

How does sustainable development education shape motivations for using collaborative consumption platforms?

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Journal title: Journal of Consumer Marketing

Acceptance date: 25-Aug-2025

DOI: 10.1108/JCM-01-2025-7569

Abstract

Current consumption patterns have aggravated environmental degradation. In response, collaborative consumption (CC) through collaborative platforms (CPs) has emerged as a sustainable alternative. Although CPs can support sustainability, their environmental benefits remain contested, following the observation of consumerism rebound effects. Given education's potential to increase knowledge about the importance of sustainability, this study explores the impact of sustainable development education (SDE) on the extrinsic motivations (functional utility, economic utility, moral utility, and hedonic utility) and intrinsic motivations (ecological awareness, eco-anxiety, green orientation, and consumerism) that improve attitudes toward CPs and increase intentions to use them. This research is based on two studies, each using a different sample: one of high school students ($N = 232$) and one of older people enrolled in a lifelong learning program ($N = 157$). A questionnaire collected the data that were analyzed to test the research hypotheses. SDE significantly influences intrinsic and extrinsic motivations. The results suggest that CPs are primarily used for commercial rather than sustainability purposes because attitudes are predominantly shaped by extrinsic motivations. Additionally, motivators play a mediating role in the proposed model. This study highlights critical social and practical implications by emphasizing the need for educational systems that promote responsible consumption and challenge students' consumeristic and materialistic tendencies. This study is the first to examine the influence of SDE on collaborative consumption and comprehensively explore the roles of intrinsic and extrinsic motivations in the context of CPs,

shedding light on the collaborative consumption paradox.

Keywords

Collaborative consumption, collaborative platforms, sustainable development education, intrinsic/extrinsic motivations, attitudes, self-determination theory

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1. INTRODUCTION

Consumption adversely affects the environment by depleting resources such as energy, materials, and land, creating waste, and causing pollution (Hertwich, 2010). A large proportion of environmental deterioration stems from personal consumption choices (Grinstein and Nisan, 2009). Therefore, changing individuals' consumption patterns can mitigate environmental deterioration (Wu and Yang, 2018). Specifically, collaborative consumption is an increasingly popular alternative that may help alleviate certain environmental impacts by promoting reuse and prolonging the useful life of products (Perren and Grauerholz, 2015).

Collaborative consumption is defined as peer-to-peer activity that involves obtaining, giving, or sharing access to goods and services, coordinated through community-based online platforms (Hamari *et al.*, 2016). This consumption model is based on the exchange between individuals (rather than professionals or companies) of goods and services that remain idle or underused and entail economic value. It thus leads to a more equitable, sustainable, and decentralized economy (Mora *et al.*, 2020).

Technological development has been central to the emergence of digital CC platforms or collaborative platforms (CPs). These CPs enable the exchange and sharing of goods and services between consumers. These platforms have created high expectations in their capacity to promote sustainability (Fuster Morell and Espelt, 2018). Notable examples include Wallapop, Vinted, Blablacar, and Milanuncios. However, CPs have received criticism because they may in fact increase consumerism (Guyader, 2018). A common argument is that the low prices and ease of resale can encourage excessive consumption of unnecessary items (Robert *et al.*, 2014). Meanwhile, savings from second-hand purchases are then spent on other new goods (Thomas, 2003), thereby driving overconsumption.

In sum, the capacity of CPs to promote sustainability and discourage consumerism is a desirable outcome that should be encouraged. To achieve this outcome, education offers a valuable tool for raising awareness about the importance of sustainability and sustainable consumption (Elegbede *et al.*, 2023). There is evidence of the influence of education for sustainability on students' sustainable consumption behavior (Ertz and Sarigöllü, 2022). As a result, the Education for Development and Education for Global Citizenship (UNESCO, 2023) measures aim to instill sustainable development education (SDE) at all levels. SDE can help consumers understand that CPs can reduce the quantity of idle or underused products and contribute to

reducing detrimental environmental impacts (De Angelis and Ianulardo, 2025).

Given this background, this research explores the effect of SDE as an antecedent of intrinsic and extrinsic motivations when developing attitudes toward CPs, which then lead to the intention to use CPs. Although research suggests that SDE is an antecedent in the formation of attitudes toward sustainability (Avelar and Farina, 2022; Kaur and Kaur, 2022; Verachtert and Stiers, 2024), understanding how personal norms and values shape these attitudes is necessary. Prothero *et al.* (2011) cited the role of values in the use of CPs as an opportunity for further research. This research responds to this call by empirically exploring motivations for using CPs resulting from SDE and providing critical insights into the contradictory dynamics of CC. This research also makes a valuable contribution by empirically confirming that SDE shapes CC motivations and intentions. This confirmation provides insight into the critical yet understudied link between education and consumption behavior.

2. THEORETICAL FRAMEWORK AND HYPOTHESES

2.1. Sustainable development education

Sustainable development education (SDE) refers to all forms of formal, non-formal, and informal education and training that equip individuals to respond effectively to pressing environmental challenges (Wals and Benavot, 2017). SDE is fundamental to face global challenges and reflects the role of educational institutions in educating citizens about the need to make a commitment to the environment and responsible consumption (Carbonell-Alcocer *et al.*, 2022). Education is crucial to promote sustainable development and make younger generations conscious and active contributors to a more equitable and environmentally friendly future (Avelar and Farina, 2022).

As a result, there have been various initiatives to introduce sustainability in education. For instance, SDE promoted by UNESCO seeks to integrate sustainable knowledge, skills, and attitudes into school curricula with the aim of ensuring that young people adopt more sustainable lifestyles (UNESCO, 2023). At the European level, initiatives such as GreenComp and the Education for Climate Coalition promote green skills, connecting education to the green transition (European Commission, 2022). Transformative education, supported by the 2030 Agenda and the Paris Agreement, promotes values such as peace, human rights, and equality, preparing students to address global challenges from an ethical and sustainable perspective (UNESCO, 2019). In addition to formal education, lifelong learning programs play a critical

role in mitigating environmental impact (Wals and Benavot, 2017) by raising awareness and educating consumers outside the educational system.

