

INFLUENCE OF PROJECT-BASED LEARNING ON CRITICAL THINKING AMONG PRIMARY SCHOOL TEACHERS IN CALABAR EDUCATION ZONE, CROSS RIVER STATE, NIGERIA

BY

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Abstract

This study investigates the influence of project-based learning (PBL) on critical thinking among primary school teachers. PBL is characterized by real-world contexts, student-centered approaches, and inquiry-based methods. The study explores how PBL influences creative skills, problem-solving, and collaboration skills in primary school teachers. Three hypotheses were formulated to give direction to the study. A descriptive survey design was used for the study. The population of the study comprised 3,058 primary school teachers in Calabar Education Zone of Cross River State. The sample was made up of three hundred (300) teachers selected from the sampled public primary schools. A questionnaire titled, project based learning and critical thinking questionnaire was developed by the researchers to gather data from the respondents. Data obtained from the respondents were analyzed using ANOVA. The results show that PBL has a positive effect on creative skills, with teachers demonstrating improved creative thinking, problem-solving, and collaboration abilities. The findings suggest that PBL is an effective instructional approach for developing creative skills in primary school teachers, preparing them for success in an increasingly complex and dynamic world. Based on the finding of the study, it was recommended among others that teachers should create a more engaging, effective and relevant learning environment for their teachers by incorporating PBL into their instructional practice.

Keyword: Project-based learning, critical skills, creative thinking, problem solving, collaboration skills, primary school teachers

Introduction

Educational scholars and practitioners are continually seeking an innovative and constructive learning process that could foster their students' intellectual, personal, and social development by considering their critical thinking and problem-solving skills. A variety of teaching approaches and methods such as cooperative learning, integrated teaching approach, problem-based learning, and technology-based instruction have been suggested as possible ways to promote the redefined learning goals in the 21st century. Among these, project-based learning and its potential effect on learners' development of critical thinking and problem-solving skills have received great attention as confirmed by the number of longitudinal and qualitative studies on the matter (Wambui, 2024).

Project based learning (PBL) is a valuable and successful teaching strategy that has been running in educational institutes for many years. PBL can be understood as an approach that is designed by using the 5Es method (Engagement, Exploration, Explanation, Elaboration, and Evaluation).

It is believed that project-based learning can be used to improve teachers quality across cognitive, psychomotor, and affective areas. It is largely understood as a teaching method that provides flexibility for students/teachers to explore their individual potentials (Sugiyanto, Setiawan, Hamidah & Ana, 2020). Monity, Olofu and Nnyenkpa (2024) concluded that students/teachers who did not acquire the fundamental skills at an early stage in life are at a disadvantage when they are at the advance school age.

In the era of digital transformation of education, the new generation of information technologies such as artificial intelligence, big data, and metaverse are bringing great changes to education at an unimaginable speed, and at the same time posing unprecedented challenges to talent training. Cultivating students with higher-order thinking skills that can adapt to the future development of society and reasonably cope with the complex real world has become an important mission in the current education reform and development around the world (Zhang & Ma, 2023).

In a recent policy report, the UK-based Partnership for 21st Century Skills has highlighted the importance of project-based learning as part of a cultivation effort in preparing a ready citizen and workforce for the digital age. Monity, Idaka and Abam (2024) added that it gives students/teachers a way to gain industrial experience and skills during their studies, to get them ready for the kind of industrial environment they will encounter after graduation. Given the voluminous project-based learning literature, a number of analyses have argued that project-based learning engages students in a lifelong development process for their 21st century skills (Shah & Gillen, 2024). The researchers' claims are grounded in statements that project-based learning, when adopted in the classroom, combines realistic practices with problem identification, investigation, decision-making, and social collaboration. They also emphasize that, in project-based

educational settings, the learners are involved in self-assessment, which drastically improves their self-reflection capacity. As a result, in project-based working environments, learners develop essential problem-solving and higher-order thinking skills, including creative thinking, risk-taking, communication, cooperative learning, leadership, flexibility, time management, and problem identification and resolution.

Project based learning provides learners with an authentic learning experience, wherein they are encouraged to work together in groups to solve a specific problem or project that is oriented towards the real world. This process allows learners to learn to communicate, solve problems collaboratively, and appreciate the role of each team member (Ryberg et al., [2024](#)). PBL is one of the most prominent strategies that have encroached on the traditional systems and their negative routine activities that kill the spirit of creativity. PBL incorporates the fundamental principles of teaching and learning which use content and competencies texts as equal partners and integrate the objectives in a problem-centered context. One important issue is the effects of project-based learning (PBL) on the development of teachers' critical thinking abilities.

