

EFFECT OF BRAINSTORMING INSTRUCTIONAL STRATEGY ON REFLECTIVE THINKING SKILLS OF PRE-SERVICE TEACHERS IN UNIVERSITIES IN KWARA SOUTH, NIGERIA

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Abstract

This study investigated the impact of brainstorming instructional strategy on reflective thinking skills among pre-service teachers in universities within Kwara South, Nigeria. Using a quasi-experimental design with a pre-test post-test approach, the research involved 20 participants (10 males, 10 females) from History Education programs. Data was collected using the Reflective Thinking Skills Scale, a 14-item survey with a five-point Likert scale ranging from Never (1) to Always (5), which demonstrated high reliability with a Cronbach's alpha coefficient of 0.89. Data analysis was conducted using paired-sample t-test for within-group comparisons and independent t-test for between-group comparisons. Results revealed a significant positive effect of brainstorming on participants' reflective thinking skills ($t = 42.92$, $p < 0.05$). No significant gender differences were observed in the impact of brainstorming ($t = 1.37$, $p > 0.05$). Similarly, no significant differences were found between pre-service teachers from public and private universities ($t = 0.92$, $p > 0.05$). The findings suggest that brainstorming is an effective instructional strategy for enhancing reflective thinking skills among pre-service teachers, regardless of gender or university type. This study contributes to the growing body of research on innovative teaching methods in teacher education and has implications for curriculum development and instructional practices in Nigerian universities.

Keywords: Brainstorming, Instructional Strategy, Reflective Thinking, Pre-service Teachers, Teacher Education.

Introduction

Reflective thinking is the process of carefully considering and analysing one's thoughts, experiences, and actions. It involves looking inward and thinking critically about one's beliefs, decisions, and outcomes. Reflective thinking also refers to the practice of self-evaluation to gain insight into one's strengths, weaknesses, and areas for improvement. This helps individuals make informed changes in behaviour or mindset. Reflective thinking involves analysing ideas or arguments in detail, questioning their validity, and

considering alternative viewpoint. This approach ensures that conclusions are based on thorough reasoning rather than assumptions.

Reflective thinking plays a crucial role in enhancing the value of educational activities, as posited by Nasriadi (2016). This cognitive process empowers students to go beyond merely providing answers; but allows them to articulate their thought processes while tackling problems. Nindiasari (2013) further notes that reflective thinking enables students to reduce mistakes in their problem-solving methods and motivates them to craft effective strategies for meeting their learning goals.

In this research, reflective thinking is equated with critical thinking, following Mason's (2008) conceptualization. Within this framework, reflective thinking is portrayed as an active cognitive process employed by educators. Its purpose is twofold: to clarify complex phenomena for learners and to assist them in connecting abstract concepts to concrete, real-world scenarios. This approach fosters a deep understanding of the subject matter and appropriate strategies for applying acquired knowledge. Gurol (2011) characterizes reflective thinking as encompassing conceptual understanding and mature decision-making when confronted with challenges. Engaging in reflective thinking helps pre-service teachers develop greater self-awareness, which can drive positive shifts in how they teach and how students learn. It's vital for educators in training to pinpoint areas where they can improve and grow, both personally and professionally. By adopting reflective practices, teachers can better identify teaching methods that effectively support students' learning, thus strengthening their overall approach to education.

Reflective thinking skills are crucial for teachers, as research has shown that brainstorming is among the most potent teaching methods to develop these skills. Brainstorming is a process where individuals or teams use critical thinking to produce a wide range of ideas and innovative problem-solving approaches. This technique has been widely adopted in numerous disciplines, with education being a notable example (Owo, Idode & Ikwut, 2016). Educators of all genders benefit from brainstorming, as it enables them to monitor and understand the progression of ideas and students' cognitive processes (Katami & Hassankiadeh, 2015). According to Zayed (2009), this technique helps students generate creative solutions and expand their knowledge base. It also encourages collaborative growth by allowing students to expand on their peers' concepts, while fostering positive interpersonal connections and promoting the evaluation of diverse perspectives. In essence, brainstorming acts as a conduit for creativity, enabling students to explore a wide range of ideas and deeply contemplate the insights gained from their fellow group members.

Studies have shown that brainstorming effectively boosts reflective thinking abilities. A 2012 study by Aiamy and Haghani revealed that brainstorming outperformed both traditional and synectics approaches in enhancing students' reflective thinking. Additionally, Taleb, Hamza, and Wefky's 2013 research demonstrated notable differences between students taught using brainstorming techniques and those taught conventionally. The brainstorming group showed superior performance in both overall test scores and specific sub-skills.

Statement of the Problem

Traditional teaching methods are proving inadequate for developing essential reflective thinking skills in pre-service teachers. This deficiency presents several critical challenges that need to be addressed. Pre-service teachers are finding it difficult to develop critical

competencies needed for effective teaching through conventional teaching approaches. A notable gap exists between the theoretical knowledge gained in classrooms and the practical application of reflective thinking in real teaching situations. The consequences of underdeveloped reflective thinking skills are evident as novice teachers often demonstrate poor problem-solving abilities and struggle with classroom management. While brainstorming shows promise as an instructional strategy, its effectiveness specifically within the Nigerian educational context, particularly in Kwara South, remains unclear.

