Utilization and Attitudes Toward Recycled and Reused Materials as Teaching Resources Among Student Demonstrators

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ABSTRACT This study investigates the utilization and perception of recycled and reused materials as instructional materials in the pedagogical process among Bachelor of Elementary Education (BEEd) students. With increasing environmental concerns, including waste disposal and resource conservation, this research aims to explore how sustainable practices, such as recycling and reusing, can be integrated into the teaching and learning process. The study used a quasi-experimental design, involving 27 second-year BEEd students who conducted demonstration teaching using various recycled materials, such as plastic bottles, cans, and newspapers. Data were collected through interviews and observations, which were then analyzed using a thematic approach. The results revealed that recycled materials were frequently used due to their accessibility, cost-effectiveness, and environmental benefits. Participants highlighted the advantages of using these materials, such as reducing waste, saving money, and promoting creativity. However, challenges were noted in terms of preparation and the perceived effectiveness of these materials in enhancing student learning. The study concludes that while the use of recycled and reused materials has potential educational and environmental benefits, further support in terms of teacher training and resources is necessary to fully integrate these materials into teaching strategies. The findings suggest the need for continued research and initiatives to promote sustainable practices in education.

Keywords: cost effective, creativity, educational benefits, environmental problem, pedagogical intervention, resiliency in education

INTRODUCTION

Background of the study

The world is tremendously becoming technologically advance of all things that are used already by human race. The things that are used in the houses, companies, offices, agencies and organizations those include schools which sometimes materials and supplies are being abused and there is no proper way of using them. Because of these, it is getting worse in terms of economy and environment problems due to many concerns and issues, which are brought by the nature and by fabricated items of human being. One of them is the waste disposal, which is being scattered everywhere and anywhere. Some people do not know how to dispose it properly. Some children are not totally trained and educated on how to do it. Because of that, the proper place to train and educate them is in the school. It has a big factor to contribute in relation to waste management.

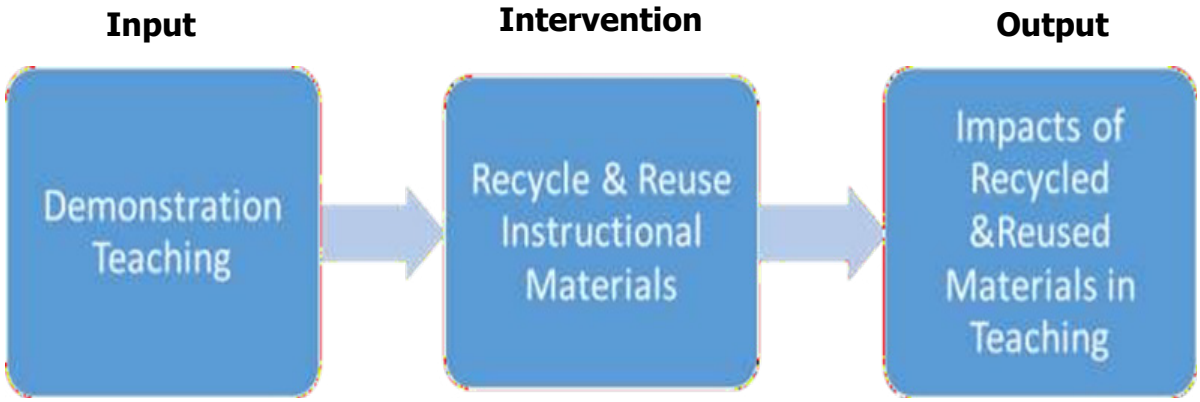
Now more than ever, educators have critical roles to play, not only in providing their learners with knowledge and skills to address challenges and issues, but also in promoting the values that will instill concernment and responsibility towards their community and in the whole world. Educators need to step back and redefine education based on the challenges have been facing today especially in terms of environmental issues. It should

be based on pedagogical principles such as inter-disciplinary, value orientation, cultural awareness, problem-solving orientation, methodological diversity, participation and local involvement (EPA, 2018). The overall aim of education is far beyond the classroom setting, it is to empower the learners on what to contribute to the society in a reflected and responsible manner. The school personnel, students and stakeholders are the main sources of using different materials in school as well as in the environment. The school personnel have something to do regardless of advance in technology to minimize the garbage in school and anywhere through recycling and reusing of it. It could also help in the teaching and learning process by using them as instructional materials to augmenting the computer aided inside the classroom. The millennial learners and teachers are expected to be creative and innovative in their own ways of teaching and learning by using their learning skills, literacy skills, and life skills. Creativity and innovation is not only done through computer technology aided but in some other ways especially if education is concern.

