

Factors Influencing the Effectiveness of Evidence-Based Teaching on Students' Learning Outcome in Bayelsa State

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Abstract

This study investigates the factors influencing the effectiveness of evidence-based teaching (EBT) on students' learning outcomes. Using a design triangulation approach, relevant literature was gathered on evidence-based learning as a teaching method other than the traditional methods of teaching. Empirical reviews on past scholarly works shows a gap in literature, not indicating the factors influencing its implementation in subjects other than the sciences like Bayelsa State. The study identified factors such as teachers' skills, availability of instructional materials and support from school administrative agencies as such factors and observed that all of them are relevant to the implementation and effectiveness of evidence-based teaching method in senior secondary schools in Bayelsa State.

Key Words: *Factors, Influencing, Effectiveness, Evidence-Based, Teaching, Learning-Outcome, Teaching-Strategies and Formative Assessment*

1.0 Introduction

The effectiveness of evidence-based teaching (EBT) in improving academic performance has gained substantial attention in educational research (Rezaei 2023). EBT involves instructional strategies that are empirically validated to enhance learning outcomes. Despite its potentials (Okurumeh, Okurumeh, & Asarhasa, 2019), the implementation and effectiveness of EBT can be influenced by various factors, including teacher preparedness, resource availability, and student engagement. This study aims to identify and examine these factors as they influence the learning outcomes of senior secondary school students in Bayelsa State, Nigeria.

In Nigeria, the educational landscape presents unique challenges and opportunities for implementing EBT. This study aims to identify and examine the factors that influence the effectiveness of EBT in senior secondary schools in Bayelsa State. By leveraging on a mixed-

method approach, we seek to provide a comprehensive insight into the dynamics of EBT implementation and its impact on learning outcomes.

2.0 Literature Review

Components of Evidence-Based Teaching:

Evidence based educational system or teaching method has the following components:

1. Research-Informed Instructional Strategies

Utilization of teaching tactics that have been experimentally verified is a fundamental aspect of EBT. Formative assessment, feedback, direct teaching, and cooperative learning are some of the tactics that fall under this category. For instance, a meta-analysis by Hattie (2009) indicated that students' performance is much improved when they get timely and detailed feedback. Similarly, research has shown that students' social and intellectual abilities are enhanced by cooperative learning, in which they collaborate to accomplish goals (Johnson & Johnson, 2009).

2. Data-Driven Decision Making

In EBT, data from student assessments, observations, and other sources are continuously used to inform instructional decisions. This process involves collecting data on student performance, analyzing it to identify patterns and areas for improvement, and using these insights to adjust teaching strategies. The cyclical process of data collection, analysis, and adjustment is central to EBT, as it ensures that teaching practices are continually refined and aligned with student needs (Black & Wiliam, 1998).

3. Professional Development and Collaboration

For EBT to be effectively implemented, teachers must engage in ongoing professional development and collaborate with their peers. If schools want their teachers to be able to use evidence-based methods in the classroom, they must provide them with professional development opportunities that highlight current research and instructional strategies. In addition, when educators work together, they are able to solve problems more effectively and share successful strategies, both of which contribute to better classroom instruction (Desimone, 2009).

4. Implementation Challenges

Despite its benefits, EBT faces several challenges in implementation. These include resistance to change among educators, limited access to high-quality research, and the time required to collect and analyze data. Additionally, the contextual factors of different educational environments can impact the applicability of certain evidence-based strategies. For instance, a strategy that works well in one classroom may not be as effective in another due to differences in student demographics, resources, or cultural factors (Slavin, 2008).

Previous research highlights the importance of teacher training and professional development in the successful implementation of EBT (Darling-Hammond et al., 2017). Resource availability, including access to instructional materials and technological tools, has also been shown to impact

EBT effectiveness (Smith et al., 2019). Additionally, student engagement and motivation are critical for maximizing the benefits of EBT (Fredricks et al., 2004).

