



Beyond Awareness: The Role of Environmental Literacy in Sustainable Fashion Behaviour Among Forestry Students

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Abstract

The fashion industry is rapidly expanding while exerting significant pressure on the environment through carbon emissions, textile waste, water pollution, and deforestation. This study investigates how environmental knowledge influences sustainable fashion behavior among forestry students at Tadulako University. A quantitative survey was conducted with 50 purposely selected students who had received basic environmental education. The data were analyzed using descriptive statistics, Pearson correlation, and multiple regression. Results show that overall environmental knowledge is positively related to sustainable fashion attitudes and behaviors, with correlation strengths ranging from weak to moderate. Multiple regression produced an R^2 of 0.495, indicating that the independent variables collectively explain nearly half of the variation in sustainable fashion behavior. Among the seven knowledge indicators, the ability to seek and read information on sustainable fashion (X6) emerged as the only significant predictor, strongly linked to practices such as reading garment care labels and upcycling. These findings highlight the critical role of practical, applicable knowledge in fostering sustainable fashion consumption.

INTRODUCTION

The fashion industry is one of the fastest-growing sectors globally, yet it is also a significant contributor to environmental degradation. Fast fashion is a clothing industry model that relies on low-cost production, rapid consumption, and a relatively short product life cycle (Rukhaya et al., 2021; Niinimäki et al., 2020). This system emerged in response to high consumer demand for the latest trends (Shinta, 2018), allowing products to be mass-produced and marketed quickly. While offering easy access and affordable prices, fast fashion has serious consequences, both socially and ecologically. The high scale of production driven by consumer demand puts significant pressure on natural resources, posing a major challenge to achieving sustainable consumption and production patterns. Rapidly changing fashion trends have also fueled the rise of the ready-to-wear concept.

The fast fashion business model promotes the production and consumption of large quantities of clothing at low prices (Leman et al., 2020). Its impacts are evident in increased carbon emissions, textile waste, water pollution from dyeing processes, and deforestation associated with the production of raw materials such as viscose or rayon. Sustainability issues have begun to receive serious attention in the 21st century, encompassing labour violations, the use of toxic chemicals, and excessive consumption (Fletcher & Grose, 2012).

Empirical studies have highlighted the magnitude of these environmental impacts. Li et al. (2024) reported that the carbon footprint of fast fashion consumption reaches 2.50 kg CO₂e per single pair of jeans, or 11 times higher than that of traditional fashion. The textile industry also contributes contaminants to water bodies, including toxic compounds from dyes, toxic chemicals and heavy metals (Rame et al., 2020). Research by Yuniarti and Widayatno (2021) revealed that untreated wastewater from small-scale batik industries in Laweyan Village contains BOD levels of 1,479.9 mg/L, COD levels of 829.2 mg/L, and TSS levels of 3,000 mg/L. These values far exceed the quality standards set by

the Indonesian government, namely BOD 60 mg/L, COD 150 mg/L, and TSS 50 mg/L (Regulation of the Minister of Environment and Forestry of the Republic of Indonesia Number P.16/MENLHK/SETJEN/KUM.1/4/2019 concerning textile wastewater quality standards). Such excessive pollutant levels can lead to severe environmental impacts, particularly water pollution in rivers and degradation of aquatic ecosystems, including harm to aquatic organisms. Furthermore, the use of viscose and rayon materials contributes to deforestation because these synthetic materials are derived from wood pulp and processed to resemble cotton and silk, but require high energy and chemical requirements (Nayak et al., 2023). Beyond its global environmental impacts, fast fashion also generates environmental pressures at the local level through increased textile wastewater, short clothing lifespans, and high consumption rates among younger consumers, particularly university students.

In response to such environmental degradation, effective waste management and treatment strategies are essential. Reducing pollution at its source, combined with the implementation of environmentally friendly approaches such as phytoremediation, represents a crucial effort to minimize contamination in aquatic ecosystems (Anwar et al., 2025). In addition, source reduction is widely recognized as one of the most effective strategies to prevent environmental pollution while promoting more sustainable resource use (Shanin et al., 2025).