Dube *et al.* (2024) emphasized the transformative potential of education to prepare generations to address sustainability challenges. Recent research has shown that SDE fosters critical thinking, digital competence, and responsible consumption through systemic and participatory pedagogies (Vargas-Merino *et al.*, 2024; Yang and Ng, 2025). When embedded in education and extended through lifelong learning strategies, SDE supports the internalization of sustainability values that shape long-term behavior. Educational settings that promote understanding of sustainability dynamics and systems thinking enhance students' ability to act as agents of change (De Angelis and Ianulardo, 2025). This process is reinforced by digital and collaborative learning environments that facilitate continuous and inclusive access to sustainability education (Albuquerque *et al.*, 2024; Paliwal and Singh, 2021; Singh *et al.*, 2020).

Scholars have highlighted the importance of linking academic curricula to the Sustainable Development Goals (SDGs) proposed as part of the 2030 Agenda (Annan-Diab and Molinari, 2017; Kolb *et al.*, 2017). Knowledge about sustainability is crucial in forming attitudes (Ajzen, 1991). Studies have confirmed that SDE influences sustainable attitudes and behaviors (Avelar and Farina, 2022; Michalos *et al.*, 2012), although scholars have warned of the need for profound changes in values and habits (Amran *et al.*, 2019; Tibbs, 2011). Such changes are crucial because SDG 4 aims to motivate a change in behavior toward more sustainable lifestyles (Darner, 2009). Thus, delving into the motivations behind these changes is critical to gain a deeper understanding of the mechanisms involved.

2.2. Self-determination theory

Self-determination theory (SDT) was developed to explain the motivational basis of personality and social behavior (Deci and Ryan, 1985). SDT posits that there are two types of motivation: intrinsic and extrinsic. Extrinsic motivation refers to “the performance of an activity in order to attain some separable outcome,” whereas intrinsic motivation refers to “doing an activity for the inherent satisfaction of the activity itself” (Ryan and Deci, 2000, p.71). People perform an intrinsically motivated activity for no other reason than their interest in the activity itself, even if they receive no reward (Ryan and Deci, 2024). Extrinsically motivated behaviors are externally regulated because they arise to satisfy an external demand or obtain some reward (Ryan and Deci, 2000).

SDT has allowed marketing scholars to understand the myriad motivations for consumption in several contexts. In the case of CC, SDT has helped researchers define the motivations that lead people to participate (García-Rodríguez *et al.*, 2022; Hamari *et al.*, 2016). SDT has also been successful in explaining pro-environmental behaviors in the case of environmental education programs (Darner, 2009). Specifically, Darner (2009) theorized that active environmental education in the classroom is a key factor in motivating pro-environmental behaviors among students. The learning process involves the construction of new knowledge that allows individuals to understand their context (Cole and Cole, 1993). This process of assimilation is not static and influences the intrinsic and extrinsic motivational processes (Ryan, 1995) that drive intentions.

Following these arguments, in this research, SDT is used to understand how sustainability education can affect students' motivations and subsequently their attitudes and behaviors toward using CPs. Specifically, CPs' functional utility, economic utility, moral utility, and hedonic utility are proposed as extrinsic motivations, and students' ecological awareness, eco-anxiety, green orientation, and consumerism are proposed as intrinsic motivations.

2.3. Consumption on collaborative platforms and sustainability

CPs operationalize CC, acting as third parties (Ertz *et al.*, 2019) that provide an online channel for consumers (Belk, 2010; Heinrichs, 2013; Mora *et al.*, 2020; Tluczak and Kauf, 2017). They enable a consumption model based on the exchange of goods and services between individuals to use idle resources (e.g., reuse and reduction). This CP model is linked to the principles of the circular economy. CPs have thus created high expectations as tools for promoting sustainability (Fuster Morell and Espelt, 2018). CPs such as Vinted (2023) and Wallapop (2022) even use these arguments to attract users. In sum, CPs provide a framework in which users can efficiently and effectively exchange goods (Fuster Morell and Espelt, 2018).

CPs are part of a modern trend in sustainability whereby economic, ethical, and social benefits are combined (Stepnov and Kovalchuk, 2020). Given the economic interests involved, a critical line of thought focuses on people's motivations to use these platforms. Specifically, Guyader (2018) categorized types of collaborative consumption as community-based (prosocial), consumer-based (commercial), or opportunistic (exploitative), depending on what people look for when using these platforms. Similarly, Sundararajan (2019) stressed that motivations for participating in CC may be commercial as well as social. Furthermore, Kim and Yoon (2021)

found that attitudes toward CC are driven by motivations related to entertainment, sustainability, and economic factors.

2.4. Research hypotheses

The literature shows consistent findings on the relationship between attitudes and intentions. Based mainly on the theory of planned behavior (TPB) (Ajzen and Fishbein, 1980) and the technology acceptance model (TAM) (Davis, 1989), prior research has shown that behavior is predicted by an individual's intentions to perform it and that those intentions are predicted by the individual's attitudes toward that behavior. In the case of CC, the empirical findings support this idea. For instance, Roos and Hahn (2019) found that consumer attitudes toward CC positively influence consumers' intention to consume collaboratively, which positively influences CC behavior. Similarly, Hamari *et al.* (2016) confirmed the direct and positive relationship between attitudes toward CC and behavioral intention to participate in CC. Consequently, the following hypothesis is proposed:

H1: Attitude toward CPs increases the intention to use CPs.

SDT establishes that motivations can form attitudes, and attitudes are needed to translate perceived values and benefits into intentions (Zhu *et al.*, 2017). Thus, this research explores the relationship between intrinsic and extrinsic motivations and attitudes toward CPs.

