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Analysis of the Effectiveness of Digital Infographics on Green Consumer Behaviour through Enchanced Enviromental Literacy as an Effort to Achieve the Sustainable Development Goals

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Abstract: Environmental issues such as climate change, pollution, and waste accumulation urgently highlight the need to shift public consumption patterns through green consumer behaviour-actions that explicitly factor environmental impacts into every choice regarding products and services. This study evaluates the effectiveness of digital infographic educational media focused on green consumer behaviour to improve environmental literacy among vocational students, aligning directly with Sustainable Development Goals (SDGs 4, 12, and 13). Employing a quantitative approach with a one-group pre-test and post-test design, the study involved 43 Culinary Education students as respondents, who were selected through a cluster sampling technique based on their class grouping. Non-test techniques were utilized to assess how digital infographics contributed to targeted SDGs indicators. Post-intervention results demonstrated a clear improvement across academic and behavioral metrics. The students' average knowledge score increased from 12.14 to 14.47, while their average behavior score rose from 47.63 to 54.95. Furthermore, N-Gain analysis revealed a high improvement category for knowledge with a score of 0.81, alongside a moderate improvement for attitude at 0.34. Effect size evaluations using Cohen's d confirmed high impacts of 0.80 and 0.82. Ultimately, this specialized digital infographic media proves to be an effective educational tool for enhancing comprehension and inspiring students to adopt sustainable, environmentally conscious consumer habits.

Keywords: Consumption Behaviour; Digital Infographics; Environmental literacy; Green Consumer Behaviour; SDGs.

Abstrak: Isu lingkungan seperti perubahan iklim, polusi, dan akumulasi limbah sangat menyoroti perlunya mengubah pola konsumsi publik melalui tindakan perilaku konsumen ramah lingkungan yang secara eksplisit memperhitungkan dampak lingkungan dalam setiap pilihan produk dan layanan. Studi ini mengevaluasi efektivitas media edukasi infografis digital yang berfokus pada perilaku konsumen hijau untuk meningkatkan literasi lingkungan di kalangan siswa vokasi, selaras langsung dengan Tujuan Pembangunan Berkelanjutan (SDGs 4, 12, dan 13). Dengan pendekatan kuantitatif dengan desain pra-tes dan pasca-tes satu kelompok, studi ini melibatkan 43 mahasiswa Pendidikan Kuliner sebagai responden. Teknik non-tes digunakan untuk menilai bagaimana infografis digital berkontribusi pada indikator SDGs yang ditargetkan. Hasil pasca-intervensi menunjukkan peningkatan yang jelas di antara metrik akademik dan perilaku. Skor rata-rata pengetahuan siswa meningkat dari 12,14 menjadi 14,47, sementara skor perilaku rata-rata mereka naik dari 47,63 menjadi 54,95. Selain itu, analisis N-Gain menunjukkan kategori peningkatan pengetahuan yang tinggi dengan skor 0,81, bersama dengan peningkatan sikap yang sedang sebesar 0,34. Evaluasi ukuran efek menggunakan d Cohen mengonfirmasi dampak tinggi sebesar 0,80 dan 0,82. Media infografis digital khusus ini terbukti menjadi alat edukasi yang efektif untuk meningkatkan pemahaman dan menginspirasi mahasiswa mengadopsi kebiasaan konsumen yang berkelanjutan dan ramah lingkungan.

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Kata kunci: Perilaku Konsumsi; Infografis Digital; Literasi Lingkungan; Perilaku Konsumen Hijau; SDGs.

INTRODUCTION

Food waste has emerged as one of the most pressing environmental challenges worldwide (Wani et al., 2024). Beyond the economic losses associated with the disposal of edible food, food waste generates substantial environmental consequences (P. Roy et al., 2023), including increased greenhouse gas emissions, inefficient use of natural resources such as water and energy, and the accumulation of organic waste that contributes to climate change (Heydari, 2024). According to recent studies, unsustainable consumption patterns and food waste generation remain major obstacles to achieving environmental sustainability and responsible resource management (Glavič, 2021). In Indonesia, food waste continues to be a significant concern due to limited public awareness regarding responsible food consumption, waste management, and sustainable lifestyle practices (Salsabilla et al., 2025). Consequently, efforts to transform consumer behavior have become increasingly important in supporting sustainable development.