Conceptual Framework of Evidence-Based Teaching

Evidence-based teaching (EBT) involves the use of instructional methods and strategies that are supported by empirical research. The foundation of EBT lies in the systematic collection and analysis of data to inform teaching practices (Slavin, 2002). This approach contrasts with traditional teaching methods that may rely on anecdotal evidence or intuition. Evidence implies putting students' hands on desk in the teaching learning process. It involves many strategies, such as research work, group discussions, practical, take home exercises and on the job trainings. This method exposes the learner to real life situations as is often used in the medial sciences (Hattie, 2009). The reason for evidence-based studies are to promote efficiency, professional experience and acquisition of industry required skills while in training.

Students have different spans of learning in different situations. Some has the ability to concentrate while being idle (not participating in the class) while others concentrate by participating either by talking (discussion), putting hands on desk (Practical) or observing what is being taught observing the progression of doing something (demonstration and escort). All these methods could be combined in one class on a subject matter or on different classes in different subject matters, which calls for teachers' dynamics in teaching in diversity, and methods and ability to evaluate the relevant method to be used for a group of students or a student and on a subject matter and topic (Slavin, 2002). This approach in the teaching learning process improves better learning outcome of the learners and encourage good performance. Such methods include the following few evidence-based learning strategies that are applicable in teaching science, commercial and arts-based subjects in secondary schools:

A. Dialogue

If two people are well-versed in a certain topic and can have a fruitful conversation about it in front of an audience, they are engaging in dialogue. In comparison to more traditional formats like lectures, it is more casual and offers a number of distinct benefits. Involving students in a dialogue encourages them to make personal research, seek for facts on the subjective matter. Establish evidence of existence, reality and real-life situations. At the end of a dialogue, the participants will have primary information on the subject and have evidence of the observed phenoxeniums (Slavin, 2002).

Characteristics of dialogue

- (i) It can be highly informal and contentious.
- (ii) It facilitates the easy and direct exchange of information and viewpoints.
- (iii) It encourages two people to support and share responsibility with one another.
- (iv) It's a great way for unskilled speakers to present their ideas.
- (v) It usually piques the interest of other group members.
- (vi) It's easy to plan and execute.

- (vii) As the discussion progresses, it allows for clarification, logic validation, and consistency.
- (viii) It also allows for the expression of two or more points of view.

Purposes: All of the following are included in this approach:

- (i) To present information in a casual, conversational way;
- (ii) To pique people's interest in a topic;
- (iii) To drive home a point;
- (iv) To delve deeply into opposing viewpoints or reach consensus on them; and
- (v) To inspire original thought and original solutions.
- (vi) To quickly provide the groundwork for conversation and thinking and to provide essential information in preparation for more extensive discussion

It usually has a chairman or moderator whose duties include:

- (i) He or she should meet with the symposium speakers in advance to ensure a logical organisation;
- (ii) Outline the topics to be addressed and acquire a consensus on the order and allotted time; and
- (iii) Meet with them just before the meeting to go over the points made above.
- (iv) At the beginning of the meeting, he or she should provide a brief overview of the problem and its importance, outline the order of speakers, and create an environment where everyone can listen and think.
- (v) Inform the group about the procedure that needs to be followed, including who is responsible for what before, during, and after the symposium.
- (vi) As each speaker takes the stage, introduce them in detail and determine if they are qualified to speak on the subject. The crowd is very captivated by this.
- (vii) Carry out further tasks as established, such as summarising or using follow-up strategies, such as:
 - (a) Allocate a certain amount of time for each speaker to provide a brief explanation.
 - (b) Take turns letting each speaker ask a question of the other speakers, or
 - (c) Let the audience ask questions directly from the floor.

Duties of each speaker include:

- (i) Show up to the moderator-organized preparatory sessions
- (ii) Get your presentation materials in order so you can deliver it in the specified time

- (iii) Get the audience involved by inviting them to ask questions directly.