In Indonesia, the fast fashion phenomenon has expanded rapidly, driven by the presence of international brands, local products, and easy access through online marketplaces. Younger generations, particularly university students, have become active consumers, as clothing purchases are often influenced by social pressure and the desire for social acceptance rather than purely functional needs (Sugestiani et al., 2024). Rostiani and Kuron (2019) found that Generation Y consumers are motivated to purchase fast fashion products due to internal factors such as the desire to appear attractive and to keep up with current trends.

Related studies have also examined fast fashion from different perspectives. Elvera et al. (2023), for example, investigated students' perceptions at Universitas Negeri Yogyakarta, focusing on the role of technology in shaping fast fashion consumption and students' purchase intentions. Meanwhile, Lestari and Kurniawan (2025) analyzed the relationship between environmental awareness and social influence on fast fashion consumption among Generation Z in Bandung.

Although these studies provide valuable insights into fast fashion consumption and its environmental implications, they largely focus on general consumer groups or urban youth. Research that specifically examines how environmental knowledge influences sustainable fashion behavior among forestry students—who are expected to possess a stronger environmental perspective—remains limited, particularly in the Indonesian context.

From a theoretical perspective, environmental knowledge is a key determinant of pro-environmental behavior. In this context, environmental education plays a crucial role in addressing these challenges, as integrating socio-scientific issues into learning can enhance individuals' awareness and understanding of real-world environmental problems, including those associated with unsustainable consumption patterns (Fitriani, 2023). Individuals who understand environmental consequences are more likely to develop positive environmental attitudes, which in turn influence responsible consumption behaviors, including sustainable fashion choices. In addition, Khare et al. (2020) argue that the availability of environmentally friendly fashion products can enhance consumers' purchase motivation, suggesting that knowledge and access to sustainable options jointly shape environmentally responsible purchasing behavior.

This situation underscores the importance of implementing sustainable fashion, which prioritises the use of environmentally friendly materials, ethical production processes, and responsible consumption practices. From a theoretical perspective, the relationship between

environmental knowledge and sustainable behavior can be explained through the Theory of Planned Behavior, which suggests that knowledge influences attitudes and behavioral intentions. Recent studies indicate that environmental knowledge does not always translate into sustainable fashion behavior, highlighting a gap between awareness and actual consumption practices (Magwegwe & Shaik, 2024). Furthermore, sustainable fashion behavior is shaped by values, beliefs, and norms that mediate the influence of environmental awareness (Hong et al., 2024). In addition, environmental knowledge has been found to significantly influence purchase intentions, although attitude remains the most dominant predictor of sustainable fashion behavior (Lee et al., 2025).

Based on this background, this study aims to analyze the influence of environmental knowledge on sustainable fashion patterns among students of the Faculty of Forestry, Tadulako University. This study offers a novel contribution by focusing on forestry students, a group often assumed to possess strong environmental awareness, and examining how their environmental knowledge influences sustainable fashion behavior. Unlike previous studies that mainly investigate general consumers or urban youth, this research highlights the role of practical, information-seeking knowledge in shaping sustainable fashion attitudes and behaviors. The results are expected to enrich the literature on the relationship between environmental knowledge and sustainability-based fashion consumption behaviour, while also providing practical contributions to the development of sustainable fashion education programs and campaigns on campus.

METHOD

This study employed a quantitative approach, utilizing a survey method with a questionnaire. The sample consisted of 50 students from the Faculty of Forestry at Tadulako University, selected using purposive sampling. Respondents were selected intentionally, with the criteria being that

students had acquired basic knowledge of the environment and forestry through related courses. Data collection was conducted from June to August 2025. The questionnaire instrument was designed to measure

environmental knowledge levels (X1-X7) as the independent variable and sustainable fashion patterns, including attitudes and behaviours (Y1-Y15) as the dependent variable. These can be described as follows:

Table 1. Basic environmental knowledge

Code	Information
X ₁	Environmental Studies course
X ₂	Sustainable fashion concept
X ₃	Fashion influences water pollution
X ₄	Fashion's impact on deforestation
X ₅	Colours from the fashion industry pollute rivers
X ₆	Reading sustainable fashion information
X ₇	Viscose/rayon causes deforestation

