Comparison of perceptions on re-purposing finished projects as teaching aids in schools

Naw Sara Hser Blut Htoo[1], Zhang Jingru[2], Hong Minghui[3], Tha Th Yu Paw[4], Naltan Lampadan[5], Sajaporn Sankham[6]
Asia-Pacific International University[1,2,3,4,5,6]
naltan@apiu.edu[1,2,3,4.5,6]

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ABSTRACT

Creative teaching aids enhance student engagement and learning outcomes by making the learning process more interactive, relatable, and memorable. These aids—ranging from visual tools like charts, diagrams, and infographics to interactive materials like models, games, diatoms, digital simulations, and multimedia content—stimulate curiosity and encourage active participation. Although a wide range of teaching aids has been utilized in educational settings, the idea of leveraging completed student projects as instructional tools remains largely underexplored. This study investigated the potential of repurposing finished projects, such as dioramas and bulletin boards, as innovative teaching aids in educational settings. The study aimed to assess undergraduate teachers and students, and 23 elementary teachers and 58 elementary students' awareness of teaching aids and to compare the perceptions regarding the challenges, benefits, and recommendations related to repurposing projects. The findings showed that there was a significant difference in awareness considering the occupation of the respondents. Also revealed in the study were the perceived challenges and benefits of the participants with regards to diorama and bulletin board.

Keywords: Teaching aids, Dioramas, Bulletin boards, Learning aids, Curriculum integration.

Introduction

In recent years, educators have increasingly emphasized the value of hands-on projects, such as dioramas and bulletin boards, in enhancing student learning and engagement. These creative works serve as a means of demonstrating understanding and applying knowledge, often with significant time and effort invested by students. However, once graded, these projects are frequently discarded, leading to wasted resources and missed opportunities for further

educational use. This raises critical questions about the potential of repurposing such projects as teaching aids, particularly in schools that suffer from a lack of instructional materials. The exploration of this issue is especially relevant in the context of educational institutions like the Asia-Pacific International University (AIU) and the Adventist International Mission School (AIMS), where student-made projects are often disposed after evaluation.

The core problem addressed in this research is how repurposing finished projects can alleviate the shortage of teaching aids in schools. This issue stems from two primary concerns: first, the extensive wastage of student-created resources, and second, the ongoing deficiency of teaching materials, which affect the quality of education in resource-constrained schools (Shabiralyani, Hasan, Hamad, & Iqbal, 2015). By investigating the awareness, challenges, and benefits of using dioramas and bulletin boards as teaching aids, this study aims to offer practical recommendations for maximizing the utility of these often-neglected materials. Specifically, the research will examine participants' familiarity with dioramas and bulletin boards, assess whether awareness varies by factors such as gender, age, occupation, and country of origin, and explore the perceived challenges and advantages of repurposing these projects for instructional purposes.

Literature review

While many teaching aids have been explored, there is little attention given to the potential of using finished projects as teaching aids in schools.

Teaching aids are vital tools that enhance student learning by simplifying complex concepts and engaging multiple senses (Ordu, 2021). They can range from simple visuals like posters to interactive resources such as digital media and physical models (Višnić, Bibić, Vučković, Ivkov-Džigurski, & Kotnik, 2017). The primary aim of these aids is to support lesson objectives and accommodate various learning styles, ultimately improving comprehension, retention, and engagement in a dynamic learning environment. Project-Based Learning (PBL) further benefits from teaching aids, as they provide tangible ways to explore concepts (Kokotsaki, Menzies, & Wiggins, 2016). Teaching aids like dioramas or bulletin boards not only showcase students' creative outputs but also serve as practical tools for instruction, making learning more meaningful as students apply their skills and knowledge in real-world contexts.

Dioramas, which are three-dimensional models representing scenes or concepts, have long been utilized as effective educational tools, especially for visualizing abstract or complex ideas (Prasetya & Maisaroh, 2023). Their immersive nature helps bridge the gap between theoretical

concepts and practical understanding, making learning more interactive and memorable (Cools, Conradie, Ciocci, & Saldien, 2018). In the context of PBL, dioramas help students demonstrate their comprehension of specific subjects, whether in history, geography, or science. As students craft dioramas, they develop critical thinking and creative problem-solving skills, reinforcing what they have learned.