Cautions

- (i) Be cautious while picking a topic and make sure to divide it into digestible chunks.
- (ii) When choosing a moderator and speakers, it's important to be selective.
- (iii) Choose members who aren't biased and can explain the subject rationally and without showing their emotions.
- (iv) A moderator's job isn't to make speeches, but to interpret them at the right moments.
- (v) When making plans, establish a system for limiting the duration of talks and make sure that everyone knows they have to stay on topic.
- (vi) A well-run symposium relies on clear and concise presentations, but in order for the event to achieve its goal, it is essential to encourage and sustain a smaller group size.

B. Debate

A debate is a sequence of arguments presented by experts on both sides of an issue. The standard procedure involves forming two groups, one representing the positive side of an issue and the other the negative. On either side, you should see an equal number of people. In most groups, one person serves as team leader with the backing of the others, while a third person acts as chair or moderator to keep things running well.

Debates were frequently used in secondary schools on all subject areas, from science to arts, hygiene, social values and religion. It gives opportunity to learners to develop critical thinking and apply abstract knowledge on real world problems. The topics could be fictions, prose, norms and subject based. When students participate in a debate, it becomes very easy to remember the points when asked in an examination. It gives students opportunity to acquire firsthand knowledge on the subject (). Debates gives the participants joy and panic. It generates a great zeal for studying and desire to express what havd been prepared. In some instances, awards are given to students or groups that wins which could be converted to assessment scores if debates are used as means of performance evaluation after small learning or discussion group studies.

Characteristics of Debate

- (i) Short notice preparation is a breeze
- (ii) it aids in capturing and maintaining audience interest
- (iii) Identifying themes related to social and economic requirements may keep the audience engaged throughout the discussion.
- (iv) The debate motivates audience members to think critically and analyse.
- (v) it allows everyone to speak their minds without holding back (both in terms of time and subject matter)
- (vi) it may be preceded with an agreement

Purposes: If you're looking for a way to:

- (i) The subject matter is highly contentious.
- (ii) The presentation style does not hinder the group's ability to listen and understand.

- (iii) When the group needs to hear both sides of an issue or decision.
- (iv) When members of the group can articulate their perspective in a compelling and meaningful way.
- (v) When there's a need to convey different viewpoints in a larger group where full participation is not feasible.
- (vi) When members of the group participate at a lower level in order to stimulate each other's thoughts and actions.
- (vii) When the group fosters an environment conducive to accepting ideas presented by participants' coherent arguments.

The moderator/chairman is responsible for the following:

- (i) Greeting attendees and arranging their appearances in a timely manner
- (ii) Brief everyone on the action to take, including their specific roles and responsibilities within the group.
- (iii) The chair should introduce the leaders and participants to assess their expertise on the designated topic.
- (iv) Following each speaker's presentation, the chair should provide a summary, highlighting key points or topics that were discussed.
- (v) Inviting the next speaker to politely disagree with the prior one is a great way to get everyone in the room to pay closer attention as you go over the topics at hand.
- (vi) While acknowledging the merits of the defeated side, he or she should convey an unbiased verdict that is logically reasonable.

Guidelines for Effective Debate Preparation ()

- (i) Begin with an engaging introduction—a story, some jokes, a bold statement, a citation, or a pertinent question—that sets the tone for the rest of the speech.
- (ii) Provide concrete examples to illustrate your points.
- (iii) Incorporate details that are specific, familiar, unusual, funny, or controversial to inject energy into the debate.
- (iv) Make an attempt to highlight the issues with the prior speaker and back up your claims with evidence.
- (v) Speak up passionately and honestly in favour of your idea, never holding back, and be sure your arguments will be heard.
- (vi) In the allowed time, conclude with an outstanding summary and a direct request to look the audience in the eye.