One approach that has received considerable attention in sustainability research is Green Consumer Behaviour refers to consumption practices that incorporate environmental considerations throughout the product life cycle, including purchasing decisions, product use, and waste disposal (Naini & Reddy, 2025). Consumers who demonstrate green consumption behavior are more likely to select environmentally friendly products, reduce unnecessary consumption, adopt recycling practices, minimize waste generation, and prevent food waste (Hermanto et al., 2026). Therefore, promoting Green Consumer Behaviour has become a critical strategy for encouraging sustainable consumption and reducing environmental degradation. The development is closely associated with environmental literacy (Liu & Tobias, 2024).

Environmental literacy encompasses individuals knowledge, awareness, attitudes, and competencies related to environmental issues (Miao & Nduneseokwu, 2025), enabling them to make informed decisions and engage in environmentally responsible actions (Fang & Hassan, 2022). Individuals with higher levels of environmental literacy tend to possess greater awareness of the environmental consequences of their consumption behavior and are consequently more likely to adopt pro-environmental lifestyles (Yang et al., 2026). Educational initiatives that enhance environmental literacy have been shown to improve awareness of waste management, food waste reduction, and sustainable consumption practices (Ghani et al., 2025). Such literacy not only increases environmental understanding but also encourages behavioral changes that contribute to sustainability goals.

Environmental literacy directly drives Green Consumer Behaviour, aligning with SDGs 4, 12, and 13 (Abera, 2023). Strengthening environmental literacy through digital infographics which integrate concise text and engaging visuals enhances comprehension and learner engagement (Husamah et al., 2025). Among these, digital infographics have gained increasing attention due to their ability to present complex information in a concise, attractive, and visually engaging format. Digital infographic media can facilitate knowledge acquisition, improve comprehension, and enhance learner engagement by integrating textual and visual information (Bhat & Alyahya, 2023). As a result, digital infographics have

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considerable potential to support environmental education initiatives aimed at promoting sustainable consumption behavior.

Existing research rarely evaluates digital infographics for integrating environmental literacy, food waste reduction, and Green Consumer Behaviour to support the SDGs particularly among university students. Addressing this gap, this study develops and evaluates an SDGs oriented digital infographic for Culinary Education students. It aims to analyze the media's effectiveness in boosting Green Consumer Behaviour through enhanced environmental literacy.

THEORETICAL REVIEW

This effectiveness is explained through the Cognitive Theory of Multimedia Learning (Mayer, 2024) which states that optimal understanding is achieved when information is presented through a combination of verbal and visual elements processed via two distinct yet complementary cognitive channels-consistent with Dual Coding Theory which asserts that the integration of verbal and visual codes strengthens long-term memory retention. Environmental literacy is an individual's ability to understand, critically evaluate, and act upon environmental issues, encompassing knowledge, attitude, and action-oriented skills as its core dimensions with the NAAEE assessment framework serving as a standard reference for its measurement. As an outcome of the educational process, this literacy is closely linked to instructional media interventions, including digital media.

Demonstrated that interactive infographics designed for a university community significantly increased environmental awareness while reducing reliance on printed material (Prandi et al., 2021). In the same vein, a scoping review by found that infographic-based learning activities in higher education consistently strengthened learners' ability to process and communicate environmental and sustainability content, particularly when students were engaged in both consuming and producing infographics (Jaleniauskiene & Kasperiuniene, 2023). Digital media use in family and informal learning settings meaningfully shaped how younger audiences engaged with environmental topics, reinforcing the role of visual-digital stimuli as a driver of environmental literacy formation (Lin & Ardoin, 2023). Integrated multimedia learning approach combining contextual environmental values produced measurable gains in students' environmental literacy scores, lending further support to the effectiveness of visual-digital instructional media documented in the Cognitive Theory of Multimedia Learning (Rahayu et al., 2026) .