Bulletin boards are another versatile teaching aid, functioning as dynamic spaces where teachers and students can display information, student work, or important announcements. Bulletin boards promote collaboration and serve as a focal point for communication and interaction within the classroom (Hardy, 1923). Different types of bulletin boards—announcement, educational, thematic, and interactive—offer unique benefits, ranging from disseminating information to engaging students in ongoing class discussions (Fuvesi, 2009). Interactive boards, in particular, can foster deeper student engagement by prompting participation through polls, questions, or creative contributions.

One of the most pressing challenges in education is the lack of adequate teaching resources. Studies highlight how the shortage of teaching aids in underfunded schools can negatively affect both teaching quality and student outcomes (Maffea, 2020). The lack of interactive tools and materials often leads to diminished learning experiences, especially for disadvantaged student groups, exacerbating existing educational disparities. Teachers in resource-limited environments may face burnout as they struggle to provide engaging lessons without the necessary materials.

Despite these challenges, there is untapped potential in repurposing finished student projects, such as dioramas and bulletin boards, as teaching aids. By doing so, schools can not only mitigate resource shortages but also promote sustainability by reducing waste. This strategy leverages students' creative efforts, allowing their work to serve as an instructional resource for future learners, thereby enriching the educational environment without additional costs (Maulana, Kolbi, Heriyadi, & Pahmi, 2023). Encouraging university students to donate their projects to resource-poor schools is a practical solution, aligning with Maffea's (2020) recommendation to involve the community in overcoming resource constraints.

Several related studies reinforce the importance of creative teaching aids in enhancing student engagement and learning outcomes. For instance, Maulana et al. (2023) demonstrate how teaching aids improve students' understanding of difficult subjects like mathematics. Similarly, Kamaruddin and Sulaiman (2017) discuss how interface design in teaching aids, particularly in higher

education, can influence student engagement and learning efficacy. Both studies underscore the importance of well-designed, interactive tools in education, validating the premise that repurposed projects can serve as effective teaching aids.

Research objectives

This study aims to assess the level of awareness among teachers and students regarding the use of finished student projects as teaching aids, and to compare the perceptions of the benefits, challenges, and recommendations related to repurposing the materials in classroom settings. It also seeks to explore how respondents' roles influence their view on the effectiveness of reusing the projects for educational purposes.

Significance of the study

By exploring this topic, the research will enhance understanding of how to mitigate wasted student effort and address the shortage of educational resources in schools. By highlighting the benefits and barriers of repurposing finished projects, this research seeks to inform educators, administrators, and policymakers about effective strategies for optimizing resource use in classrooms.

Research methods

This study employs a quantitative research design to gather and analyze numerical data about the perspective of stakeholders on the repurposing of finished projects (dioramas and bulletin boards) as teaching aids in educational settings. A structured survey instrument will be used to collect data from participants, allowing for systematic comparison and analysis of responses.

The population of this study includes Asia-Pacific International University (AIU) education students, AIU Education teachers, AIU Education department administrators, and Adventist International Mission School (AIMS) teachers. Located in Muak Lek, Thailand, AIU is a private institution approximately 108 kilometers (about 67.11 mi) northeast of Bangkok. As of the second semester of 2024, AIU boasts a diverse student body of approximately 100 sophomores to senior bachelor education students, with a dedicated faculty of 13 education teachers and administrators. Aside from AIU, the study also involves Adventist International Mission School (AIMS), an affiliated institution. The AIMS faculty includes approximately 34 teachers. The study will be conducted within the premises of Asia-Pacific International University, focusing on stakeholders within the university community and affiliated schools to gather insights and perspectives on the research topic.

Stratified sampling technique is employed to ensure representation from different stakeholder groups within the population. Stratification is based on participant categories such as AIU education students, AIU education teachers, AIU

administrators, and AIMS teachers. Approximately 60% of the total population was targeted for participation, and a total of 89 individuals responded to the survey. Random sampling methods are then used within each group to select participants, ensuring that each subgroup is adequately represented in the sample (Parsons, 2014). Data were collected through surveys administered on-site to participants. Participants will be provided with clear instructions for completing the survey, ensuring confidentiality and anonymity of responses. The data collected will be processed using jamovi and Microsoft Excel.