Critical thinking is a significant skill that all individuals should possess. It is essential to be able to think deeply in order to solve real-life problems that are complex. Critical thinking is a mental process that encourages students/teachers to use their abilities. It aids in the classification of ideas and activities for self-directed learning, clear reasoning of an idea, putting things together and seeing relationships, determining the importance of what has been studied, and evaluating the effect of what has been evaluated or proposed. The world is overwhelmed with unique elements that must be resolved, resulting in a need for professionals with problem-solving skills. Critical thinking ability is lessons essential for this century and for the global economy based entirely on information. The development of critical thinking skills by the youth is a significant goal in global education policy (Saepuloh, Sabur, Lestari & Uâ, 2021). The significance of critical thinking skills is also growing in primary education. A pedagogy that encourages learners to develop these abilities has become necessary. According to current knowledge, the usage of critical thinking lessons in school is advantageous not just in the practice of developing moral beings, but it also aids adults in resolving authentic challenges. In school, the application of the project-based learning strategy develops various high-order thinking abilities, such as creative skills, problem-solving, and collaboration skills.

Creative thinking is a crucial skill which must be owned by individual for facing the complex problem in the future. At the end of the twentieth century, creativity is conceptualized as something that anyone can acquire. Creative thinking has been defined as the forming of associative elements into new combinations which either meet specified requirements or are in some way useful. Creative thinking is about generating ideas that can in some way be applied to the world. Creative thinking involves some activities, for example, formulating idea into a new knowledge to find new and better things

(Salsabillah, 2019).

Problem solving skills are crucial for learners because they empower them to tackle challenges, think critically, and adapt to new situations, ultimately enhancing their academic and personal development (Adeoye & Jimoh, 2023). By prioritizing problem-solving skills, teachers can help learners develop the skills they need to succeed in both academic and professional setting. Learners can use problem-solving skills to identify the needs of their communities and develop innovative solutions to address those needs (Kwangmuang et al, 2021).

Collaboration skills are the abilities and practices that enable learners to work effectively with others. These skills include communication (sharing ideas, thoughts, information clearly and effectively); teamwork (working together, sharing responsibilities and supporting each other); active listening (paying attention to others, understanding their perspective and responding thoughtfully); problem-solving (identifying and resolving problems together); flexibility (adapting to changing circumstances and being open to new ideas); and respect and empathy (valuing and respecting each other's contributions and experiences) (Kaso, Wahdah, Abrina & Petrus, 2024).

Critical thinking helps students to self-control, adhere to accuracy, reliability, and clarity towards the topics and issues they are exposed to. It enables them to form appropriate and deliberate judgments and decisions away from prejudice (Issa & Khataibeh, 2021). Apparently, learners who can think critically have important basic skills in the learning and teaching process. They can critically investigate problems, produce and test relevant ideas. They are able to make logical decisions considering evidence and arguments for solving problems. In this regard, learners need skills that focus mainly on critical thinking, which is described as one of the most important features of success in the twenty-first century. Also, they are essential to the practice of learning, and as a criterion for distinguishes between learners. Thus, helps in acquiring a set of skills, abilities, and personal characteristics that make them qualified for professional success by focusing on scientific knowledge, and employing it in real-world situations. In the past few decades, the need for educational methods that facilitate the development of skills increases. These skills are adapted to the new requirements and to the change of the world. Therefore, this study aimed to investigate the influence of project-based learning on critical thinking skills of primary school teachers in Calabar education zone of Cross River State.

Hypotheses

1. There is no significant influence of project-based learning on creative skills among primary school teachers.
2. Project-based learning has no significant influence on problem-solving skills among primary school teachers.
3. There is no significant influence of project-based learning on collaboration skills among primary school teachers.

Methodology

Research design

Descriptive survey design was used for the study. Descriptive survey with regards to the present study is primarily concerned with answering the following questions: to what extent does project-based learning influence teachers' creative skills? How does project-based learning influence teachers' problem-solving skills? How does project-based learning influence teachers' collaboration skills?

Population and sample

The population of the study comprise 3,058 primary five teachers in Calabar Education Zone of Cross River State (State Primary Education Board, 2024, Calabar). The simple random sampling technique was utilized in choosing the local government areas and the public primary schools used in the study. The researchers wrote the names of the local government areas that made up Calabar education zone and randomly picked three local government areas (Calabar Municipality, Akpabuyo and Odukpani). The population of the study was 3,058 both teachers drawn from which make 50 percent of the entire population of the study. Simple and accidental sampling techniques were used to sample three hundred (300) teachers from three (3) Local Government Areas in Calabar Education Zone in Cross River State. The main instrument use for data collection was Project-Based Learning on Critical Thinking among Primary School Teachers (PBLCTPSTQ) designed by the researchers. The face and content validity were established by three experts in measurement and evaluation in the Faculty of Education, University of Calabar. Split half method of reliability was used to determine the reliability of estimate of the instrument and the index was found to be .089 which was high enough to be used. The questionnaires were administered personally by the researchers with research assistants trained for the purpose. For ease of data preparation, codes were designed for each item. A coding schedule was prepared by developing a key for each of the constructs of the instrument. Data collected was analysed using analysis of variance (ANOVA)..