Regarding extrinsic motivations, Ertz and Sarigöllü (2022), identified different forms of utility involved in CC. Functional utility refers to the ability to be useful (Barnes and Mattsson, 2017; Zhang *et al.*, 2019). Economic utility refers to perceived economic benefits (Barnes and Mattsson, 2017; Michalak *et al.*, 2022). Moral utility refers to perceived sustainability and environmental benefits (Alzamora-Ruiz *et al.*, 2020; Kim and Jin, 2019). Finally, hedonic utility refers to the pleasure and enjoyment offered (Hamari *et al.*, 2016; Pinotti and Moretti, 2018). These different forms of utility have been explored, albeit separately, in the context of CC. For instance, Barnes and Mattsson (2017) emphasized the role of economic and environmental benefits in CC. Similarly, Hwang and Griffiths (2017) confirmed that attitudes toward CC services are determined by the perceived utilitarian and hedonic value they offer. Consequently, the following hypothesis is proposed:

H2: Attitude toward CPs is positively influenced by extrinsic motivation in the form of (a) functional utility, (b) economic utility, (c) moral utility, and (d) hedonic utility.

Concerning intrinsic motivations, the literature explains that students' environmental and social attitudes are reflected in their sustainable behavior (Avelar and Farina, 2022). Value-belief-norm theory (Stern *et al.*, 1999) posits that personal norms are rooted in individual values and the motivation to maintain these values through corresponding behavior. This background suggests that biospheric value orientations (e.g., an individual's awareness of the environment) and egoistic value orientations (e.g., material wealth or consumerism) are, respectively, positively and negatively related to developing a personal norm to behave sustainably. Consumerism, the view that income, material possessions, and wealth are important for achieving happiness, is negatively associated with consumers' attitudes toward CC (Lindblom *et al.*, 2018). Botsman and Rogers (2011) suggested that consumers' social awareness and environmental awareness are significant determinants of CC. Roos and Hahn (2019) showed that personal norms and attitudes strongly influence CC. Eco-anxiety, which refers to "the distress caused by climate change where people are becoming anxious about their future" (Coffey *et al.*, 2021, p.1), may also influence people's attitudes to alleviate their discomfort (Sharma and Palazzo, 2024). The worry resulting from eco-anxiety can even be considered a motivating force associated with pro-environmental attitudes (Verplanken *et al.*, 2020). Consequently, the following hypothesis is proposed:

H3: Attitude toward CPs is positively influenced by intrinsic motivation in the form of (a) ecological awareness, (b) eco-anxiety, (c) and green orientation and is negatively influenced by intrinsic motivation in the form of (d) consumerism.

SDE can be incorporated at all educational stages to foster competencies in sustainable development by endowing students with knowledge that influences their ecological awareness and personal attitudes toward sustainability (Avelar *et al.*, 2022; Avelar and Farina, 2022; Kaur and Kaur, 2022; Verachtert and Stiers, 2024). The literature explains that curricula with sustainability principles promote favorable attitudes toward sustainable development in primary school students (Michalos *et al.*, 2012). These attitudes, in turn, lead to pro-environmental behaviors (Iqbal *et al.*, 2023) and responsible consumption habits (Raut and Pendse, 2023).

SDE encourages reflection on nature and enhances knowledge about it, as well as the obligation to value it (Bayram, 2012). From an intrinsic point of view, humans are part of nature, and the value of environmental protection is inherent in the sense of belonging to nature. Thus, environmental education helps learners recognize values that may lead to intrinsic motivations, clarify concepts and attitudes that influence self-development, and create a behavioral code

related to environmental issues (Scott and Oulton, 1998).

From an extrinsic point of view, education allows individuals to develop knowledge so that they can benefit in the future by, for example, securing a job (Whitehead, 1984). SDE specifically equips students with knowledge and skills to contribute to a sustainable future (Mahlaole, 2025). For instance, regarding the inclusion of sustainability in education, UNESCO proposes a guide that focuses on reshaping values and emphasizes the importance of providing practical tools. These tools are designed to help students identify viable alternatives to achieve sustainable consumption, including through collaborations that improve their quality of life (UNESCO, 2024).

Educational environments have long been recognized as contexts that foster both intrinsic and extrinsic motivation (Niemic and Ryan, 2009). As a result, education can play a decisive role in activating both types of motivation. Research in other domains has shown the scope of education to enhance students' perceptions of value and utility in their decisions (Woody, 2021). Therefore, when sustainability education highlights the practical, moral, and even hedonic benefits of sustainable behaviors, it can reinforce extrinsic motivations such as functional, economic, moral, and hedonic forms of utility. Consequently, the following hypotheses are proposed:

H4: SDE positively influences extrinsic motivation in the form of (a) functional utility, (b) economic utility, (c) moral utility, and (d) hedonic utility.

H5: SDE positively influences intrinsic motivation in the form of (a) ecological awareness, (b) eco-anxiety, and (c) green orientation, and negatively influences intrinsic motivation in the form of (d) consumerism.

The direct relationship between motivation and attitude has been extensively studied (e.g., Hwang and Griffiths, 2017). However, motivations may be determined by different influences, including education. For instance, Darner (2009) explained that educators can foster environmentally friendly behaviors by increasing students' environmental motivation. As a result, education, environmental motivation, and attitudes are interrelated because the educational environment determines motivations, which are linked to attitudes. Scarce research has explored the relationship between education, motivation, and attitudes (Darner, 2009). For instance, Maralani (2016) reported that intrinsic and extrinsic motivations mediate the relationship between the educational environment and self-determination. Consequently, the

following hypothesis is proposed:

H6: The effect of SDE on attitude toward CPs is mediated by (a) intrinsic motivations and (b) extrinsic motivations.

Based on the hypotheses, the research model depicted in Figure 1 is proposed.

FIGURE 1

3. EMPIRICAL STUDIES

Two empirical studies, each using a different sample, were conducted to test the hypotheses. These studies explored the role of SDE in motivations and attitudes across two different groups: young students enrolled in a formal education program and older consumers enrolled in an informal lifelong learning program.