This study was conducted in order to find out the utilization and perception of recycled and reused materials as instructional materials in pedagogical process in the classroom. In the theory "constructivism" of John Dewey, a theory of knowledge (epistemology) argues that humans generate knowledge and meaning from an interaction between their experiences and their ideas. As a theory of learning, constructivism is relevant in this study as the researcher wishes to establish how learners learn and teachers teach. Constructivism is a theory -- based on observation and scientific study -- about how people learn. It is studied that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. The role of the teacher in the social constructivist classroom is to help students to build their own knowledge through their creativity and innovative skills and to control the existence of students during the learning process in the classroom. Hence, the teacher concentrates on students' learning rather than on teacher performance.

Teaching the learners on good environmental habits by reusing and recycling classroom items at school is one of the signs of practicing pedagogical principles. It is not only will be demonstrated on how to live an Eco-friendly life, but will also save a lot of money on classroom supplies in the part of the teacher (Janelle Cox, 2019). This study sought to determine the utilization rate and perception of recycled and reused materials utilized in the demonstration teaching as instructional materials.

Research Paradigm



Theoretical Framework

In the theory of constructivism of John Dewey, is a theory of knowledge (epistemology) that argues that humans generate knowledge and meaning from an interaction between their experiences and their ideas. As a theory of learning, constructivism is relevant in this study as the researcher wished to establish how learners learn and teachers teach. Constructivism is basically a theory -- based on observation and scientific study -- about how people learn. It says that people construct their own understanding and knowledge of the world, through experiencing things and reflecting on those experiences. The role of the teacher in the social constructivist classroom is to help students to build their knowledge and to control the existence of students during the learning process in the classroom. Finally, the teacher concentrates on students' learning rather than on teacher performance.

METHODOLOGY

The study was conducted by using Quasi-experimental, which is an empirical interventional study to estimate the causal effect of an intervention on target population without random assignment.(Cresswell, J.W. & Cresswell, D.,2018). It involved selecting groups without any random pre-selection processes. The participants were the total population of twenty seven students (27) of groups of second year students, who were taking Bachelor of Elementary Education (BEEd). They had their demonstration teaching inside the class of the researcher by using recycled and reused materials as their instructional materials.

After the demonstration teaching they were interviewed. They were asked in relation to their experiences and preparation they had done while having a demonstration teaching by using recycled and reused materials as their instructional materials. It was recorded in video in relation to their answers. The respondents were asked about the recycled and reused materials they used in their teaching and learning as instructional materials as well as they were asked about the effect of using recycled and reused materials as instructional materials in teaching their students inside the classroom. Their answers were consolidated and tallied the common answers to the questions were asked from them. To make it specific, researcher asked the following questions: What are the recycled and reused materials you used in your demonstration teaching? Moreover, how is the effect of using recycled and reused materials as instructional materials?

The researcher acted as observer. During the observation, the researcher did not interfere the demonstration until all of the participants were able to finish their demonstration teaching. At the same time, the researcher jotted down notes based on the observation made.

After the consolidation of the respondents' answers to the questions asked, they were analyzed and interpreted based on the study by using thematic approach.

RESULTS AND DISCUSSION

The data and information needed were gathered from actual teaching demonstration and through videos. It was listed down the reused and recycled instructional materials used and were tallied as reflected on the table below:

Utilization of Recycled and reused materials in the demonstration teaching

The table 1 above presents data on the utilization of recycled and reused materials by participants in a demonstration teaching session, where a total of 27 participants were involved. The materials utilized varied, with plastic bottles being the most frequently used at 88.89%, followed by drinking cans at 74.07%. Other materials such as plastic water containers and plastic cups were also commonly used, each at 55.56%. Cartoons and drinking straws were utilized by 44.44% and 40.74% of the participants, respectively. Newspapers and brochures were used by 37.03% of participants, while breakable bottles were also used by 40.74%. Wood sticks had the least utilization, with only 18.52% of participants incorporating them.

The data shows that plastic materials, particularly bottles and cans, are the most favored by participants in the demonstration, likely due to their accessibility, durability, and potential for various uses in educational activities. In contrast, materials like wood sticks, which may be less versatile, were used by fewer participants. This trend could indicate a preference for more practical or easily accessible materials in creating teaching tools or learning aids.
The data highlights the importance of encouraging sustainable practices in educational settings. The higher utilization of plastic materials could signal a reliance on such resources, which, despite their benefits in terms of availability and usability, contribute to environmental waste if not disposed of properly. It also suggests that materials that are less environmentally impactful, such as wood sticks, need further promotion for wider adoption. Moreover, the data suggests a need for greater awareness of alternatives to plastic and for more creative approaches to utilizing materials that are both sustainable and educational.