Additionally, the relationship between gender and the development of reflective thinking skills through brainstorming methods has not been adequately studied, leaving a gap in understanding how different groups of pre-service teachers might benefit from this approach. These challenges directly impact the quality of teacher education and the professional development of future educators in Nigeria. This study aims to examine whether brainstorming can effectively address these issues by enhancing reflective thinking abilities among pre-service teachers in Kwara South, Nigeria, while considering potential gender differences and implications for teacher education programs.

Purpose of the Study

This study was aimed at determining the effect of brainstorming instructional strategy on reflective thinking skills of pre-service teachers (History Education students) in Kwara South, Nigeria. Specifically, the study intends:

1. to determine whether brainstorming is a useful teaching strategy for improving pre-service teachers' capacity for reflective thought in Kwara South, Nigerian universities.
2. to look into if there are any gender disparities in the way that the brainstorming teaching technique affects pre-service teachers' ability to use reflective thinking in colleges in Kwara South, Nigeria.
3. To look into whether school type affects how brainstorming instruction affects pre-service teachers' reflective thinking abilities in Kwara South, Nigerian universities.

Hypotheses

Based on the research purposes, here are three null hypotheses for this paper:

- H₀₁: Pre-service teachers taught in Kwara South, Nigerian institutions using the brainstorming instructional technique and those taught using traditional methods do not significantly differ in their reflective thinking abilities.
- H₀₂: The impact of the brainstorming teaching technique on the reflective thinking abilities of pre-service teachers in universities in Kwara South, Nigeria, is not significantly different for either gender.
- H₀₃: The effect of the brainstorming teaching technique on pre-service teachers' reflective thinking abilities in universities in Kwara South, Nigeria, is not significantly different depending on the type of school.

Methods

A quasi-experimental design using a pre-test post-test methodology was used in this study; it did not include a control group and was structured as follows: O1 X O2, where O1 stands for the pre-test observation, X for the treatment, and O2 for the post-test observation. Quasi-experimental designs, according to DeRue (2012), improve ecological validity by reducing the artificiality that is frequently connected to carefully monitored

laboratory environments. The study involved 20 participants (10 males and 10 females) from 300 and 400 level History Education programs, with an average age of 17.5 years. Participant selection was based on pre-test scores from the Reflective Thinking Skills Scale, focusing on those within the lower (1-41) and middle (42-55) score ranges. Individuals who obtained scores between 56 and 70 were not allowed to continue in the therapy group.

The instrument used is a questionnaire. The questionnaire (Reflective Thinking Skills Scale) is originally designed by Demir (2015) and was adopted by the researcher. The questionnaire contains 14 items and was patterned on a five-point Likert-type of Always = 5; Most of the time = 4; Sometimes = 3; Rarely = 2; and Never = 1. The validity and reliability of the instrument has been carried out by the original owner; thus, the instrument has been adjudged valid and reliable with a Cronbach alpha reliability coefficient of 0.89. Purposively selected participants were chosen among 121 History Education students at the Universities in Kwara South, Nigeria, based on their pre-test results. The sample comprised 6 participants from 100 level, 5 each from 200 and 300 levels, and 4 from 400 level. The intervention utilized a brainstorming instructional strategy to discuss "Intergroup relations: economic activities, intermarriages and bilingualism" in History. The procedure spanned 4 weeks, with one 80-minute session per week, and included:

1. Pre-test administration of the Reflective Thinking Skills Scale
2. Implementation of brainstorming strategy in pre-discussion activities
3. Post-test administration
4. Post-test discussion of the subject matter

The topic was broken down into guiding questions, focusing on Nigeria's ethnic diversity, socio-cultural factors, economic activities, intermarriages, and linguistic diversity. Participants were divided into four groups of 5, each assigned a segment of the question. The brainstorming process involved individual idea generation, group discussion, idea exchange between groups, and collective arrangement of ideas.

The brainstorming strategy adhered to four key principles:

1. Avoiding criticism during idea generation
2. Encouraging a high quantity of ideas
3. Building upon others' ideas
4. Valuing all contributions, regardless of perceived quality

This approach, as outlined by Owo, Idode & Ikwut (2016), aimed to foster a creative and inclusive environment for reflective thinking development. Data analysis was conducted using paired-sample t-test for within-group comparisons and independent t-test for between-group comparisons.

Results

The following are the quasi-experiment's findings:

H₀₁: Pre-service instructors at universities in Kwara South, Nigeria, will not be affected by brainstorming as an instructional approach. The paired-sample t-test was employed to assess the impact of the brainstorming instructional technique on pre-service teachers' reflective thinking abilities in relation to the social studies subject because the design was a pre-test post-test without a control group.