Environmental literacy, alongside economic literacy, significantly predicted environmentally friendly consumer behaviour among student populations, confirming literacy's role as a direct antecedent rather than a peripheral factor (Pratiwi et al., 2023). Using a large sample in China, similarly demonstrated that environmental literacy assessed across the dimensions of environmental values, responsibility, problem perception, and behavioural skill had a significant positive effect on residents' green consumption practices (Liu & Tobias, 2024). Within the Value Belief Norm framework specifically, confirmed that biospheric and altruistic values shape environmental attitudes and personal norms, which in turn predict green purchase intention (Wang et al., 2023). Extended the Theory of Planned Behavior among undergraduate students and found that environmental awareness amplified the effect of attitude and perceived behavioural control on green behavioural intention

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Taken together, this recent body of work supports the positioning of environmental literacy not merely as an outcome of media exposure but as an active mechanism linking digital infographic stimuli to green consumer behaviour (S. K. Roy, 2023).

RESEARCH METHOD

This study employed a quantitative research design utilizing a one-group pretest–posttest design (Harerimana et al., 2023). Pre and post tests evaluated the digital infographic's effectiveness in enhancing students environmental literacy and Green Consumer Behaviour. Additionally, non-test instruments assessed how the media supported specific SDG indicators (Quality Education, Responsible Consumption, and Climate Action) based on Table 1.

Table 1. SDGs Knowledge and Attitude Questionnaire Items

SDGs 4 Quality Education	SDGs 12 Responsible Consumption and Production	SDGs 13 Climate Action
Enhancing environmental knowledge, environmental literacy, and the development of environmentally responsible attitudes through education.	Waste reduction, use of environmentally friendly products, recycling, and sustainable consumption.	Emission reduction, pollution prevention, environmentally friendly lifestyles, and climate change mitigation

Data analysis was conducted using descriptive statistics to compare pretest and posttest scores on the Table 2 and Table 3.

Table 2. Blueprint of Learning Indicator for Pre-Test and Post-Test

Material Indicator	Learning Indicator	Item	SDGs Relevance
Human Environment Relationship	Explain the relationship between humans and the environment as a source of life.	1	13
Environmental Pollution	Identify the definition of environmental pollution.	2	4 & 13
Zero Waste	Explain the purpose of implementing the Zero Waste concept.	3	4 &12
Waste Management	Differentiate between proper and improper waste management practices.	4	12
Organic Waste	Identify the characteristics of organic waste.	5	12
Inorganic Waste	Differentiate between organic and inorganic waste.	6	12
Environmentally Friendly Products	Identify the characteristics of environmentally friendly products.	7	4 & 12
Environmentally Friendly Packaging	Explain the characteristics of biodegradable plastic, bioplastic, and recycled plastic.	8	4 & 12
Eco-Friendly Products	Identify the benefits of using environmentally friendly products.	9	12 & 13
Green Consumption Behavior	Explain the relationship between consumption behavior and environmental degradation.	10	12 & 13
Biofoam	Identify the characteristics of biofoam as environmentally friendly packaging.	11	12
Reduce Principle	Explain the application of the Reduce principle in daily life.	12	12

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Material Indicator	Learning Indicator	Item	SDGs Relevance
Food Waste Utilization	Explain efforts to reduce food waste through reprocessing.	13	12
Single-Use Products	Identify the impacts of using single-use utensils.	14	12 & 13
Energy Efficiency	Explain energy- and water-saving behavior.	15	13

Table 3. Blueprint of Behaviour Indicator for Pre-Test and Post-Test

Attitude Indicator	Behavior Indicator	Item	SDGs Relevance
Product Selection Awareness	Seek information before purchasing environmentally friendly products.	1	4 & 12
Consumption Planning	Purchase products according to needs.	2	12
Reuse	Choose reusable packaging.	3	12
Product Selection	Use products labeled as environmentally friendly.	4	4 & 12
Plastic Reduction	Reduce the purchase of products packaged in plastic.	5	4 & 12
Eco-Friendly Shopping Bags	Reduce the use of plastic bags.	6	12 & 13
Packaging Selection	Avoid using Styrofoam.	7	12
Environmental Literacy	Seek information about environmentally friendly products.	8	4 & 12
Sustainable Consumption	Reduce unnecessary consumer purchases.	9	12
Use of Reusable Water Bottles	Use a reusable drinking bottle.	10	12 & 13
Biodegradable Packaging	Choose biodegradable packaging.	11	12
Waste Reduction	Reduce the use of single-use products.	12	12
Local Products	Choose local products to reduce distribution emissions.	13	12 & 13
Organic Products	Choose environmentally friendly organic products.	14	12
Commitment to Green Consumer Behaviour	Continue to choose environmentally friendly products even when they are more expensive.	15	12