The study reveals positive attitudes towards finished dioramas and bulletin boards as educational tools, highlighting their potential to enhance learning experiences. However, challenges such as resource limitations and issues with engagement and relevance were found, emphasizing the need for careful integration into the curriculum. Demographic factors like age and occupation influence awareness levels, with educators showing greater awareness than students. Comparing teacher and student perspectives highlighted common concerns about resources and engagement, showing the importance of tailored educational approaches. Therefore, integrating interactive tools like finished dioramas and bulletin boards holds promise for enhancing student engagement, understanding, and creativity in the classroom.

Results and discussion

Table 1 *Awareness of Diorama*

Diorama	Mean	SD
I have made a diorama.	3.99	1.309
I am familiar with the concept of using diorama as teaching aids in schools.	3.74	1.189
I have a clear understanding of how diorama can enhance the learning experience in the classroom.	3.92	1.096
Diorama explains complex educational concepts in a visually engaging manner.	4.03	0.903
The purpose of using diorama often aligns with the learning objectives of the curriculum.	3.98	0.982
Average	**3.932**	**1.0958**

The findings from respondents' ratings highlight a generally positive attitude toward dioramas as teaching aids. With a mean score of 3.99, respondents demonstrated high practical experience and involvement in creating dioramas. They recognized dioramas' ability to enhance learning (mean rating of 3.92) and communicate complex concepts effectively (mean rating of 4.03), while also aligning with curriculum objectives (mean rating of 3.98). Despite familiarity with using dioramas in schools (mean rating of 3.74), the data confirms their effectiveness as engaging instructional tools (McGregor, Deb, & Gadd, 2019).

Table 2 *Awareness of Bulletin Boards*

Bulletin Board	Mean	SD
I have made a bulletin board.	3.98	1.338
I am familiar with the concept of using bulletin boards as educational tools.	3.91	1.141
I understand how bulletin boards can be effectively utilized in educational settings.	4.11	0.877
Bulletin boards are effective in visually communicating important information to students.	4.23	0.854
The use of bulletin boards significantly enhances the learning environment in educational institutions.	4.18	0.838
Average	4.082	1.0096

The respondents' ratings indicate a high level of engagement and positive perception of bulletin boards as educational tools. They reported strong practical involvement, with a mean rating of 3.98 for having created bulletin boards themselves, and a solid familiarity with their use in educational contexts (mean rating: 3.91). Respondents also demonstrated a deep understanding of bulletin boards' effectiveness (mean rating: 4.11), recognizing their ability to visually communicate important information (mean rating: 4.23) and enhance the learning environment (mean rating: 4.18). These findings highlight respondents' belief in bulletin boards as valuable instructional resources. (Dos Santos & Wright, 2006). (See Table 2)

Table 3 *Awareness of Diorama by Gender*

Gender	Number	Mean	SD	SE
Male	60	3.92	0.962	0.124
Female	28	3.95	0.784	0.148
	F	df1	df2	p
Welch's	0.019	1	63.8	0.891
Fisher's	0.0164	1	86	0.898

The study's findings showed that there was no difference in how aware male and female participants were about dioramas. It shows that both genders showed similar levels of awareness (Males: M = 3.92, SD = 0.962; Females: M = 3.95, SD = 0.784). This shows that regardless of gender, individuals have similar levels of understanding and familiarity with dioramas as teaching tools. Statistical tests, including Welch's and Fisher's independent samples t-tests, yielded non-significant p-values ($p > 0.05$), further supporting the conclusion that gender did not influence the participants' awareness of dioramas. (See Table 3)

Table 4 *Awareness of Diorama by Age*

Age	Number	Mean	SD	SE
18-24	42	3.7	0.909	0.1402
25-34	28	3.84	0.893	0.1687
35-44	3	4.53	0.643	0.3712
45-54	9	4.47	0.656	0.2186
55-64	6	4.87	0.242	0.0989
	F	df1	df2	p
Welch's	12.5	4	12	< .001
Fisher's	3.92	4	83	0.006

