesson after lecture since they are always engaged in their work, which implies that it is impossible for them to not be interested in what they are doing (Febriana et al., 2017).

Learners in traditional classroom settings are given instructions followed by an opportunity to demonstrate their mastery of the material. They are not required to engage in critical contemplation of their choices prior to making them, which might lead to complications further down the road (Overton, 2011). When utilizing this method, the importance of 21st-century skills such as creativity, communication, working together with others, and critical thinking is minimized. Because the teacher is providing them with all of the information, it can be more challenging for children with special needs or impairments to achieve success (Febriana et al., 2017). These learners require a learning environment that encourages exploration and places an emphasis on achieving their goals via their efforts.

The following are the reasons calls for the need to reform teaching from traditional teacher centered to PBL:

- 1) Emphasizes transferable skills in the 21st Century such as creativity, communication, collaboration and critical thinking;
- 2) Is more challenging to the student's brain than simply listening to someone speak;
- 3) Allows all students equal opportunity to participate without discrimination;
- 4) Provides a safe space for each learner to explore outside of his/her comfort zone.
- 5) Offers constructive feedback.

Statement of the Problem

Nigerian students are recognized to perform better than their counterparts in international economics examinations (Fan & Zhu, 2004). Even though they had good grades, this does not suggest that the way economics is taught or learned in Nigeria is flawless. Leung (2018) shown that Nigerian students are exceptionally skilled in resolving economic problems that are considered to be routine, but that they have a more difficult time with problems that do not fall into this category. They are also less likely to take chances or come up with innovative solutions to challenges. Economics classrooms have also been criticized for having the teacher take the majority of the students' attention and for having a low student participation rate. The traditional Nigerian method of teaching economics places a significant amount of focus on both basic knowledge and basic abilities, as well as a significant amount of stress on rote memorizing of economic concepts (Zhang, 2006). Tang et al. (2020) found that the "authoritative master" role of the instructor was an essential component of the Nigerian educational system for economics, highlighting the significance of maintaining control. Students are not

given the opportunity to collaborate with one another in order to find solutions to any of the issues that are presented in traditional methods of instruction, such as learning by rote repetition. It also makes it more difficult for children to develop the ability to think creatively. Students are not encouraged to think critically about a topic through the use of textbooks, lecture demonstrations, or presentation in lecture.

Problem based learning is an approach to teaching and learning where students are presented with a challenging problem or issue and their task is to solve it through a series of investigations and explorations. These explorations lead to lessons that foster higher order thinking skills in students like critical thinking and problem-solving abilities. In addition, problem-based learning supports collaborative skills of working together as a team to reach a solution by sharing ideas among team members. This method of teaching and learning can be used in any subject area but it has been used most frequently in science, technology, engineering and mathematics (STEM) education. Research has shown that students who use problem-based learning methods have greater gains in academic achievement than those who do not use these methods.

However, there is little research on how problem-based learning can be implemented in Nigerian schools. To explore whether problem-based learning can lead to improvements in critical thinking skills, problem solving abilities and collaborative skills of Nigerian students in secondary school. This study focuses on SSS2 students from two different secondary schools in Bauchi, Nigeria.

Purpose of the Study

The study intends to ascertain whether or not using problem-based learning instruction will enhance economics students' critical thinking and collaborative skills. The study specifically wants to:

Find out whether problem based learning instruction will enhance economics student critical thinking and collaborative skills?

Research Questions

- i. How would problem based learning instruction enhance economics student critical thinking and collaborative skills?

Hypothesis

The null hypothesis was formulated and tested at $P \leq 0.05$ level of significance.

H_{01} : There is no significant difference in the critical thinking and collaborative skills between students exposed to problem-based learning and those exposed to teacher-centered method.

Methodology

The philosophy that serves as the conceptual underpinning for this investigation is known as positivism. This school of thought is predicated on the proposition that the results of observations carried out in the real world can be generalized and that predictions can, for the most part, be relied upon to be accurate. As a result of the fact that the purpose of the study is to determine the impact that PBL has on students' critical thinking, and collaboration skills, the approach that will be used is going to be quasi-experimental. It will include the utilization of two groups, namely the control group and the experimental group. The control group will not receive any treatment, while the experimental group will receive treatment in the form of lessons for a period of at least six weeks. This will be done while the other group does not receive lessons