To evaluate the digital infographic's impact on environmental literacy and Green Consumer Behaviour, data were collected from Culinary Education undergraduates via purposive sampling using pre/post-intervention questionnaires. Inferential and descriptive statistics including normality tests, paired t-tests, N-gain scores, and Cohen's d. Content focused on sustainable consumption, food waste reduction, and SDGs 12 and 13.

RESULTS AND DISCUSSION

A knowledge and attitude questionnaire, integrated with SDGs 4, 12, and 13, evaluated how the digital infographic combines environmental literacy with Green Consumer Behaviour. By covering waste management, climate change, and sustainable consumption, this framework aims to boost environmental literacy, foster responsible consumption, and advance SDG achievement.

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Table 4. Environmental Literacy Knowledge Instrument Based on SDGs

No	Statement	SDGs
1	Human life cannot be separated from the environment because the environment serves as both a place to live and a source for fulfilling basic needs.	13
2	Environmental pollution is the alteration of environmental conditions caused by human activities or natural processes.	4 & 13
3	Zero Waste aims to minimize the amount of waste generated daily, thereby creating a better and more sustainable environment.	4 &12
4	One way to reduce air pollution is by mixing organic and inorganic waste.	12
5	Organic waste is waste with a relatively high water content, making it decompose quickly and produce unpleasant odors.	12
6	Inorganic waste is waste produced from natural materials such as fruit peels, vegetables, and food scraps, most of which cannot be naturally decomposed by microorganisms.	12
7	Environmentally friendly products are products manufactured and packaged without considering their impact on the environment	4 & 12
8	Bioplastics, biodegradable plastics, and recycled plastics are types of plastics that cannot naturally decompose and turn into compost when disposed of in the soil.	4 & 12
9	Nowadays, people are becoming more concerned about environmental issues, and many are choosing eco-friendly products, including environmentally friendly packaging	12 & 13
10	Environmental degradation can result from consumerism, which increases waste generation; therefore, it is important to choose environmentally friendly food and beverage packaging.	12 & 13
11	Biofoam packaging made from starch and fiber cannot be used for culinary products because it may cause environmental damage.	12
12	The principle of Reduce, or reducing waste generation, can be implemented by purchasing durable products, avoiding single-use items, and choosing products with recyclable packaging.	12
13	To reduce food waste and adopt a zero-waste lifestyle, leftover food can be repurposed into different dishes.	12
14	Using single-use eating and drinking utensils will reduce waste that contributes to environmental degradation.	12 & 13
15	Conserving water, turning off lights when not in use, and using air conditioners wisely are examples of environmentally unfriendly lifestyles.	13

The knowledge instrument consisted of 15 true or false statements related to environmental literacy, sustainable consumption, waste management, eco friendly products, and climate action. Several items were intentionally formulated as incorrect statements to assess respondents conceptual understanding and ability to distinguish accurate environmental information from misconceptions.

Table 5. Green Consumer Behaviour Attitude Instrument Based on SDGs

No	Statement	SDGs
1	I seek information before choosing environmentally friendly labeled products for my daily needs.	4
2	I choose to purchase environmentally friendly labeled products only when they are truly necessary.	12, 13
3	I buy products packaged in reusable containers.	12, 13