Cautions

- (i) The topic range shouldn't be too broad;
- (ii) A heated argument can escalate into hostility and cause divisions amongst groups;
- (iii) In the heat of passion, one can twist the facts to suit one's own agenda, thereby ignoring the audience's main concerns;
- (iv) It serves its purpose and is applicable only in specific contexts; and

Everyone involved, including the moderator and the participants, have to keep their cool and not let their enthusiasm get the best of them.

C. Panel Discussion

In this format, a panel discussion consists of two or more speakers (often between two and eight) who engage in what is ostensibly a casual chat on a subject with the intention of educating the audience. An audience member overheard what seemed like an informal committee conversation. Since it is intended to be conversational, speeches are not allowed.

Types

- i. Panel consisting of a chairman and members: Also called a question-and-answer session. This is when the chair asks a series of questions and the panel members respond
- ii. Panel for set speech: following the chairman announces the subject, each panel member gives a speech, and then the panel turns into a forum following the final presentation
- iii. Conversational panel: Following an introduction of each member and the issue at hand, the panellists engage in a discussion around the subject.

Observable features include:

- (i) the ability to set the tone formally or informally;
- (ii) the ability to highlight and explore various viewpoints, facts, attitudes, and a topic at hand;
- (iii) the opportunity for panel members to interact and stimulate one another to the fullest extent possible;
- (iv) the ability to reach a consensus;
- (v) the division of labour among panel members through pre-meeting preparation; and
- (vi) the expectation that participants will accept facts and relevant authorities as presented in the discussion when others cite them.

Purposes

- (i) To foster a more relaxed environment for group communication
- (ii) To identify and explore the issues and problems at hand
- (iii) To help the audience grasp the problem's components
- (iv) To gather various facts and perspectives into a discussion framework
- (v) To assess the pros and cons of a potential course of action
- (vi) To inspire the larger group to think and act constructively
- (vii) To find areas of agreement, discuss the issue bases, and strive for consensus
- (viii) To guide or assist a group in problem solving

Caution

- (i) The moderator and panel members are responsible for the method's success;
- (ii) No one person should have too much say in the discussion;
- (iii) Preparation is key to a successful technique implementation; and

- (iv) If you want your panel discussion to go well, you need to give it at least half an hour. Try to wrap up when everyone is still engaged.

D. Role play

Participation from students is crucial for effective instruction. Rather than being taught in a traditional manner, people learn best when they are actively involved in the process. All learners are encouraged to actively participate in role play. It is both an excellent learning tool and a fun activity.

Basic Characteristics of Role Play

- (i) the presence of spectators who do not take part in the action;
- (ii) the fact that participants act out a scenario involving human contact; and
- (iii) the provision of feedback via subsequent discussion.

The following are the steps involved in conducting a role play:

- (i) introducing the class or setting to a problem scenario that they can relate to;
- (ii) discussing the situation and helping the class understand its nature;
- (iii) orienting the class on the technique and their roles within it; and
- (iv) asking for voluntary participation and assigning roles.
- (v) Allocate a little period for participants to be ready
- (vi) Acquaint the observers with the topic at hand, the nature of the problem or issue, and any recent developments
- (vii) Role play at the designated location.
- (viii) After the play is over, players and observers should have a follow-up conversation.
- (ix) If you're still interested, you may do the role play class again.

Results from Role Playing

- (i). It provides a platform for exploring many personas in realistic settings;
- (ii) It sheds light on the many roles one plays in real life and how well one does so; and
- (iii) It exemplifies concepts that are pertinent to the field
- (iv) Participants' capacity for empathy is enhanced
- (v) It gives a preview of how trainees would likely respond in certain real-world scenarios.

E. Brainstorming

The students actively participate in the learning process by quickly coming up with ideas and then sorting, synthesizing, and discussing the knowledge. Finding issues and working to resolve them becomes much easier with its support. Working in groups allows for the generation of more ideas than any one person could come up with on their alone.