After the six week of teaching experience with PBL, the students in both the control and experimental groups will be given a standardized test to measure their critical thinking skills and collaborative skills. This is with a view to see if PBL has impacted on the students in the experimental group. That is, it is expected that students in experimental group should exhibit more critical and collabora-

tive skills. The sample schools were GDSS Gwallameji and GDSS Bakari Dukku. SS II intact classes were used with a population of 56 for GDSS Gwallameji and 62 for GDSS Bakari Dukku respectively. The instrument used was Social Science Problem Based Learning and Collaborative Skills Test (SSPBL CST) made up of 20 items. The instrument was validated by experts and the reliability was found to be 0.74. The experimental group was taught using problem-based learning instruction while the control group was taught using teacher-centered method for six weeks. The data collected were analyzed using mean, standard deviation and t-test statistics at $P \leq 0.05$ level of significance.

Results

Research Question One: What is the difference in critical thinking and collaborative skills between students taught using problem-based learning and those taught using teacher-centered method?

In order to answer this research question, a descriptive statistic of mean scores and standard deviation were used.

Table 1: Summary of Posttest Mean Score for Critical Thinking and Collaborative Skills for Experimental and Control Group

| Groups | N | Mean | Std. Dev | Std. Err | Mean Diff |
|--------------|----|--------|----------|----------|-----------|
| Experimental | 56 | 52.650 | 7.2589 | 1.3253 | 11.167 |
| Control | 62 | 41.483 | 3.9072 | .7133 | |

In table 1 the results showed that there was difference in critical thinking and collaborative skills when students were exposed to problem-based learning and teacher-centered methods. Their computed mean critical thinking and collaborative skills was 52.650 and 41.483 for the experimental and control groups respectively indicating a mean difference of 11.167 in favour of the experimental group. This showed that the group exposed to problem-based learning have higher mean score for the acquisition of critical thinking and collaborative skills than their counterparts taught using teacher-centered method.

Hypothesis testing

Ho₁: There is no significant difference in the critical thinking and collaborative skills between students exposed to problem-based learning and those exposed to teacher-centered method.

To answer the null hypothesis, t-test was used for the analysis at $P \leq 0.05$ level of significance for retaining or rejecting the null hypothesis.

Table 2: Independent t-test Statistics on The Difference in Critical Thinking and Collaborative Skills in Experimental and Control Group

| Groups | N | Mean | Std. Dev | Std. Err | Df | P | Remark |
|--------------|----|--------|----------|----------|-----|-------|--------|
| Experimental | 56 | 52.650 | 7.2589 | 1.3253 | 116 | 0.001 | S |
| Control | 62 | 41.483 | 3.9072 | .7133 | | | |

$P \leq 0.05$

The results in Table 2 indicates that the p-value of 0.001 was observed at $df=116$. Since the p-value is less than the alpha value of 0.05, it means therefore that the difference in critical thinking and collaborative skills when students are exposed to problem-based learning and teacher-centered method was significant in favour of the experimental group. Therefore, the null hypothesis was rejected.

Discussion

The results of data analysis from this study revealed that SSII secondary school students who were exposed to treatment (PBL) had positive behaviour change towards critical thinking and collaborative skills than those who were not exposed to treatment. The null hypothesis was therefore rejected. In a similar vein, Kurniawati (2022) found that pupils became extremely motivated when they treated the problem as though it were their own work. Both Suhendri and Kurniawan (2022) and Kurniawati (2022) conducted studies that demonstrated that problem-based learning (PBL) has the potential to increase students' willingness to learn. In addition to this, it was discovered that students became more involved in the learning process, became more creative, and were thinking critically about issues related to their projects (Abdullaeva et al. and 2020; Jones et al., (2013) discovered that PBL helped to increase the consideration of interdisciplinary knowledge and skills) (collaboration). This suggests that students can benefit from participating in PBL by developing their critical thinking skills. Additionally, problem-based learning (PBL) has the potential to increase individuals' cognitive competitiveness by removing barriers that may inhibit work processes (Spector & Park, 2017). Furthermore, PBL encourages students to apply information that is relevant and meaningful to situations that occur in real life (Yulia Sari et al., 2018). In addition, research conducted by Hsu (2002) demonstrated that PBL has the potential to improve students' abilities to collaborate and think critically. Students who have a higher level of critical thinking ability tend to be more engaged in collaborative activity than students who have a lower level of critical thinking ability. This agreed with Tamim et al. (2011) who came out with a similar finding on effects of discovery method on secondary school students process skill acquisition in Abuja Municipal Area Council, Nigeria. The authors found out that discovery method was more effective in fostering students' acquisition of science process skills. The research results agreed with that of Bichi (2002) who observed that as students engage in activities; they acquire skills and confidence which aid their capacity to tackle future problem.