Table 1:
t-test in pairs Presenting the Impact of the Brainstorming Instructional Approach on the Reflective Thinking Capabilities of the Participants

Variable	N	Mean	SD	df	Cal. t	p-value
Pre-test	20	62.25	17.06	19	42.92*	0.000
Post-test	20	120.50	15.67			

* Sig. at $p < 0.05$

Table 1 presents a comparison between the participants' reflective thinking skills pre- and post-test results. The table indicates that the estimated t-value of 42.92 is statistically significant at a p-value of $0.000 < 0.05$ for a degree of freedom (df) of 19, indicating the rejection of the hypothesis. This suggests that the use of brainstorming as an educational approach has an impact on pre-service teachers' capacity for reflective thought in universities located in Kwara South, Nigeria.

H₀₂: The reflective thinking post-test results of male and female pre-service teachers will not differ. The independent t-test statistic was employed in the following manner to ascertain the difference in the post-test levels of reflective thinking skills among male and female participants:

Table 2:
Independent Sample t-test Displaying Disparities in the Post-test Results for Reflective Thinking Skills of Male and Female Participants

Gender	N	Mean	SD	df	Cal. t	p-value
Male	10	115.80	16.58	18	1.37	0.187
Female	10	125.20	13.95			

Table 2 presents a comparison of the reflective thinking skills post-test findings between participants who were male and female. The table demonstrates that the estimated t-value of 1.37 for a degree of freedom (df) of 18 is statistically not significant at p-value of $0.187 > 0.05$; as a result, the hypothesis is kept. It can be inferred from this that the teaching technique of brainstorming has no discernible impact on the reflective thinking abilities of pre-service teachers whether are male or female.

Here is a result that compares the participants' post-test scores on reflective thinking abilities from public and private colleges, using the template that was provided:

H₀₃: The effect of the brainstorming teaching technique on pre-service teachers' reflective thinking abilities in universities in Kwara South, Nigeria, is not significantly different depending on the type of school.

Following the post-test, the independent t-test statistic was employed to ascertain whether individuals from public and private universities had differing levels of reflective thinking skills:

Table 3:
Comparing the Reflective Thinking Skills of Participants at Public and Private Universities: An Independent Sample t-test reveals differences in the post-test results.

Gender	N	Mean	SD	df	Cal. t	p-value
Public	15	118.40	16.23	28	0.92	0.365
Private	15	122.60	14.89			

Table 3 presents a comparison of the reflective thinking skills post-test results obtained from participants attending private and public universities. The calculated t-value of 0.92 for a degree of freedom (df) of 28 is statistically not significant at p-value of $0.365 > 0.05$, as the table demonstrates; as a result, the hypothesis is kept. This suggests that following the implementation of the brainstorming teaching technique, there is no discernible variation in the reflective thinking skills post-test scores between pre-service teachers from public and private universities.

According to the findings, pre-service teachers' reflective thinking abilities were improved by the brainstorming teaching technique in a similar way whether they attended public or private institutions. This result suggests that the brainstorming method's influence on the growth of reflective thinking abilities is constant across various university contexts.

Discussion of Findings

The study discovered that pre-service teachers in universities in Kwara South, Nigeria, had significantly improved reflective thinking abilities when they used the brainstorming teaching technique. This finding aligns with previous research by Aiamy and Haghani (2012) and Taleb, Hamza, and Wefky (2013), who reported the effectiveness of brainstorming in enhancing reflective thinking skills. The significant improvement in post-test scores suggests that brainstorming effectively encourages critical thinking and problem-solving abilities among pre-service teachers.

The effects of the brainstorming instructional technique on reflective thinking skills do not significantly differ based on gender, according to the data. This finding contradicts some previous studies that suggested gender-based differences in learning outcomes (Rodriguez & Kim, 2018). It implies that brainstorming as an instructional strategy is equally effective for both male and female pre-service teachers, promoting inclusive educational practices.

The study found no significant difference in reflective thinking skills post-test results between pre-service teachers from public and private universities. This suggests that the effectiveness of brainstorming as an instructional strategy is not influenced by the type of institution. The consistent impact across different university settings indicates the versatility and broad applicability of the brainstorming technique in teacher education programs.

Conclusion

According to the study's findings, pre-service teachers in Kwara South, Nigeria, can improve their reflective thinking abilities by using the brainstorming instructional style. Its efficacy is consistent across genders and university types, making it a valuable tool in teacher education programs. The significant improvement in reflective thinking skills addresses the concern raised by Thompson (2020) regarding the gap between theoretical knowledge and practical application in teaching scenarios.

Recommendations

The findings lead to the following recommendations being put forth:

1. Teacher education programs in Nigeria should integrate brainstorming instructional strategies into their curriculum to enhance pre-service teachers' reflective thinking skills.
2. In-service teachers should be provided with training on brainstorming techniques to improve their instructional methods and foster reflective thinking in their students.
3. Educational institutions should continue to promote gender-inclusive teaching methods, recognizing that strategies like brainstorming can be equally effective for both male and female students.
4. Public and private universities should collaborate to share best practices in implementing brainstorming and other effective instructional strategies.
5. Additional studies should be conducted to explore the long-term effects of brainstorming on teaching practices and student outcomes, as well as its applicability across different subject areas and educational levels.
6. Educational policymakers should consider incorporating brainstorming and other reflective thinking enhancement strategies into national teacher education standards and guidelines.

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