The goals of brainstorming include:

- (i) coming up with a variety of potential answers to an issue
- (ii) Helping people learn to listen attentively and with an optimistic outlook;
- (iii) Making people feel comfortable enough to speak up when they have something to say without worrying about how their other students will respond; and
- (iv) Fostering attitudes that will make people better team players.

Steps for Organizing a brainstorming session

- i. Coming up with ideas: come up with a lot of ideas quickly to brainstorm
- ii. Revising ideas: The leader of the debate may refine the ideas that have been developed by expanding, revising, and consolidating them.
- iii. Putting everything on a flip chart: To make sure everyone will have a chance to contribute, it's important to put all the ideas on a flip chart.

Analyzing Ideas

After everyone has had a chance to speak, the group's facilitator will continue on to the next step:

Action plan analysis.

After brainstorming is over, the group is prepared to act on the agreement that was established.

F. Using small-group discussions as an active learning technique

Students get many chances to debate the lesson's topic in pairs, small groups, or the whole class as part of the discussion technique, which is an active learning approach. There is room for maneuver in discussions, depending on the goal. Additionally, it has the following benefits: it helps students understand complex ideas, finds answers to problems, compares and contrasts topics, solicits their viewpoints on a given subject, dispels myths, and promotes effective communication. The success of group discussions depends on the teacher's ability to craft well-thought-out questions that may foster an atmosphere of safety and positivity, evaluate students' knowledge, inspire them to think critically, and drive them to be curious. Before deciding on discussion topics, teachers should consider the amount of thinking their students will need to complete the tasks at hand. Use Bloom's taxonomy, which provides a framework for organizing thought from lower-order to higher-order abilities, since it is the best option. For each class discussion, it's ideal if the instructor asks a mix of simple and complex questions. In addition, students might benefit from using Bloom's taxonomy as a guide for creating questions to test their understanding at different levels of thinking. Question stems such as the Socratic method and the depth of knowledge (DOK) method are also helpful tools for developing group discussion questions.

Implementation and Timing of Group Discussion: The WHEN, WHERE, and HOW

Class modalities influence the manner in which debate is used. Every day of class, whether you're taking a hybrid, synchronous, or online course, you may include conversations into your lessons. Teachers should prepare questions in advance of class. You may use the questions into your lesson plans to spark student discussion on the material. Find out why you're having this conversation first. This is what will decide how long it lasts. Students may need more time to talk if they are asked to argue a subject, identify issues, and provide solutions. It will be necessary to include this extra time within the allotted class discussion time.

In the event that a student chooses not to answer a teacher's or moderator's direct question, what will happen?

- (1) Try restating the question in a new manner;
- (2) the original wording could have been misleading.
- (3) Make use of wait time—give students at least five seconds to think carefully before asking someone else to speak—and redirect—after a student has spoken, have another student add to or reject the opinion.

General implementation tips

- (i) Readability for all—do not use lengthy phrases or paragraphs; instead, make directions simple.
- (ii) Explain to pupils why dialogue is important
- (iii) Establish ground rules (particularly when dealing with potentially contentious or emotionally charged topics)
- (iv) Level the playing field in class discussions so that everyone has an opportunity to speak out.
- (v) Praise and support students when they do well.
- (ix) Wrap up class discussions by reviewing what everyone has learnt and highlighting any important points or themes.

Factors Affecting Evidence Based Teaching in Bayelsa State

Teacher Training and Professional Development

Teacher effectiveness is a critical determinant of student learning outcomes. Research indicates that professional development and training in EBT methodologies significantly enhance teachers' instructional capabilities (Darling-Hammond et al., 2017). Effective training programs provide teachers with the knowledge and skills necessary to implement EBT practices successfully.

Resource Availability

The availability of resources, including instructional materials and technological tools, plays an important role in the successful implementation of EBT (Smith et al., 2019). Schools equipped

with adequate resources are better positioned to support innovative teaching practices and enhance student learning experiences.