Table 2. Sustainable fashion attitudes and behaviours

Code	Information
Y ₁	Attitude that fast fashion to the environment
Y ₂	Willingness to reduce fast fashion purchases for the sake of the environment
Y ₃	Concern for environmental issues
Y ₄	Concern for reducing textile waste
Y ₅	Attitude that chooses environmentally friendly clothing materials
Y ₆	Attitude that the fashion industry contributes to the climate crisis
Y ₇	Willingness to pay more for environmentally friendly clothing
Y ₈	Reducing consumption of new clothing to reduce carbon footprint
Y ₉	Belief that Fast fashion pollute the environment
Y ₁₀	Choosing to buy durable clothing
Y ₁₁	Reading clothing care labels to extend the lifespan
Y ₁₂	Making your own environmentally friendly clothing
Y ₁₃	Donating unused clothing
Y ₁₄	Repairing damaged clothing instead of throwing it away
Y ₁₅	Upcycling old clothing into new styles

The collected data were then analyzed descriptively and inferentially to assess the influence of environmental knowledge on respondents' sustainable fashion patterns. The level of knowledge regarding environmental issues served as the independent variable in this study. Consumers with a strong sense of environmental knowledge tend to choose eco-friendly products, thus boosting their interest and intention to purchase them (Pakpahan & Sembiring, 2022).

Consumer attitude, a psychological and physiological state formed through experience and reflecting a readiness to

respond to an object, is a factor that directly and dynamically influences purchasing behaviour or purchase intention (Pakpahan & Sembiring, 2022).

The collected questionnaire data were analyzed descriptively and inferentially. Descriptive analysis was used to describe the respondent's knowledge related to environmental education and the distribution of responses for each variable indicator. To test the effect of environmental knowledge levels on sustainable fashion patterns (in terms of attitude and behaviour aspects), Pearson correlation analysis was used to determine the strength and direction of the

relationship between variables, and multiple linear regression analysis was used to assess the magnitude of the influence of environmental knowledge on sustainable fashion patterns. Significance testing was performed at a 95% confidence level ($\alpha = 0.05$). All data processing and analysis were carried out using Microsoft Excel software.

RESULT AND DISCUSSION

Level of Knowledge About Sustainable Fashion

A questionnaire was administered to 50 forestry students to assess their environmental knowledge using seven items related to their understanding of fashion industry issues. Although the sample size was relatively small ($n = 50$), it represents a specific and relevant population with prior exposure to environmental education, making it appropriate for exploratory analysis. The analysis revealed that the majority of respondents (41) had acquired basic environmental and forestry knowledge, stating they had taken an Environmental Studies course.

Their understanding of the fashion industry's impact on the environment was

considered good: 44 respondents were aware that the textile dyeing process can pollute rivers, and 37 respondents were aware that the fashion industry contributes to deforestation. Furthermore, 34 respondents were aware that the fashion industry is a significant contributor to water pollution.

Meanwhile, knowledge regarding the concept of sustainable fashion varied. Only 20 respondents stated they understood the concept, while 21 admitted they had only heard of it, and the remaining nine respondents had never heard of or encountered the term "sustainable fashion." Their exposure to information about fast fashion was also relatively moderate, with 27 respondents reporting that they had read or heard the term. The lowest level of understanding was that viscose or rayon materials can cause deforestation, with only 21 respondents aware of this fact. These results indicate that although forestry students have a high level of awareness of the environmental impact of the fashion industry in general, their in-depth knowledge of the concept of sustainable fashion and raw materials still needs improvement through more targeted educational programs.