The study results indicate a significant difference in awareness of dioramas across age groups. Participants aged 18–24 scored an average of 3.7, while those aged 25–34 scored 3.84. Older participants demonstrated higher awareness, with scores of 4.53 for the 35–44 age group, 4.47 for the 45–54 age group, and 4.87 for those aged 55–64. Welch's and Fisher's tests confirmed significant differences in awareness ratings among age groups ($p < .001$ and $p = 0.006$, respectively). These findings suggest that awareness of dioramas increases with age, with older participants exhibiting greater awareness than their younger counterparts. (See Table 4)

Table 5 *Awareness of Diorama by Country of Origin*

Country	N	Mean	SD	SE
Thailand	9	3.69	0.831	0.277
Myanmar	36	3.74	0.86	0.143
Malaysia	6	4.13	0.653	0.267
Philippines	14	4.69	0.536	0.143
Cambodia	4	3	1.071	0.535
India	3	4.13	0.808	0.467
China	12	3.77	1.102	0.318
Others	4	4.55	0.342	0.171
	F	df1	df2	p
Welch's	4.08	7	14.7	0.011
Fisher's	3.18	7	80	0.005

The study's findings indicated; a significant difference in diorama awareness among participants from different countries. Filipino participants had the highest mean awareness score of 4.69, followed by Malaysian participants at 4.13, while Cambodian participants had the lowest score of 3.00. Statistical tests, including Welch's and Fisher's independent samples t-tests, confirmed substantial differences in awareness scores among countries ($p = 0.011$ and $p = 0.005$, respectively). These results suggest that awareness of dioramas varies significantly based on participants' countries of origin, with some exhibiting higher levels of awareness than others. (See Table 5)

Table 6 *Awareness of Diorama by Occupation*

Occupation	N	Mean	SD	SE
AIU Education Teachers	*6*	*4.87*	*0.242*	*0.0989*
AIMS Teachers	*23*	*4.45*	*0.616*	*0.1284*
AIU Education Students	*59*	*3.63*	*0.89*	*0.1159*
	F	df1	df2	p
Welch's	32.2	2	27.2	< .001
Fisher's	13	2	85	< .001

The study's results indicate a significant difference in diorama awareness across different occupations. Teachers from AIU Education and AIMS had the highest mean awareness scores, with AIU Education Teachers scoring 4.87 (SD = 0.242) and

AIMS Teachers scoring 4.45 (SD = 0.616). In contrast, AIU Education Students had a lower mean awareness score of 3.63 (SD = 0.89). Statistical tests, including Welch's and Fisher's independent samples t-tests, confirmed that these differences were significant ($p < .001$). This suggests that educators have a higher awareness of dioramas compared to students. (See Table 6)

Table 7 *Awareness of Bulletin Boards by Gender*

Gender	N	Mean	SD	SE
Male	60	4.11	0.812	0.105
Female	27	4.01	0.899	0.173
	F	df1	df2	p
Welch's	0.237	1	45.9	0.629
Fisher's	256	1	85	0.614

The study revealed that there was no contrast in the awareness of bulletin boards between male and female participants. Both genders shown comparable levels of awareness, with males averaging a score of 4.11 and females slightly lower at 4.01. Welch's and Fisher's independent samples t-tests, yielded non-significant p-values ($p > 0.05$), showing that gender did not influence participants' awareness of bulletin boards (see Table 7).

Table 8 *Awareness of Bulletin Boards by Age*

Age	N	Mean	SD	SE
18-24	42	3.84	0.866	0.134
25-34	27	4.13	0.832	0.16
35-44	3	4.47	0.503	0.291
45-54	9	4.49	0.617	0.206
55-64	6	4.77	0.32	0.131
	F	df1	df2	p
Welch's	5.77	4	12	0.008
Fisher's	2.84	4	82	0.029

The data indicated that awareness of bulletin boards varied across different age groups. The average awareness scores were as follows: 18–24 years: 3.84, 25–34 years: 4.13, 35–44 years: 4.47, 45–54 years: 4.49, and 55–64 years: 4.77. Welch's and Fisher's ANOVA tests revealed statistically significant

differences in awareness scores among age groups ($p < 0.05$). This suggests that age significantly influences participants' awareness of bulletin boards, with notable variations across demographics. (See Table 8)