Student Engagement

Student engagement is a great factor that influences the effectiveness of EBT. EBT Engaged students are more likely to participate actively in learning activities, exhibit higher motivation, and achieve better academic outcomes (Fredricks et al., 2004). EBT practices that promote interactive and participatory learning environments can significantly boost student engagement.

Institutional Support

Institutional support, encompassing administrative backing and policy frameworks, is essential for the sustainable implementation of EBT (Bryk et al., 2010). Supportive leadership and clear policy directives can create an enabling environment for EBT practices to thrive.

3.0 Theoretical Foundations

The theoretical foundation of evidence-based teaching is grounded in the principles of educational psychology and cognitive science. Theories such as constructivism, which posits that learners actively construct knowledge based on their experiences, and behaviorism, which focuses on observable changes in behavior as evidence of learning, provide a basis for understanding how students learn and how teaching can be optimized (Bruner, 1960; Skinner, 1953).

Another key theory is Bloom's Taxonomy, which categorizes educational goals and objectives into cognitive, affective, and psychomotor domains. EBT draws on these theories to design instructional strategies that are both effective and measurable. For instance, Bloom's Taxonomy is often used to frame learning objectives and assess the effectiveness of teaching strategies (Bloom, 1956).

4.0 Materials and methods

This study adopts a theoretical review of few models of evidence-based teaching methods applicable in both science and art-based subjects in secondary schools in Bayelsa state. Empirical analysis of previous studies was considered and a literature gap was established and covered by this study. The study was centered on constructivism theory. This study is an exploratory investigation to introduce a paradigm change from traditional teaching methods to evidence-based methods in secondary schools. The study used an interview approach to collect primary data on teachers view, opinion and experience on the used and implementation of evidence-based teaching method in their schools. Two teachers were trained to use evidence-based teaching method to teach twenty SS3 students selected from two secondary schools from each local government area out of the eight local government areas in Bayelsa State. The interview questions were based on the following qualitative results presented below.

5.0 Results

Qualitative Findings

The analysis of qualitative data identified the following key factors influencing EBT effectiveness in Bayelsa State:

1. **Teacher Training and Professional Development:** Teachers who received training in EBT methods by the researcher reported increased confidence and competence in delivering lessons using EBT strategies, which positively impacted student learning outcomes.
2. **Resource Availability:** Schools with better access to instructional materials and technological tools were more successful in implementing EBT, leading to improved academic performance among students.
3. **Student Engagement:** High levels of student engagement and participation were associated with better academic outcomes. Students reported that EBT methods made learning more interactive and enjoyable, increasing their motivation to succeed.
4. **Institutional Support:** Support from school administration and policy makers was crucial in facilitating the adoption and sustainability of EBT practices.

Discussion

This study's results highlight the significance of many aspects in improving EBT's efficacy. If we want teachers to be able to effectively use EBT in the classroom, we must invest in their professional development and training. Additionally, adequate resources and institutional support are essential for creating an environment conducive to EBT. Student engagement also plays a significant role, as active participation and motivation are key to achieving improved academic outcomes.

Conclusion

This study highlights the multifaceted nature of factors influencing the effectiveness of evidence-based teaching. By addressing these factors, educational stakeholders can enhance the implementation of EBT, ultimately improving student learning outcomes. Future research should explore longitudinal effects of EBT and investigate additional contextual factors in diverse educational settings.

Recommendations

Based on the findings, the following recommendations are proposed:

1. **Enhanced Teacher Training:** Ongoing professional development programs should include training on EBT strategies to ensure teachers are proficient in EBT methods.
2. **Resource Allocation:** Schools should be equipped with necessary instructional materials and technological tools to support EBT.

3. **Institutional Support:** Educational policies should prioritize and support the implementation of EBT practices.
4. **Engagement Strategies:** Strategies to increase student engagement, such as interactive and participatory teaching methods, should be promoted.

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