Result

Hypothesis one

There is no significant influence of project-based learning on creative skills among primary school teachers. The independent variable here is project-based learning, while the dependent variable is creative skill. To test this hypothesis One-Way Analysis of Variance (ANOVA) was used. The result of data analysis is presented in Table 1.

Table 1: One way analysis of variance result of the influence of project-based learning on teachers' creative skills among primary school teachers

Source of variation	SS	df	MS	F	Sig.
Between groups (Project-based learning)	275.994	2	137.997	9.730	.001
Within groups (Error)	4240.641	297	14.183		
Total	4516.636	298			

*significant at .05 level, F-crit. =3.00

The analysis of variance (ANOVA) in Table 1 shows that the calculated F-ratio is 9.730 ($F=9.730$, $p<.05$), is greater than critical F-ratio of 3.00 tested at .05 level of significance and 2 and 297 degrees of freedom. Since $p(.001)$ is less than $p(.05)$, it means that project-based learning significantly influence teachers' creative skills in primary in Calabar Education Zone of Cross River State. Hence the null hypothesis that stated that there is no significant influence of project-based learning on creative skills among primary school teachers is rejected.

Hypothesis two

Project-based learning has no significant influence on problem-solving skills among primary school teachers. The independent variable here is project-based learning, while the dependent variable is problem-solving skills. To test this hypothesis One-Way Analysis of Variance (ANOVA) was used. The result of data analysis is presented in Table 2.

Table 2: One way analysis of variance result of the influence of project-based learning on problem solving skills among primary school teachers

Source of variation	SS	df	MS	F	Sig.
Between groups (Project-based learning)	864.607	2	382.304	30.599	.000
Within groups (Error)	2552.028	297	11.880		
Total	3416.635	298			

*significant at .05 level, F-crit. =3.00

The analysis of variance (ANOVA) in Table 2 shows that the calculated F-ratio is 30.599 ($F=30.599$, $p<.05$), is greater than critical F-ratio of 3.00 tested at .05 level of significance and 2 and 297 degrees of freedom. Since $p(.000)$ is less than $p(.05)$, it implies that project-based learning significantly influence project-based skills among primary teachers in Calabar Education Zone of Cross River State. Hence the null hypothesis that stated that project-based learning has no significant influence on problem-solving skills among primary school teachers is rejected.

Hypothesis three

There is no significant influence of project-based learning on collaboration skills among primary school teachers. The independent variable here is project-based learning, while the dependent variable is collaboration skills. To test this hypothesis One-Way Analysis of Variance (ANOVA) was used. The result of data analysis is presented in Table 3.

Table 3: One way analysis of variance result of the influence of project-based learning on collaborative skills among primary school teachers

Source of variation	SS	df	MS	F	Sig.
Between groups (Project-based learning)	384.610	2	192.305	13.916	.000
Within groups (Error)	4132.026	297	13.819		
Total	4516.636	298			

*significant at .05 level, F-crit. =3.00

The analysis of variance (ANOVA) in Table 3 shows that the calculated F-ratio is 13.916 ($F=13.916, p<.05$), is greater than critical F-ratio of 3.00 tested at .05 level of significance and 2 and 297 degrees of freedom. Since $p(.000)$ is less than $p(.05)$, it implies that project-based learning significantly influence collaboration skills among primary teachers in Calabar Education Zone of Cross River State. Hence the null hypothesis that stated that there is no significant influence of project-based learning on collaboration skills among primary school teachers is rejected.

Summary

Project-Based Learning (PBL) significantly impacts learning in schools. It is changing drastically for establishing the teaching paradigms. PBL equips teachers with critical thinking, problem-solving, and decision-making skills for future real-world problems. Teachers will actively learn the practical application and abilities they will need in a future where flexibility and problem-solving skills are valued. Teachers and parents should understand the viewpoint of teachers and guide them by eliminating their doubts regarding any concept or subject. It reinforces to incorporation of project-based learning into the educational system in this modern era.

Recommendations

Considering the results, the researchers recommended the necessity of adopting a project-based learning strategy

1. Project-based learning should be implemented in primary school curricula.
2. Teachers should be trained and resources to effectively integrate project-based learning into their teaching practices
3. Teachers should prepare educational activities using project-based learning.
4. The government should foster a supportive environment that encourages creativity, critical thinking, problem-solving skills and collaboration skills.

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