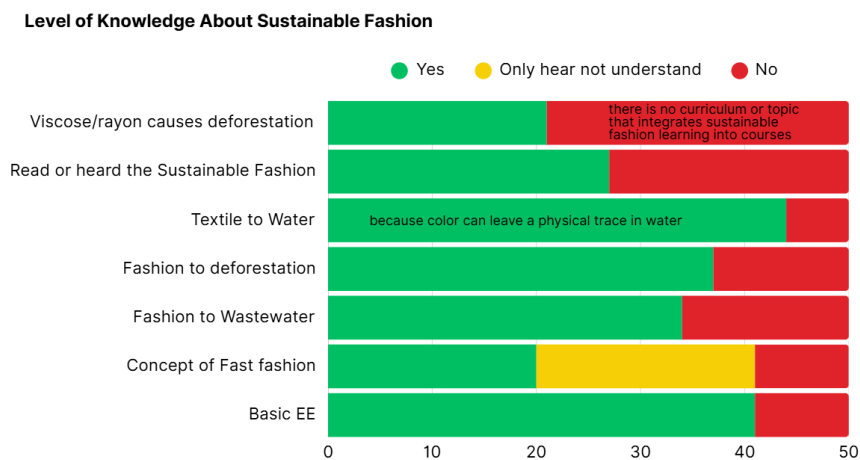


Figure 1. Environmental degree of environmental education related to sustainable fashion

Sustainable Fashion Attitudes and Behaviour

A questionnaire surveyed 50 students from the Faculty of Forestry at Tadulako University showed that the majority of respondents have adopted sustainable fashion behaviours. Donating clothes was the top choice, chosen by 48 respondents, followed by repairing clothes (45 respondents), and reading care labels (43 respondents). Reducing textile waste and choosing environmentally friendly materials also garnered significant attention, with 42 and 40 respondents, respectively.

Regarding attitudes, 41 respondents stated that fast fashion harms the environment, and 44 respondents reported a high level of concern for environmental issues. Furthermore, 41 respondents were willing to reduce their new clothing purchases to reduce their carbon footprint. Willingness to pay more for environmentally

friendly products was recorded among 38 respondents.

Conversely, interest in practices requiring specialized skills was lower: only 30 respondents expressed willingness to upcycle (transforming old clothes into new models), and 27 respondents expressed interest in making their own environmentally friendly clothing. Nevertheless, 39 respondents admitted to making efforts to reduce their carbon footprint, affirming their commitment to reducing their environmental impact.

Overall, these findings suggest that forestry students not only understand environmental issues but also implement concrete behaviours to support sustainable fashion, particularly in relatively straightforward activities such as donating and repairing clothes. However, creative practices like upcycling still require further support and training.

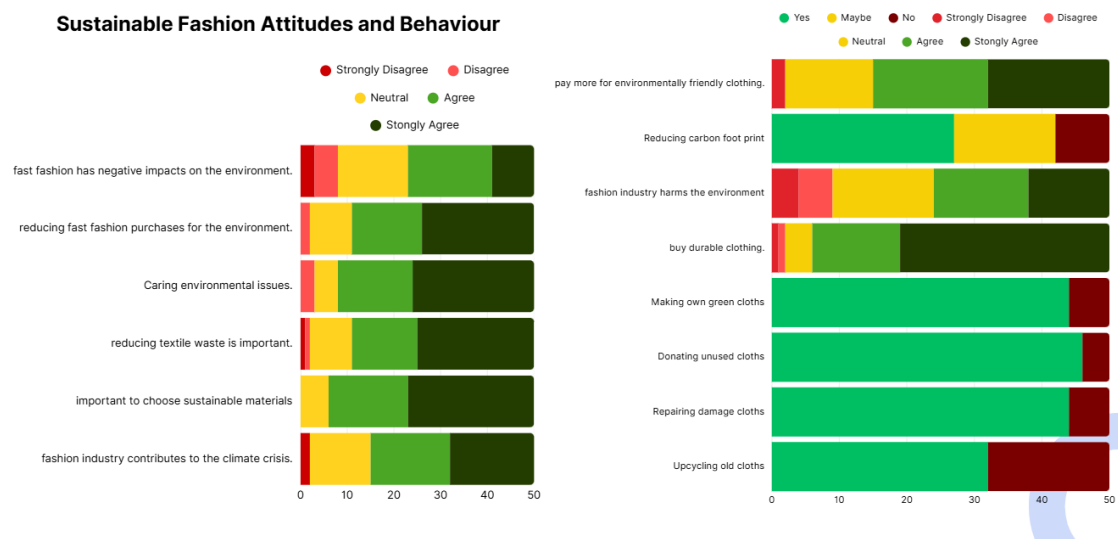


Figure 2. Sustainable fashion attitudes and behaviour

Using word clouds, respondents felt that reducing, promoting, educating, and choosing clothing made from environmentally friendly materials would help students become more

aware of sustainable fashion. Word clouds are a simple and effective visualisation method for displaying the most frequently used words in a text document (Jin, 2017; Lohmann et al., 2015).