Table 9 *Awareness of Bulletin Boards by Country of Origin*

Country	N	Mean	SD	SE
Thailand	9	3.98	0.484	0.161
Myanmar	35	3.91	0.868	0.147
Malaysia	6	3.93	0.927	0.378
Philippines	14	4.71	0.398	0.106
Cambodia	4	3.2	1.166	0.583
India	3	4.6	0.693	0.4
China	12	3.98	0.9	0.26
Others	4	4.6	0.365	0.183
	F	df1	df2	p
Welch's	3.93	7	14.4	0.013
Fisher's	2.79	7	79	0.012

Data analysis reveals considerable variation in participants' awareness of bulletin boards based on their country of origin. Filipino participants had the highest awareness level, with an average score of 4.71 (SD = 0.398), followed by participants from India at 4.60 (SD = 0.693). In contrast, individuals from Cambodia exhibited the lowest awareness, averaging 3.20 (SD = 1.166). Statistical tests, including Welch's and Fisher's ANOVA, confirmed significant differences in awareness scores among nations ($p < 0.05$). This indicates that country of origin influences awareness, with notable disparities across different countries. (See Table 9)

Table 10 *Awareness of Bulletin Boards by Occupation*

Occupation	N	Mean	SD	SE
AIU education teachers	6	4.77	0.367	0.15
AIMS teachers	23	4.51	0.555	0.116
AIU Education Students	58	3.84	0.861	0.113

	F	df1	df2	p
Welch's 14.3	14.3	2	18.5	< .001
Fisher's 8.83	8.83	2	84	< .001

The survey revealed that awareness of bulletin boards varies by occupation. AIU Education instructors had the highest average awareness score of 4.77, followed by AIMS teachers at 4.51, while AIU Education Students scored lower at 3.84. Statistical tests, including Welch's and Fisher's t-tests, confirmed significant differences in awareness scores across occupational groups ($p < .001$). This indicates that occupation influences awareness, with educators being more knowledgeable than students. (See Table 10)

Educators and students share similarities and differences in their views on the challenges of using completed dioramas in classrooms. Both groups expressed concerns about limited resources, such as time and materials, along with issues of student participation and curriculum relevance. They recognized the importance of addressing creativity and maintenance of dioramas. Teachers highlighted the complexity of dioramas for young learners and the potential for repetitive educational value, while students focused on academic challenges like topic selection and information adequacy. Additionally, students raised concerns about coordination and logistics, while teachers were more concerned about finding schools willing to adopt diorama-based learning. These perspectives emphasize the need for careful planning and deliberation to tackle the obstacles associated with using dioramas in education.

Teachers and students at AIU share concerns about the use of bulletin boards in education. Teachers emphasize that the content should align with their lessons and be accurate, while also mentioning challenges with transporting boards and engaging interest. Students echo these concerns, questioning the accuracy of the information and the difficulty of moving boards without damage. Both groups discuss practical issues like design, relevance, durability, and maintenance responsibilities, agreeing that these challenges must be addressed for bulletin boards to be effective educational tools. Regarding reusing completed projects, students view dioramas positively, believing they enhance engagement, understanding, and creativity. They suggest displaying projects in classrooms, libraries, or at other schools, but worry about resource limitations and ensuring efficiency and relevance. Teachers also see value in imaginative projects, recommending sharing them with other schools, using them during internships, or organizing fairs for feedback. Both groups agree that reusing projects makes learning more enjoyable and promotes greater involvement in school activities.

Discussion and conclusion

This study aimed to assess the awareness of dioramas and bulletin boards as

educational tools among students and teachers from Asia-Pacific International University (AIU) and Adventist International Mission School (AIMS). The hypotheses explored whether demographic factors such as gender, age, country of origin, and occupation influence awareness levels.

The data showed less significant gender differences in awareness of dioramas ($p=0.891$) or bulletin boards ($p=0.629$). This aligns with social cognitive theory (Bandura, 1986), which says that equal exposure to learning environments fosters similar knowledge and attitudes across genders.