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No	Statement	SDGs
4	I use food and beverage products that carry environmentally friendly labels.	12, 13
5	I purchase conveniently packaged food products in plastic packaging.	12
6	I use plastic bags when shopping for food ingredients at traditional markets.	12
7	I choose styrofoam packaging for food products because it is safer.	12
8	I do not seek information about products that help minimize pollution and environmental degradation.	4
9	I minimize product purchases to avoid a consumerist lifestyle.	4, 12, 13
10	I use a reusable water bottle (*tumbler*) to reduce plastic waste.	4, 12, 13
11	I choose culinary products packaged in biodegradable plastic because the packaging can naturally decompose and become compost when disposed of in the soil.	4, 12
12	I prefer buying tissues rather than using handkerchiefs or towels because they are more effective for drying.	12, 13
13	I choose local food products over imported products because their shorter distribution chain results in lower carbon emissions that may contribute to climate change.	4, 12, 13
14	I choose to consume food products labeled as organic because they are healthier and free from pesticide use, making them more environmentally friendly.	4, 12
15	I do not purchase environmentally friendly labeled products because they are more expensive, even though they provide benefits for both individuals and the environment.	4, 12, 13

The attitude instrument consisted of 15 statements designed to measure participants' Green Consumer Behaviour in relation to environmental literacy and the Sustainable Development Goals. The indicators assessed included environmental awareness, information-seeking behavior, sustainable purchasing decisions, the use of environmentally friendly products, waste reduction practices, support for local products, and climate conscious consumption. Several negatively worded statements were included to reduce response bias and to more accurately assess participants attitudes toward sustainable consumption and environmental responsibility. Responses were measured using a five-point Likert scale ranging from strongly disagree to strongly agree.

Improvement of Students' Knowledge on Green Consumer Behaviour

The mean knowledge score increased from 12.14 to 14.47 after the intervention/media was provided. The standard deviation decreased from 1.85 to 0.63, indicating that respondents' answers became more consistent after the intervention. The minimum score increased from 7 to 13, suggesting that nearly all respondents experienced an improvement in their level of understanding.

Table 6. Descriptive Statistics of Student Knowledge Before and After the Intervention

Data	Mean	SD	SE	Coefficient of Variation	Min	Max
Pretest	12.14	1.85	0.2816	0.1521	7	15
Posttest	14.47	0.63	0.09615	0.0436	13	15

Based on table 6 In addition, research on the use of integrated science teaching materials to improve environmental literacy showed a significant increase in

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knowledge (Suryanti et al., 2018). The average knowledge score of participants increased significantly compared to before the program was implemented, thus proving that providing environmental education was able to increase participants understanding of sustainability issues (Uzumcu & Acilmis, 2024). And than Normality Test of Knowledge Score, on The Table 7

Table 7. Normality Test of Knowledge Scores (Shapiro–Wilk)

Data	W	p	Decision
Pretest – Posttest	0.8939	<0.001	Not Normally Distributed

The Shapiro Wilk test revealed that the knowledge scores were not normally distributed ($p < .001$). Therefore, the Wilcoxon Signed-Rank Test was employed to examine differences between the pretest and posttest scores. The use of a non-parametric statistical procedure ensured that the hypothesis testing remained appropriate despite the violation of the normality assumption. Wilcoxon Signed-Rank Test of Knowledge Score on the table 8

Table 8. Wilcoxon Signed-Rank Test of Knowledge Scores

Data	W	z	p	Decision
Pretest – Posttest	16.00	-5.296	<0.001	Significant

The Wilcoxon Signed-Rank Test indicated a statistically significant improvement in students' knowledge ($Z = -5.296$; $p < .001$), confirming that the infographic learning media effectively enhanced students' understanding of Green Consumer Behaviour. This result is digital learning media including infographics, augmented reality, mobile learning, and interactive multimedia have become increasingly effective tools for improving environmental literacy and sustainability education across educational settings (Husamah et al., 2025) . Likewise, emphasized that integrating digital technologies into sustainability education strengthens sustainability literacy by promoting systems thinking, environmental communication, and critical understanding of sustainability issues (Tavga Salih et al., 2026).

Improvement of Students' Attitudes toward Green Consumer Behaviour

The mean behavior score increased from 47.63 to 54.95. This indicates a positive change in respondents behavior following the intervention. The minimum score increased substantially from 22 to 41, suggesting that behavioral improvements also occurred among respondents with initially low scores. This finding align with research demonstrated an increase in ecologial behaviour after enviromental education programs and taks. The study showed that participants ecological behaviour scores significantly increased in the posttest compared to the pretest, can chage individual behaviour toward greater enviromental awereness (Sulastri et al., 2024).