Figure 3. Word cloud student some activities that students can do to implement sustainable fashion

To determine the influence of respondents' knowledge levels on sustainable fashion patterns, a simple correlation test was conducted. The initial step was to combine and sum all indicator scores for the independent variable (knowledge level) and the dependent variable (attitudes and behaviours regarding sustainable fashion). The independent variables included seven indicators: understanding of the Environmental Studies course, the concept of sustainable fashion, the fashion industry's impact on water pollution and deforestation, understanding that textile dyes can pollute rivers, understanding information about sustainable fashion, and knowledge that viscose/rayon materials can contribute to deforestation.

The dependent variables were measured using fourteen attitudinal and behavioural indicators, including willingness to reduce fast fashion purchases, concern for environmental issues, the importance of reducing textile waste, choosing clothing materials that do not damage forests, willingness to pay more for environmentally friendly clothing, and the habit of recycling or repairing clothing.

The results of the Pearson Correlation Coefficient (r) analysis, which examined the relationship between environmental

knowledge (X_1 - X_7) and fashion patterns reflected in respondents' attitudes and behaviours (Y_1 - Y_{15}), are presented in Figure 4. The correlation matrices for X_1 through X_7 and Y_1 through Y_{15} are shown below.

Correlation Matrix X_1 - X_7 and Y_1 - Y_{15}

	X_1	X_2	X_3	X_4	X_5	X_6	X_7
Y_1	0.024	0.402	0.317	0.190	0.114	0.315	0.169
Y_2	-0.001	0.320	0.465	0.304	0.303	0.003	0.110
Y_3	-0.196	0.322	0.283	0.255	0.126	0.270	0.217
Y_4	-0.111	0.212	0.341	0.331	0.086	0.173	0.317
Y_5	-0.166	0.037	-0.017	0.030	0.046	-0.020	0.010
Y_6	-0.062	0.446	0.419	0.403	0.366	0.346	0.263
Y_7	-0.084	0.339	0.283	0.342	0.161	0.328	0.257
Y_8	-0.058	0.218	0.274	0.194	0.356	0.013	0.248
Y_9	0.022	0.229	0.217	0.019	0.104	0.220	0.119
Y_{10}	-0.062	-0.040	0.100	0.090	0.045	0.006	-0.104
Y_{11}	0.082	0.414	0.111	0.315	0.236	0.562	0.301
Y_{12}	-0.013	0.120	0.142	0.202	0.053	0.153	0.190
Y_{13}	-0.138	0.096	0.114	0.161	0.118	0.172	0.251
Y_{14}	0.147	-0.130	0.011	-0.079	0.053	0.030	0.190
Y_{15}	0.134	0.265	0.068	0.160	0.021	0.358	0.290

Description: X_1 - X_7 = Independent Variable (environmental knowledge); Y_1 - Y_{15} = Dependent Variable (Fashion Patterns in Attitudes and Behavior); The correlation value is in the range of -1 to +1, the closer to +1 (Green) = strong positive relationship, the closer to -1 (Red) = strong negative relationship, the closer to 0 (White) = weak relationship/no correlation.

Figure 4. Correlation matrix X_1 - X_7 and Y_1 - Y_{15}

The results of the correlation analysis between the independent variables (X_1 - X_7) and the dependent variables (Y_1 - Y_{15}) indicate that the relationship generally tends to be positive, with correlation strengths ranging from weak to moderate. This is reflected in the majority of correlation values, which range from 0.1 to 0.4. Some relationships even reach the strong category, particularly for certain pairs of variables.