Conclusion

Based on the findings of this study, it was revealed that students have higher mean score for the acquisition of critical thinking and collaborative skills than their counterparts taught using teacher-centered method.

Recommendation

On the basis of the findings emanating from this study, the use of problem-based learning should be encouraged among teachers of Economics to improve students' critical thinking and collaborative skills.

References

- Abdullaeva, B., Abduvaliyeva, D., Ruzikulova, N., Yusupova, N., & Ishbaeva, N. (2020). Developing critical thinking and problem- solving skills. *International Journal of Psychosocial Rehabilitation*, 24(Special Issue 1), 937–941. <https://doi.org/10.37200/ijpr/v24sp1/pr201237>.
- Bichi, S.S. (2002). Effects of problem-solving strategy and enriched curriculum on students achievement in evolution among secondary school students. Unpublished Ph.D. Dissertation, ABU Zaria.
- Febriana, B. A., Purwoko, A. A., & Andayani, Y. (2017). Problem-based learning in senior high school chemistry and its impact on critical thinking skills of different dispositions students. *8nd Asian Education Symposium*. <https://doi.org/54.9664/444¹6³3444²444²9>.

- Fan, L., & Zhu, Y. (2004). How have Chinese students performed in mathematics? A perspective from large-scale international mathematics comparisons. In L. Fan, N. Y. Wong, J. Cai, & S. Li (Eds.), *How Chinese learn mathematics*. New Jersey: World Scientific.
- Kasemsap, K. (2021). Advocating problem-based learning and creative problem-solving skills in global education. *Research Anthology on Developing Critical Thinking Skills in Students*, 1372–1398. <https://doi.org/10.4018/978-1-7998-3022-1.ch072>.
- Kurniawati, I. (2022). The effect of problem-based learning on students' problem-solving and self-learning abilities in acid-base. *J-PEK (Jurnal Pembelajaran Kimia)*, 7(1), 44–48. <https://doi.org/10.17977/um026v7i12022p044>.
- Lemke, J. L. (2001). Articulating communities: Sociocultural perspectives on science education. *Journal of Research in Science Teaching*, 38(3), pp. 296–316.
- Leung, F.K.S. (2018). Mathematics education of Chinese communities from the perspective of international studies of mathematics achievement. In: Cao, Y., Leung, F. (eds) *The 87st century mathematics education in China*. New Frontiers of Educational Research. Springer, Berlin, Heidelberg. https://doi.org/10.1007/978-3-662-55781-5_1.
- Overton, T. L. (2011). Problem solving – developing critical, evaluative and Analytical Thinking Skills. *Effective Learning in the Life Sciences*, 25–40. <https://doi.org/10.1002/9781119976646.ch2>.
- Spector, J. M., & Park, S. W. (2017). Contributing to the knowledge base of motivation and learning. *Motivation, Learning, and Technology*, 145–151. <https://doi.org/10.4324/9781315537641-15>.
- Suhendri, S., & Kurniawan, F. (2022). Improving students' motivation and reading ability in learning narrative text using problem-based learning. *Jurnal Penelitian Tindakan Pendidikan*. <https://doi.org/10.23917/jptp.v1i1.978>.
- Suryaningtyas, A., Kimianti, F., & Prasetyo, Z. K. (2020). Developing science electronic module based on problem-based learning and guided Discovery Learning to increase critical thinking and problem-solving skills. *Proceedings of the International Conference on Educational Research and Innovation (ICERI 2019)*. <https://doi.org/54.6335/assehr.k.644648.457>.
- Tang, T., Vezzani, V., & Eriksson, V. (2020). Developing critical thinking, collective creativity skills and problem solving through playful design jams. *Thinking Skills and Creativity*, 37, 100696. <https://doi.org/10.1016/j.tsc.2020.100696>.
- Tamim, R. M., Bernard, R. M., Borokhovski, E., Abrami, P. C., & Schmid, R. F., (2011). What forty years of research says about the impact of technology on learning: A second order meta-analysis and validation study. *Review of Educational Research*, 81(1), 4–28.
- Yulia Sari, L., Fachri Adnan, M., & Hadiyanto, H. (2018). Enhancing students' active involvement, motivation and learning outcomes on mathematical problem using problem-based learning. *Proceedings of the International Conference of Mental Health, Neuroscience, and Cyber-Psychology - Icometh-NCP 2018*. <https://doi.org/54.76032/69606>.