3.1. Study 1

Study 1 was conducted with high school students enrolled in courses where sustainable development was part of the curriculum. This study provided an initial step to test the impact of SDE on the motivations and attitudes of students.

3.1.1. Research methodology

Data were collected from students enrolled in Spanish high schools in the 2023/4 academic year. These students were chosen because most young people have access to smartphones, computers, and the internet, giving them easy access to CPs (INE, 2024). The sample was suitable because, in Spain, the national education law emphasizes the mainstreaming of SDGs at all educational stages by teaching topics such as the circular economy, ecological footprints, and responsible consumption (López, 2019).

The sampling technique in this study was purposive and non-probabilistic sampling. Students enrolled in high schools were targeted to ensure that they had exposure to formal education in sustainability, which was a key variable in the present research. To recruit the participants, several schools were contacted via email. They were informed about the research objectives, and their collaboration was requested to help disseminate the questionnaire to students. All responses were from students enrolled in secondary education programs (baccalaureate or vocational programs) that included content on sustainable development. Data collection took

place at the end of the school year to ensure reliable responses on sustainability. A total of 277 responses were gathered. After data cleaning, 45 responses were eliminated, leaving 232 valid cases. The characteristics of the sample are shown in Table I.

TABLE I

An online questionnaire was designed using items drawn from previously validated scales in the literature to measure each construct. The online appendix (Table A1) provides the detailed list of sources. All items were adapted to the studied context and were assessed using a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Several procedures were used to minimize bias. Experts in sustainability and consumer behaviors validated the questionnaire. A pilot test was carried out with students to adjust its length and ensure comprehension. The questions were strategically ordered, starting with those related to CP use and perceptions to avoid the influence of questions on values and behaviors. Sociodemographic questions were left to the end of the questionnaire. The questionnaire preamble explained that responses were confidential, anonymous, and voluntary. An informed consent link was included to comply with European data protection regulations (EU Regulation 2016/679). CPs were clearly defined, and examples were included before the items to ensure participants' consistent understanding. For example: "When we refer to collaborative platforms we mean 'virtual spaces (websites or apps) that enable online interactions between individuals to share (e.g., Airbnb, Blablacar, and TooGoodToGo), sell, or buy (e.g., Vinted, Wallapop, and Milanuncios) goods'."

3.1.2. Results

To test the direct hypotheses, partial least squares (PLS) path modeling was chosen for three reasons. First, it works well with small samples. Second, it can handle complex models. Third, it is suitable when research is in its early stages and the model has not been previously tested (Hair *et al.*, 2019).

Sociodemographic data were analyzed using IBM SPSS. Model testing was conducted with SmartPLS 4.1.0.2, employing bootstrap resampling (10,000 resamples). Latent variables extracted from SmartPLS were analyzed in SPSS to examine mediation effects. Specifically, Model 4 used 10,000 bootstrap samples, with SDE serving as the independent variable, attitude as the dependent variable, and the four intrinsic and four extrinsic motivations as mediators.

Reliability, internal consistency, and validity were assessed following the recommendations of Hair *et al.* (2021) for measurement model testing. The results (Online Appendix, Table A2) confirmed scale reliability, with all Cronbach's α values exceeding 0.7. Similarly, the results confirmed internal consistency, with composite reliability (CR) exceeding 0.6. The average variance extracted (AVE) values were greater than 0.5, thus confirming the convergent validity of the scales (Bagozzi and Yi, 1988). Construct validity was also confirmed because, in all cases, the direct relationships between the dimensions and their indicators had significant loading values (t -value > 1.96 at the 95% confidence level).

Finally, discriminant validity was confirmed by testing whether the square root of the AVE of each reflective construct was greater than the correlations between constructs (Online Appendix, Table A3), using the Fornell and Larcker (1981) criterion.

Following Podsakoff *et al.* (2003), Harman's single-factor test was run to test for common method bias (CMB). The results of exploratory factor analysis loading all items onto one factor showed that a unique unrotated factor explained 37.09% of variance extracted. This result indicated a minimal risk of CMB because the factor accounted for less than 50% of the variance (Podsakoff *et al.*, 2003).

After validating the measures, the proposed relationships were estimated. The results (Table II) showed a significant and positive relationship between attitude toward CP use and intention to use CPs, thereby supporting H1. The results also showed that extrinsic motivation (functional utility, economic utility, moral utility, and hedonic utility) positively influenced attitude, thereby supporting H2. However, functional utility (H2a) and economic utility (H2b) had weaker impacts ($f^2 = 0.022$ and $f^2 = 0.029$, respectively) (Cohen, 1988). The results partially supported H3. Only green orientation had a positive and significant effect on attitude (H3c supported). In contrast, ecological awareness and eco-anxiety did not significantly affect attitude (H3a and H3b rejected). Moreover, consumerism had a significant but non-negative effect on attitude (H3d rejected). Regarding SDE, a positive and significant effect of sustainability education on extrinsic motivations was observed, thereby confirming H4. The effect of SDE on intrinsic motivation was partially confirmed (H5a–H5c). However, the results led to the rejection of H5d because a significant but non-negative relationship was observed between sustainability education and consumerism.

TABLE II

The results of the mediation analysis revealed a significant and positive indirect effect of sustainability education on attitude via all extrinsic motivations, except functional utility, and via one intrinsic motivation (green orientation), as reflected by the 95% confidence intervals (see Table III). The positive indirect effects suggested that SDE increased economic, moral, and hedonic motivations and green orientation, thereby enhancing students' attitudes toward CPs. These results offered partial support for H6. Additionally, the mediators partially explained the effect of sustainability education on attitude because the direct effect persisted even when the mediating effects were included in the model. Notably, the direct effect of SDE was negative. Thus, including the mediating effects reduced attitudes toward CPs, whereas the overall effect was positive. Hence, motivations were observed to change the direction of the effect in the model.