Variable X_6 (knowledge of reading sustainable fashion information) is the independent variable with the most consistent influence on the dependent variable. The highest correlation values are shown in the relationship between X_6 and Y_{11} (the behavior of reading clothing care labels to extend the lifespan of clothing) ($r = 0.562$), which is categorized as strongly positive, as well as the relationships with Y_{15} (the behavior of upcycling old clothes) ($r = 0.358$) and Y_6 (the attitude of the fashion industry contributing to the climate crisis) ($r = 0.346$), which are categorized as moderately positive. Furthermore, X_6 also has positive

relationships with several other dependent variables, indicating that X_6 is the most dominant predictor among the independent variables.

This finding indicates that access to and understanding of sustainability-related information plays a crucial role in shaping pro-environmental behavior. Recent studies have shown that sustainability-related knowledge, particularly practical product information, significantly influences consumers' responsible behavior, such as extending product lifespan and making environmentally conscious decisions (Niinimäki et al., 2020). Furthermore, research by McNeill and Moore (2015) highlights that young consumers who actively engage with product information, including labels and sustainability claims, are more likely to adopt sustainable fashion practices such as reuse and upcycling.

In addition, empirical evidence suggests consumers' product knowledge, perceived consumer effectiveness and perceived personal relevance significantly affect young consumers' attitudes, subjective norms and perceived behavioural control, thereby affecting purchase intentions for environmentally sustainable textiles and apparel (Kang et al., 2013). Therefore, X_6 can be considered the most dominant predictor among the independent variables, as it consistently influences both attitudes and behaviors related to sustainable fashion.

Additionally, variables X_2 (knowledge of sustainable fashion concepts) and X_3 (knowledge of the fashion industry's impact on water pollution) also demonstrate meaningful associations with sustainable fashion attitudes and behaviors. This is reflected in the moderate to strong positive correlations between X_2 and Y_6 ($r = 0.446$), as well as between X_3 and Y_2 ($r = 0.465$). These findings suggest that an understanding of sustainability concepts and awareness of

water pollution issues can strengthen students' environmental attitudes and their willingness to reduce fast fashion consumption.

This result is consistent with the study conducted by Ahmad et al. (2020), which examined the relationship between knowledge, attitudes, and practices in the context of green fashion. Their findings indicate that respondents who were aware of water and soil pollution caused by toxic chemicals used in textile production and dyeing were more likely to develop pro-environmental attitudes and behaviors. Ahmad et al. (2020) also highlighted that such pollution poses serious consequences, particularly for communities living near pollution sources, reinforcing the importance of environmental knowledge in shaping responsible consumption decisions. Similarly, Novianti et al. (2021) analyzed surface water and groundwater quality in areas surrounding textile factories and found that both river water and groundwater were contaminated, with pollution indices ranging from lightly to moderately polluted. These findings support the argument that knowledge of environmental pollution related to the fashion industry plays a crucial role in shaping pro-environmental attitudes and consumption behavior.

This correlation suggests that increases in X_2 and X_3 have the potential to significantly influence changes in several dependent variables, although not as strongly as X_6 . Practical and information-seeking knowledge (X_6) shows a stronger influence than conceptual knowledge (X_2) and thematic knowledge (X_3) because it directly supports decision-making and everyday consumption practices. While conceptual understanding of sustainable fashion and awareness of environmental impacts mainly increase cognitive awareness and concern, they do not always provide clear guidance on how

individuals should act. In contrast, actively seeking and reading information about sustainable fashion equips individuals with concrete and applicable knowledge, such as understanding care labels, choosing durable products, and applying upcycling practices, which reduces the gap between awareness and action (Van der Merwe et al, 2014). As a result, practical knowledge functions as a bridge that translates environmental understanding into consistent sustainable fashion behavior, making its influence more pronounced than that of general or issue-specific knowledge.