Table 9. Descriptive Statistics of Behaviour Scores

Data	Mean	SD	SE	Coefficient of Variation	Min	Max
Pretest	47.63	6.76	1.031	0.1420	22	59
Posttest	54.95	6.92	1.056	0.1260	41	69

Based on table 9 Enviromental education has a significant positive impact on students enviromental behaviour, that enviromental education programs are an

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effective strategy for developing sustainable behaviour (Aldawsari et al., 2025). Table 9 indicates that students' attitudes toward Green Consumer Behaviour improved considerably following the intervention. The mean score increased from 47.63 to 54.95, reflecting a positive shift in students' environmental attitudes after participating in infographic-based learning. The findings suggest that increasing environmental knowledge through visual learning also contributes to affective development. According to the Theory of Planned Behavior, individuals who possess greater knowledge and stronger environmental beliefs are more likely to develop positive attitudes toward environmentally responsible behaviour. The present findings are consistent with Safitri et al. (Desy Safitri et al., 2026) who demonstrated that environmental education significantly enhances ecological intelligence and sustainable lifestyles among Indonesian students. Their study found that environmental learning positively shapes students' environmental attitudes, which subsequently influence sustainable behaviour. Similarly, Chen et al (Chia Chen et al., 2026) reported that multimedia-based environmental education significantly strengthened pro-environmental attitudes because interactive visual learning increased students' motivation and emotional engagement with environmental issues, and next to Shapiro Wilk test based on table 10

Table 10. Normality Test of Attitude Scores (Shapiro–Wilk)

Data	W	p	Decision
Pretest – Posttest	0.9613	<0.155	Normally Distributed

The Shapiro–Wilk test indicated that the attitude scores were normally distributed ($p = .155$). Therefore, the paired samples *t*-test was considered appropriate for examining differences between the pretest and posttest scores. The paired-samples *t*-test demonstrated a statistically significant improvement in students attitudes toward Green Consumer Behaviour ($t = -5.415$; $p < .001$). This finding indicates that infographic-based learning effectively fostered more positive environmental attitudes among students. These results align who reported that augmented reality supported environmental education significantly strengthened pro environmental behaviour by enhancing environmental awareness and positive environmental attitudes (Safitri, Ibrahim, & Sujarwo, 2026). Likewise, found that sustainability-oriented pedagogy successfully transformed students' consumption behaviour through improvements in environmental attitudes and sustainability awareness (Kardoyo et al., 2026).

Table 11. Paired-Samples *t*-Test

Data	t	df	p-value
Pretest – Posttest	-5.415	42	<0.001

The paired-samples *t*-test demonstrated a statistically significant improvement in students' attitudes toward Green Consumer Behaviour. This finding indicates that infographic-based learning effectively fostered more positive environmental attitudes among students. These results Safitri et al align reported that augmented reality-supported environmental education significantly strengthened pro-environmental behaviour by enhancing environmental awareness and positive environmental attitudes (Safitri, Ibrahim, & Sujarwo, 2026). Sustainability oriented pedagogy successfully transformed students' consumption behaviour through improvements in

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environmental attitudes and sustainability awareness (Kardoyo et al., 2026). Demonstrated that environmental literacy, including environmental knowledge, concern, and willingness to participate positively predicts green consumption behaviour, providing further evidence that cognitive improvement contributes to behavioural readiness (Yu et al., 2026).