TABLE III

3.2. Study 2

In this study, the results of Study 1 were replicated for a different sample. This second study enabled comparison of the effects of SDE on motivations, attitudes, and intentions across different populations that have received education in sustainability.

3.2.1. Research methodology

The new sample comprised individuals enrolled in a lifelong learning program at a Spanish university. This program is an initiative by regional government and universities, framed within active aging and lifelong learning programs. It aims to give older adults education in culture and science to support their personal growth. It offers a wide range of content. This study focused on learners enrolled in the program offering sustainable development content.

As in Study 1, sampling was purposive and non-probabilistic. Older adults enrolled in a structured lifelong education program were targeted to ensure that participants were exposed to sustainable development learning content and that they had different life experiences from those in the student sample used in Study 1. This sampling approach thus enhanced the cross-population validity of the research. In cooperation with the program managers and teachers, the questionnaire was shared with several classes. A total of 159 responses were received. After data cleaning, two responses were excluded, resulting in 157 valid cases. The questionnaire for this study was the same as in Study 1, except for the addition of some profile

questions (income and education). Sample characteristics are shown in Table I.

3.2.2. Results

The same procedure was followed as in Study 1 for analyzing the data. As in Study 1, the results showed good reliability, internal consistency, construct validity, and convergent validity (Online Appendix, Table A4). Discriminant validity was also confirmed after removing one item from the consumerism scale because its loading was low and non-significant (Online Appendix, Table A5). The threat of CMB was also discarded because Harman's single-factor test revealed 28.55% variance extracted for a unique unrotated factor.

The results of the structural model are shown in Table IV. As in Study 1, the attitude toward CP use increased the intention to use CPs, thereby supporting H1. Regarding extrinsic motivations, moral utility and hedonic utility positively influenced attitude. In contrast, contrary to Study 1, functional utility and economic utility did not significantly affect attitude, thereby partially supporting H2. No intrinsic motivation (green orientation, consumerism, ecological awareness, or eco-anxiety) had a positive and significant effect on attitude. Thus, H3 was not supported. Regarding SDE, a positive and significant effect of sustainability education on hedonic utility and moral utility was observed, thereby confirming H4b and H4c. The effect of SDE on intrinsic motivation was partially confirmed (H5a–H5c). However, the results led to the rejection of H5d because the relationship between sustainability education and consumerism was not significant.

TABLE IV

The results of the mediation analysis are presented in Table V. A significant and positive indirect effect of sustainability education on attitude was only observed via moral utility, as reflected by the 95% confidence interval. The positive indirect effects suggested that SDE increased moral utility, thereby enhancing students' attitudes toward CPs. This result partially supported H6. This mediator played a key role because the direct effect was not significant in the model, whereas the indirect effect was.

TABLE V

FIGURE 2

4. OVERALL DISCUSSION

Given current environmental challenges, education is crucial to inform and prepare future consumers. Across two studies, this research explores how SDE influences individuals' intention to use CPs. Figure 2 summarizes the results of these two studies.

First, both studies indicate that a positive attitude is a determining factor in the intention to use CPs. This finding supports previous research on CC reports a relationship between attitude and purchase intention (Hwang and Griffiths, 2017). The current research extends these existing findings to the case of CPs.

Second, the results show that attitude toward CPs is primarily formed by extrinsic motivations rather than intrinsic motivations. Both studies indicate that moral utility and hedonic utility determine attitudes toward CPs. In the case of young students, in addition to these forms of utility, functional utility and economic utility also shape attitudes, which are non-significant in the case of older consumers. These differences across samples can be explained by two separate factors. First, the digital divide affecting older adults (Chee, 2024) may hinder their perceived utility of CPs. Second, young people's lack of disposable income may increase their sensitivity to the economic benefits offered by CPs. Regarding intrinsic motivations, neither ecological awareness nor eco-anxiety appears to increase attitudes for either sample. In the case of young consumers, attitudes are increased not only by green orientation but also by consumerism, which has no effect in older consumers. This finding contrasts with those reported in the literature, whereby materialism is reported to reduce CC attitudes (Chee, 2024; Lindblom *et al.*, 2018).

Treated as a whole, these findings paint a harsh reality. Attitude is primarily determined by external factors instead of an internal belief in sustainability. Moreover, consumerism appears to be a determinant of positive attitude among young consumers. These findings raise questions about the role of CPs as a means of sustainable consumption for young consumers. The findings suggest that, in some cases, CPs might function more as an alternative form of conventional capitalist consumption than as a driver of sustainable behaviors.

These findings can be explained by the paradox of collaborative consumption (Guyader, 2024). The concept of CC has transformed in recent years. Originally, it centered on sharing and making use of underutilized goods, inspired by anti-consumption ideals (Albinsson and Yasanthi Perera, 2012). Today, it has evolved into a market-oriented model focused on

maximizing user utility and self-benefit (Guyader, 2024). It is no longer perceived as an economic model for fostering more sustainable consumer behavior. This view is in line with the writings of several researchers, who question the extent to which CPs favor sustainability or simply perpetuate the capitalist system of consumption (Martin, 2016; Sundararajan, 2019).

Third, the results confirm that SDE positively affects intrinsic and extrinsic motivations. This finding is aligned with the views of Bayram (2012) on the importance of sustainability knowledge in people's motivations to protect the environment. Nonetheless, some disparities can be observed across the two samples. Regarding extrinsic motivation, the results suggest that young consumers perceive the functional, economic, hedonic, and moral utility of CPs, influenced by the positive impact of SDE. However, the results indicate that SDE only increases perceived economic and moral utility among older consumers. Similarly, SDE affects intrinsic motivations. For both consumer profiles, education increases ecological awareness, eco-anxiety, and green orientation. However, consumerism appears to have a positive effect on education among young consumers but a non-significant effect among older consumers. Thus, education is effective in promoting sustainable values. However, it faces a challenge in the form of younger generations' consumerism. Younger generations, born into the current era of capitalism, tend to place high value on material possessions (Bank of America, 2022). In contrast, older generations that have experienced the cultural shift from post-war austerity to today's consumer society are less consumeristic and more conscious about durability and the value of goods (Leach *et al.*, 2013).