This implicates that there is an opportunity to enhance environmental consciousness among participants by integrating more sustainable and reusable materials into demonstration teaching activities. Educators can use this information to create awareness and encourage practices that reduce the environmental impact of teaching materials, promoting a culture of sustainability within the educational sector.

Based on the findings of Ding et al., (2023) and Chatzopoulos et al., (2023), that the integration of service design pedagogies in education has shown promise in encouraging students to innovate with recycled materials. As supported also by Neinhuis (2021), service learning projects have demonstrated that recycled materials can serve as catalysts for product innovation, particularly in higher education contexts. This pedagogical approach supports the notion that higher-level learning occurs when students are challenged to apply their creativity in real-world contexts, turning waste into valuable educational resources.

Moreover, by implementing green chemistry principles that utilize recycled materials, educators can further enrich the learning experience. This approach enhances students' knowledge of chemical safety and sustainability and allows them to engage practically with ecological concerns (Zahari & Taha, 2021). Similarly, educational projects involving building and crafting with recycled materials can significantly improve students' analytical thinking and problem-solving skills (Chystiakova, 2022). Projects that require students to rethink waste materials highlight the potential for upcycling, cultivating a deeper understanding of resource management and sustainability (Neinhuis, 2021; Ashraf & Alanezi, 2020).

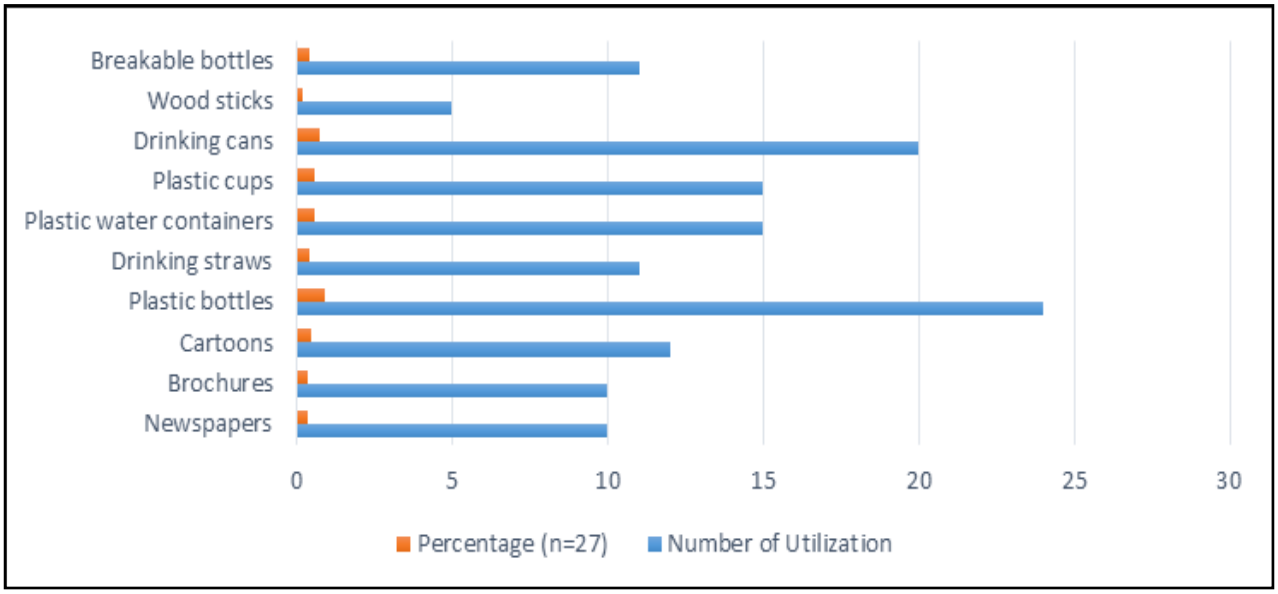


Figure 1: Utilization of Recycled and reused materials by the participants in the demonstration teaching.

Perceptions of using recycled and reused instructional materials in demonstration teaching

The data presents the responses of 27 participants regarding the effect of using recycled and reused materials as instructional materials (IMs) in teaching. The responses were varied, with some highlighting the benefits of environmental conservation, economic savings, and fostering creativity, while others mentioned the challenges of preparation and questioned the effectiveness of using these materials in the classroom.

Among the positive responses, many participants noted the utility of recycled materials in reducing waste, saving money, and promoting environmental awareness. For example, several participants mentioned how using recycled materials can help reduce garbage and conserve resources. Others emphasized the creativity required in repurposing these materials, describing the process as both beneficial for the environment and a source

of personal development. However, there were also a number of responses indicating that the effectiveness of these materials depends largely on the creativity and preparation involved. Some participants expressed that while the use of recycled materials could be useful, it was not always easy to prepare and may not have a significant impact on student learning.