N-Gain Score

To further evaluate the effectiveness of the digital infographic media, an N-Gain analysis was conducted to measure the magnitude of improvement in students' environmental literacy knowledge and Green Consumer Behaviour attitudes following the intervention. The result are presented in table 12

Table 12. N-Gain Score Category and Effectiveness Level

Variable	N-Gain	Category	Effectiveness level
Knowledge	0.81	High	Effective
Attitude	0.34	Moderate	Moderately Effective

Furthermore, the N-Gain analysis Table 12 showed a score of 0.81 for environmental literacy knowledge, categorized as high, indicating that the digital infographic media was effective in improving students' knowledge. In contrast, the attitude variable achieved an N-Gain score of 0.34, categorized as moderate, indicating that the media was moderately effective in fostering Green Consumer Behaviour. The lower improvement in attitudes compared with knowledge suggests that behavioral change requires a longer period of reinforcement and practical application than knowledge acquisition. Overall, these findings demonstrate that digital infographic media is an effective educational tool for enhancing environmental literacy and promoting sustainable consumption behavior among university students. The findings who demonstrated that environmental education significantly improves sustainable lifestyles and ecological intelligence among Indonesian students. Their study concluded that environmental education influences students' behaviour indirectly through the development of positive environmental attitudes and ecological awareness (Safitri, Ibrahim, Sujarwo, et al., 2026). Recent evidence further explains the difference between knowledge gain and attitude gain by showing that digital environmental content influences pro environmental behavioural willingness through perceived usefulness, credibility, emotional engagement, and entertainment value (Wistara et al., 2026)**.** This suggests that although infographic media effectively improve cognitive understanding, sustained behavioural transformation requires repeated exposure to persuasive environmental messages and authentic learning experiences beyond classroom instruction.

Cohen's *d* Effect Size Test Result

Based on the analysis of data from 43 respondents, effect size testing was conducted separately for the two research variables, given their differing data distribution characteristics. For the knowledge aspect, since the data were not normally distributed, testing was performed using the Wilcoxon Signed Rank test, For the attitude aspect, whose data were normally distributed, testing was conducted using the Paired Sample t-test. also falling into the large category. Both results indicate that the differences between pretest and posttest scores on these two

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aspects were not only statistically significant but also carried substantial practical meaning.

Table 13. Cohen's *d* Effect Size Test Result

Aspect	Statistical Value	*p-value*	*Effect size*	Category
Knowledge	*Z* = -5,296	<0,001	*r* = 0,808	Large
Attitude	*t* = -5,415	0,001	*d* = 0,826	Large

Based on Table 13 The large effect sizes obtained for both aspects indicate that the digital infographic media intervention had a substantial impact on improving students' knowledge and attitudes regarding Green Consumer Behaviour, rather than merely reflecting a difference that happened to reach significance due to sample size. Referring to Cohen's classification convention, the values of r=0.808 and d=0.826 exceed the threshold for the large category ($r \geq 0.5$ and $d \geq 0.8$), suggesting that the impact of this media is comparatively strong relative to typical educational interventions. This finding is consistent with the results of (Audinah et al., 2024) who found a Cohen's *d* of 2.391 in a classical guidance intervention based on Problem Based Learning, reinforcing the idea that systematically and structurally designed learning interventions tend to produce large changes in both cognitive and affective aspects of learners. On the knowledge aspect, the magnitude of this effect size reinforces the findings of (Alifah & Mulyana, 2022) who showed that visually based media on green consumer behavior effectively improved students' understanding of the ecoliteracy concept.

This suggests that presenting Green Consumer Behaviour material through a visual format such as infographics can simplify a relatively complex concept, making it easier to understand and enabling significant knowledge gains within a relatively short period. Meanwhile, on the attitude aspect-generally more difficult to change than knowledge because it involves the internalization of values-achieving a large-category effect demonstrates the media's success in driving affective change among students. This finding aligns with the results of (Ramadhani et al., 2022), who found that conservation education instruction influenced the formation of students' green consumer attitudes and behavior, as well as with (Pratiwi et al., 2023a)who confirmed that economic literacy and environmental literacy significantly influence students' green consumer behavior. It can therefore be concluded that the digital infographic media developed was effective not only in transferring information, but also in shaping students' awareness and attitudes toward environmentally friendly consumption issues.

CONCLUSION

Overall, the results demonstrate that digital infographic media can serve as an effective educational tool for improving both environmental literacy knowledge and Green Consumer Behaviour attitudes. This finding highlights the potential of digital visual learning media to support the achievement of SDGs 4 (Quality Education), SDGs 12 (Responsible Consumption and Production), and SDGs 13 (Climate Action) by fostering environmental awareness and sustainable consumption behavior among university students.

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