Fourth, the results also show that, for young people, economic, moral, and hedonic forms of utility, along with green orientation, reverse the negative effect of SDE on attitudes into a positive influence. For older individuals, the direct effect is non-significant. However, a mediating effect of moral utility appears to make the effect of SDE significant and positive. This finding indicates that, although SDE directly reduces attitudes toward CPs, the extrinsic rewards offered by CPs can improve these attitudes. This finding can be explained by the limitations discussed in spillover theory (Thøgersen and Crompton, 2009). Although young people are aware of pressing environmental issues such as climate change, they may also believe that small individual behavioral changes will not lead to the significant and necessary transformations required to address these environmental issues. They may consider that more profound change is needed, driven by ambitious government policies and active public pressure that go beyond simple lifestyle choices (Thøgersen and Crompton, 2009). This idea could explain why their attitudes toward CPs are driven by extrinsic motivations and the associated

rewards, even though they identify that these platforms do not positively contribute to the environment. Following this reasoning, moral utility may reduce cognitive dissonance (Festinger, 1957). Although young people are acutely aware of environmental degradation and the limited scope of CPs to address this issue, they attempt to associate positive elements with these platforms (particularly moral utility) to reduce the psychological discomfort that arises when their beliefs and behaviors come into conflict.

5. CONCLUSIONS

5.1. Theoretical implications

Alternative consumption patterns conducive to sustainable development are emerging (Kataria *et al.*, 2023; Raj and Aithal, 2020). CPs are expected to play a vital role in fostering sustainability by promoting sustainable consumption practices and minimizing environmental impact and material consumption. However, these platforms are subject to criticism from scholars who warn of their contribution to capitalist forms of consumption (Guyader, 2018). The present research addresses this topic from a critical perspective to explore unresolved issues around CPs. As a result, this research contributes to the literature in two ways.

First, in recent years, education has embraced sustainability as a way of transforming consumption habits. Although this shift in education has aroused academic interest and some research has explored the role of education in motivations (Darner, 2009), to the authors' knowledge, this paper is the first empirical research to acknowledge the importance of studying SDE to understand consumer intentions toward CPs, linking SDE and the marketing literature. As emphasized in the special issue call for papers, the marketing literature has explored sharing and collaborative consumption in recent years. For instance, highlighting the complexity of CC, Hwang and Griffiths (2017) explored the hedonic, utilitarian, and symbolic value perception of CC and its effect on attitudes. Shang and Wu (2022) considered pro-environmental self-identity and green personal norms to explain attitudes and intentions toward CC. Bhalla (2021) studied materialism and economic and environmental motivations to explain attitudes. However, sustainability education and the myriad intrinsic and extrinsic motivations for collaborative consumption have not been comprehensively examined in literature. Under this new consumption paradigm, educational institutions are fundamental for instilling environmental concerns and socially responsible consumption patterns in all generations. Specifically, SDE provides values that students can adopt in their intrinsic value systems. Education thus offers the most powerful tool to encourage people to respect the environment, while also providing

knowledge on environmental protection outcomes and their importance for quality of life in the future (Bayram, 2012).

Second, this research considers the key role of intrinsic and extrinsic motivations in the formation of attitudes. It thus expands the literature providing evidence of the effects of SDE on attitudes. This approach makes it possible to reveal people's motivations for using CPs. Most studies have shown that education can change attitudes (Darner, 2009). However, motivations are a vital part of this change. This research sheds light on the role of motivations in this process, showing that both intrinsic and extrinsic motivations influence the intention to act. This exploration of motivations sheds light on the CC paradox (Guyader, 2024). Namely, it reveals that CPs do not genuinely promote sustainability because attitude toward CPs are primarily determined by extrinsic rewards. Instead, the current research shows that CPs paradoxically intensify capitalist consumption. The research thereby makes a meaningful theoretical contribution that advances discussions in this field.

5.2. Practical implications

This research emphasizes the importance of SDE. Through transformative education, SDE acts as a catalyst for the well-being of individuals and the planet by transferring knowledge and values that foster sustainability awareness (SDG 4). According to Irina Bokova, Director-General of UNESCO, now more than ever, education must be aligned with the challenges of the 21st century to promote values and skills that drive sustainable and inclusive growth. Many challenges remain in this regard. This research can help tackle these challenges by highlighting the following practical implications.

First, the studies presented in this paper show that SDE is effective in developing intrinsic environmental motivations. Such motivations lead to self-determined behavior because they become integrated into students' organizational cognitive structures (Darner, 2009). However, there are some deviations to this trend (i.e., increasing consumerism among young people). Thus, to maintain this trend and address these negative aspects, public administrations and education authorities must intensify efforts to ensure that teachers are sufficiently equipped to embrace sustainability in the classroom. Actionable strategies might include the following: introducing mandatory content on sustainability and collaborative consumption in curricular subjects, covering topics such as the circular economy and environmental ethics; running team-based eco-challenges such as collectively reducing plastic use or tracking and minimizing

ecological footprints to promote a sense of shared responsibility and boost the intrinsic satisfaction of contributing to the common good; adopting the GreenComp framework in curricula through well-defined competencies and assessment tools; and providing comprehensive teacher training programs in active sustainability pedagogy.

Second, it is crucial to be critical of the role of CPs to improve pro-environmental attitudes and future green behaviors because attitudes toward CPs are mainly driven by extrinsic motivations. The most powerful tool to prevent resource exploitation is the intrinsic value of nature and the human capacity to appreciate this value (Bayram, 2012). Fostering intrinsic motivations to use CPs thus remains critical. It is not only the use of CPs that matters but also the purpose of this use. When CPs are used simply to consume more goods, especially new ones, they may in fact intensify unsustainable consumption. Conversely, when used to share, swap, or reuse underutilized goods, they fulfill their original sustainability-oriented purpose. Strengthening values such as cooperation, empathy, and environmental stewardship could change the reasons for using CPs. For example, gamified learning based on comparing the environmental impact of using CPs for sustainable or commercial purposes could be useful. Also, schools could organize project-based learning and could base learning on real-world experiences, such as simulations of second-hand markets or app-based reuse challenges involving collaborative platforms. When students perceive a sense of achievement in contributing to collective success, they become more willing to adopt sustainable behaviors (Deci and Ryan, 2000). This greater willingness to adopt such behaviors contributes to a long-term commitment by citizens to make ethical and responsible decisions.