The interpretation of the data reveals a mixed perception of using recycled and reused materials as instructional tools. A substantial number of respondents recognized the environmental benefits, such as reducing waste and conserving resources, as well as the economic advantages, particularly for teachers who can save money by utilizing materials they already have. The emphasis on creativity and innovation suggests that participants view the repurposing of materials as an opportunity for both personal growth and student engagement.

However, there were also critical responses indicating that the use of recycled materials may not always yield significant educational outcomes. Some participants felt that these materials were difficult to prepare and may not enhance the learning experience as much as other more conventional teaching aids. These responses highlight the challenge of integrating recycled materials into a teaching strategy effectively and the potential limitations when it comes to the practical application of these materials in the classroom.

The implications of this data suggest that while the use of recycled and reused materials can be beneficial, it may require additional support in terms of teacher training and resources to maximize its effectiveness. Teachers may need guidance on how to creatively incorporate these materials into their teaching strategies, ensuring that they not only serve environmental and economic purposes but also contribute to meaningful learning experiences. Furthermore, future studies should explore the specific contexts in which recycled materials can be most effectively used, taking into account factors such as subject matter, student needs, and available resources.

Table 1. The perception on the utilization recycled and reused materials as instructional materials.

Respondent	Answers from video by answering the question on the utilization of recycled & reused materials as IMs
1	For me, the effect of using recycled and reused materials as instructional is very useful and lessen the garbage in the environment.
2	It was great, can be useful in the environment and save money in the part of the teacher.
3	It was great, can value the environment in terms of garbage and it save money instead of buying the materials
4	It has no great or less effect but students will learn how to value the things around them by not throwing their used materials.
5	First, they are economically and very available; second, we are saving mother earth; and, third we are learning how to be creative and innovative.
6	It is related to home economic, it is great and save the garbage.
7	The effect for me, it is very useful and can help the garbage in the surroundings.
8	For me, the effect, it is useful and have less garbage.
9	The effect is, it can help the environment.
10	The effects are many, one is by having creativity.
11	The effect is creating another thing from out of it.
12	It helps saving money to me and how to be creative.
13	For me, it has great effect and teaches students to be more creative.
14	For me, it has great effect, convenient, useful and needs creativity.
15	It is useful especially by saving the garbage.
16	For me, using recycled & reused materials in the classroom is not that effective. Still, it depends on how creative the individual is.
17	It is hard to prepare and has no positive effect to me but it helps our environment.
18	It is ok but hard to prepare.
19	As I teach as if I am teaching also technology by creating something.
20	It a challenge and I enjoy preparing my visual aids using recycled and reused materials found around us.
21	I help collecting the garbage in our surrounding.
22	I did not spend money to buy my materials instead I collected the empty items at home.
23	Its effect to me is to be creative and to be a discoverer.
24	I'm not good in art. But I help the garbage spreading.
25	It has good effect to the environment but not easy to prepare the materials.
26	Positive effect in saving money.
27	For me, recycled and reused materials have no big effect in teaching but the teacher becomes creative.

CONCLUSION

The study explored the utilization and perceptions of recycled and reused materials as instructional materials in demonstration teaching. The findings suggest that these materials are commonly used due to their accessibility, cost-effectiveness, and potential environmental benefits. The most frequently used materials include plastic bottles, cans, and other easily available items, emphasizing the importance of sustainability in educational practices.

Participants noted several advantages, such as reducing waste, saving money, and fostering creativity. However, challenges were also identified, particularly in the preparation process, and there were mixed views on the effectiveness of these materials in enhancing student learning. Despite these concerns, the general perception was positive, with many participants recognizing the value of using recycled materials to promote environmental consciousness and creativity.

This study highlights the need for further research on how to integrate recycled materials more effectively into educational settings. Teachers would benefit from additional training and resources to enhance the creative use of these materials in a way that both supports environmental sustainability and improves teaching outcomes.

RECOMMENDATION

It is recommended that educators receive more training and support in the creative use of recycled and reused materials to maximize their effectiveness as instructional tools. Schools should foster an environment where sustainability is prioritized by incorporating eco-friendly practices into the curriculum. This can be achieved through workshops or professional development programs that guide teachers on how to effectively integrate these materials into their teaching methods. Additionally, further research is needed to identify the most suitable materials for different subjects and age groups, as well as to explore the potential challenges in preparing and utilizing these materials. By promoting a culture of creativity and environmental consciousness, schools can enhance student engagement while contributing to a more sustainable future.

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