In terms of dependent variables, Y_{11} and Y_6 appear to be most influenced by the independent variables. Y_{11} shows a fairly strong relationship with several independent variables, especially X_6 ($r = 0.562$), X_2 ($r = 0.414$), and X_7 ($r = 0.301$). Similarly, Y_6 had a relatively consistent correlation with almost all independent variables, including X_2 ($r = 0.446$), X_3 ($r = 0.419$), X_4 ($r = 0.403$), and X_5 ($r = 0.366$). This indicates that Y_{11} and Y_6 are the dependent indicators most sensitive to changes in the independent variables.

Negative correlations were only found in a few variable pairs, such as X_1 (knowledge of environmental studies) with Y_3 (attitude of concern for environmental issues) ($r = -0.196$) and X_2 with Y_{14} (behaviour of repairing damaged clothes rather than throwing them away) ($r = -0.130$). These weak negative relationships may be explained by the focus of the environmental studies curriculum, which primarily emphasizes natural resource management in Central Sulawesi rather than consumer-related environmental issues such as sustainable fashion practices.

The multiple regression analysis yielded an R-square value of 0.495, indicating that the independent variables collectively explained 49.5% of the variation in the dependent variable. In comparison, the remaining 50.5% was influenced by factors outside the scope

of the research model. The adjusted R-square value of 0.409 indicates that, after adjusting for the number of predictor variables, the independent variables contributed 40.9% to the dependent variable, which can be categorized as moderate in social and environmental research.

The ANOVA test results showed an F-value of 5.749 with a significance level of $0.000 < 0.05$. This suggests that the regression model used is suitable, and that the independent variables have a significant influence on the dependent variable. This indicates that the simultaneous presence of the independent variables significantly contributes to changes in the dependent variable. However, when viewed partially through the t-test results, only variable X_6 has a significant influence with a positive coefficient value of 0.4788 and a significance level of $0.000569 < 0.05$. This means that every one unit increase in X_6 will increase the dependent variable by 0.4788 units, assuming the other variables remain constant. The other variables, namely X_1 , X_2 , X_3 , X_4 , X_5 , and X_7 , do not show a statistically significant influence ($p\text{-value} > 0.05$). However, variable X_5 , with a significance value of 0.0652, falls into the near-significant category, so it can be considered a potentially relevant variable in the research context. The results of this study confirm that the regression model used is sufficient to describe the relationship between the independent variables and the dependent variable, even though only one variable has a significant influence.

CONCLUSION

The results of this study confirm that the independent variables (X_1 – X_7) generally have a positive relationship with the dependent variables (Y_1 – Y_{15}), with correlation strengths varying from weak to moderate. Among all independent variables, X_6 (knowledge of reading sustainable fashion information) is

the most dominant predictor. This is reflected in the relatively high correlation between X_6 and Y_{11} (the behaviour of reading clothing care labels to extend clothing life) as well as the results of the regression analysis, which show a partial and significant influence of X_6 on the dependent variable. Multiple regression analysis indicates that the constructed model is a good fit, with an R-squared value of 0.495, which means that the independent variables collectively explain 49.5% of the variation in the dependent variable. However, only X_6 has a statistically significant effect, while the other variables do not show a real effect, although some, such as X_5 , are in the near-significant category. Thus, it can be concluded that knowledge of reading sustainable fashion information (X_6) is a key factor that influences the development of sustainable fashion attitudes and behaviours, particularly in the behaviours of reading clothing care labels and practising upcycling old clothes.

These findings highlight that practical and information-based knowledge plays a more critical role in shaping sustainable fashion attitudes and behaviours than purely conceptual or thematic environmental knowledge. Consequently, this study underscores the importance of strengthening applied learning in environmental education by integrating sustainable fashion information literacy, clothing care practices, and upcycling activities into university curricula and campus-based sustainability campaigns. In addition, learning materials should explicitly address the environmental impacts of textile production, including the use of wood-based raw materials for viscose and rayon production, as well as textile dyeing processes that generate untreated wastewater discharged into rivers, leading to watershed degradation and groundwater contamination affecting local communities.

Integrating such real-life and locally relevant case examples into the curriculum is essential for contextualizing environmental knowledge, enabling students to better understand the direct consequences of consumption choices, and effectively bridging the gap between environmental awareness and everyday sustainable consumption behaviour among university students as key agents of change.

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