Finally, the findings can help firms. Specifically, CPs' suppliers must reposition their offerings. Although they use green claims to attract consumers, CPs are seen as another means of consumption, with consumers valuing the functionality, economic benefits, and enjoyment they provide. Notably, intrinsic environmental motivations do not necessarily improve attitudes, except in the case of consumerism, which can in fact exacerbate these attitudes. Therefore, CPs should prioritize their contribution to sustainable consumption. For example, CPs can use AI-driven nudges to prevent overconsumption and promote sustainable behavior, with evidence showing that nudging can effectively influence pro-environmental behaviors (Wee *et al.*, 2021). Likewise, informational messages that alert consumers to the responsibility of conscious consumption can reduce the need to accumulate material things because raising awareness about the impact of consumer choices has been shown to decrease materialistic tendencies and encourage more mindful behavior (White *et al.*, 2019). In addition, platforms could introduce

CO₂-saving indicators that inform users of the environmental benefits of their purchases. Educational interventions that prompt reflection on personal values and environmental consequences have also proven effective in reducing the desire to accumulate material goods (Carbonell-Alcocer *et al.*, 2022).

Practical and visible actions might include a counter of purchased products, where, depending on the number of products acquired, consumers are alerted to their overconsumption, for example through a traffic light system. Firms could also ask sellers for more information about products, such as the brand or company where products were purchased, date of purchase, and reasons for sale. This information could be used to evaluate the sustainability of products, with more environmentally friendly products being positioned higher in users' product searches. This policy would not only help consumers make green choices but also encourage sellers to be aware of the true purpose of these platforms. CPs could thus contribute to meeting the SDGs by reducing material consumption (SDG 12) and combating climate change (SDG 13).

5.3. Limitations and future research

This research also has some limitations. First, the methodology has inherent constraints. Specifically, despite their usefulness in capturing perceptions and attitudes, self-reported surveys have drawbacks such as potential response bias (Tourangeau *et al.*, 2000). Consequently, the results should be interpreted with care. To address this limitation, future research could employ experimental or quasi-experimental designs to increase control over the independent variables and compare their effects on the dependent variables.

Sampling constitutes a second limitation. Although this research used two studies with different samples to provide robust results, both relied on people who had been exposed to sustainability education. This feature may limit the generalizability of the findings to other populations. Expanding the research by using samples of respondents who had not been exposed to sustainability education would offer more robust evidence of the causal relationships between SDE, attitudes, and the intention to use CPs. The use of other samples could also help explore whether sociodemographic characteristics (e.g., habitat, budget, sex, and educational level) influence the intention to use CPs. Such characteristics could also be used to identify clusters or segments within the sample.

Finally, future studies can expand on some of the findings that diverge from those of prior research. Specifically, the role of consumerism is controversial because the findings of the

present research contradict those reported in the literature (Lindblom *et al.*, 2018). Although CPs' promotion of consumption is presented as the reason for these discrepancies, it is also reasonable to speculate that these differences result from the rise in ethical consumption (Davies *et al.*, 2012). Future research could explore this idea. Moreover, the lack of influence of eco-anxiety on attitudes toward CPs is a major deviation from past research findings (Verplanken *et al.*, 2020). A possible explanation for this discrepancy is that high levels of eco-anxiety may cause inaction or eco-paralysis (Boluda-Verdú *et al.*, 2022). Therefore, further research is needed to study the relationship between eco-anxiety and desensitization to environmental concerns (Norgaard, 2011).

ACKNOWLEDGMENTS

This work was supported by the Spanish Ministry of Science, Innovation and Universities of Spain, MCIN/AEI/10.13039/501100011033 [projects: PID2023-152671OB-I00 and PID2023-148263OA-I00]. The first author was financially supported by the Spanish Universities' Ministry under the University Teachers' Training Programme (FPU/00606-2021).