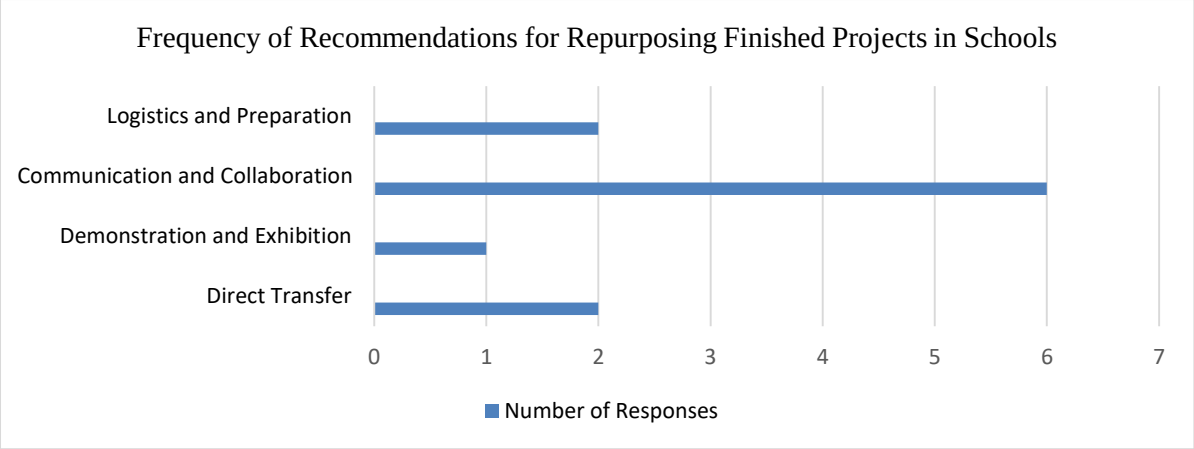
Age, however, played a notable role. Older participants showed higher awareness levels, which aligns with Knowles' Adult Learning Theory (1984), suggesting that experience over time deepens familiarity with educational tools.

Cultural background also influenced awareness. Participants from the Philippines and India score higher, a pattern explained by Hofstede's cultural dimensions theory (1980), which highlights how cultural values shape engagement with collaborative and visual learning methods like dioramas and bulletin boards.

Occupation was another important factor, with educators demonstrating significantly greater awareness than students. This support constructivist learning theory (Piaget, 1952), which emphasize the teacher's role as a guide who facilitates learning through instructional aids.

Both groups acknowledged challenges, particularly limited resources and difficulties aligning these tools with the curriculum. These concerns mirror findings by McGregor, Deb, and Gadd (2019), who discuss practical barriers in using dioramas effectively. The appreciation for creativity and the reuse of projects reflects Kolb's experiential learning theory (1984), which stresses the importance of active engagement for deeper learning.

This study met its objective by demonstrating that awareness of dioramas and bulletin boards as educational tools is influenced by age, country of origin, and occupation, but not by gender. These findings support educational theories such as adult learning, constructivism, and cultural learning frameworks. It shows the importance of experience, cultural background, and professional role in shaping awareness.



Research implication

The recommendations for repurposing finished projects in schools emphasize several key strategies, with the most recommended being communication and collaboration with different schools. Effective communication between teachers, students, and various schools ensures that finished projects, such as dioramas and bulletin boards, are used as valuable teaching aids. Collaborating with schools and organizations helps tailor these projects to meet specific educational needs. Direct transfer is another approach, where students or teachers can deliver the projects to schools, either transporting smaller items by car or arranging collection by school personnel. Demonstration and exhibition of projects are also encouraged, allowing students to visually present their work and further engage audiences. Logistics and preparation are crucial, involving proper documentation, packaging, and labeling to ensure the safe transport of projects. This requires careful planning and coordination to facilitate smooth delivery and effective use in schools. These strategies highlight the importance of collaboration and preparation to maximize the educational value of repurposed projects.

Limitation and recommendation for further research

The limitation of this research is its focus on a specific educational community, the Asia-Pacific International University (AIU) and Adventist International Mission School (AIMS), which may restrict the findings to broader educational contexts.

Expanding the sample size and including participants from diverse educational institutions and regions would enhance the generalizability of the findings.

Researchers could also explore the impact of specific design elements of dioramas and bulletin boards on student engagement and learning outcomes.

Future research should focus on longitudinal studies to track changes in awareness and perceptions of dioramas and bulletin boards among educators and students over time.

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