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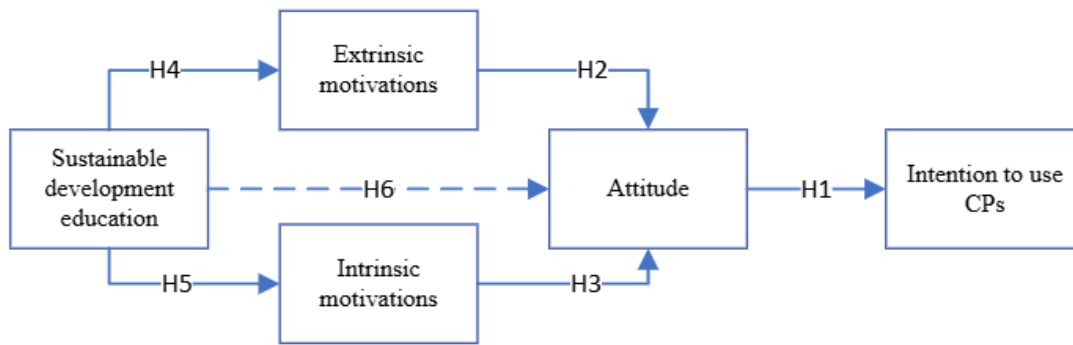
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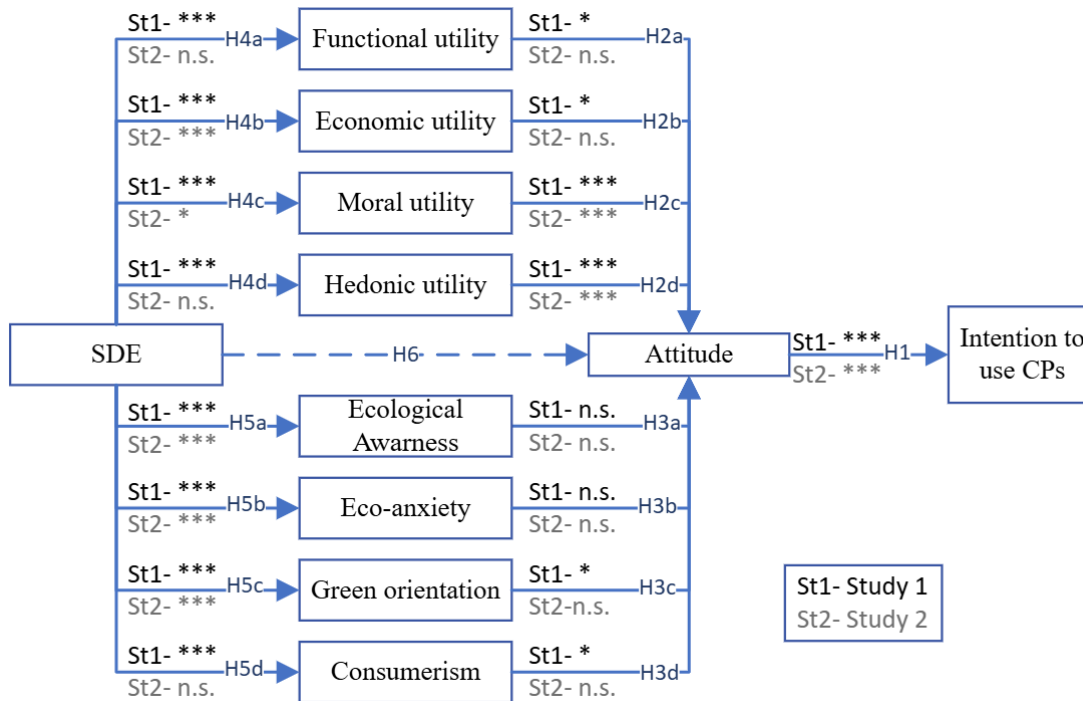
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Figure 1. Conceptual model



Source: Authors own work.

Figure 2. Results of Study 1 and Study 2.



Source: Authors own work.

Table I. Study 1 and Study 2 sample characteristics

Variable	Study 1	Study 2
Gender		
Female	44.8%	60.1%
Male	43.1%	38.0%
Another	7.8%	-
I prefer not to answer	4.3%	1.3%
Age		
16 years old	4.3%	-
16 - 20 years old	77.2%	-
21 - 25 years old	9.9%	-
26 - 30 years old	5.2%	-
> 30 years old	3.4%	-
< 50 years old	-	0.6%
50 - 60 years old	-	13.3%
61 - 70 years old	-	17.1%
71 - 80 years old	-	25.9%
> 80 years old	-	42.4%
Habitat		
Very small municipality (< 1,000 inhabitants)	9.9%	4.4%
Small municipality (1,001 - 5,000 inhabitants)	12.5%	7.0%
Medium-sized municipality (5,001 - 50,000 inhabitants)	31.5%	48.1%
Large municipality (50,001 - 500,000 inhabitants)	41.8%	38.0%
Very large municipality (> 500.000 inhabitants)	4.3%	1.9%
Studies		
No education	-	0.6%
Primary education	-	13.3%
Baccalaureate	36.7%	17.1%
Vocational training	-	25.9%
Bachelor's degree	-	42.4%
Doctorate	-	-
Vocational training (Basic Level)	8.6%	-
Vocational training (Intermediate Level)	34.5%	-
Vocational training (Higher Level)	20.3%	-
Income/Budget available		
< €10	21.1%	-
10-19€	31.5%	-
20-29€	16.4%	-
30-60€	12.5%	-
> 60€	18.5%	-
<1.000€/month	-	7.6%
1.000€ - 1.500€/month	-	17.7%
1.501€ - 2.000€/month	-	26.6%
2.001€ - 2.500€/month	-	28.5%
>2.500€/month	-	19.0%
Colaborative platform usage frequency	Average from 1 to 5	
Sharing	2.12	1.9
Selling second-hand goods	2.61	1.6
Buying second-hand goods	2.68	1.49

Source: Authors own work

Table II. Results of the structural model-Study 1

Relations	Coefficient	t value	p value	f ²	Effect	Conclusion
H1: ATT→IUS	0.585	8.499***	<0.001	0.520	Strong	Supported
H2a: FU→ATT	0.127	2.041*	0.041	0.022	Week	Supported
H2b: EU→ATT	0.141	2.216*	0.027	0.029	Week	Supported
H2c: MU→ATT	0.301	5.239***	<0.001	0.159	Moderated	Supported
H2d: HU→ATT	0.298	4.567***	<0.001	0.155	Moderated	Supported
H3a: EAW→ATT	-0.001	0.013 ^{n.s.}	0.989	0.000	Insignificant	Not
H3b: EAN→ATT	0.050	0.929 ^{n.s.}	0.353	0.004	Insignificant	Not
H3c: GOR→ATT	0.117	2.266*	0.023	0.027	Week	Supported
H3d: CON→ATT	0.091	2.011*	0.044	0.022	Week	Supported
H4a: SDE→FU	0.258	3.863***	<0.001	0.071	Week	Supported
H4b: SDE→EU	0.247	3.456***	<0.001	0.065	Week	Supported
H4c: SDE→MU	0.218	3.247***	0.001	0.050	Week	Supported
H4d: SDE→HU	0.371	5.839***	<0.001	0.160	Moderated	Supported
H5a: SDE→EAW	0.344	5.376***	<0.001	0.134	Moderated	Supported
H5b: SDE→EAN	0.432	7.169***	<0.001	0.229	Moderated	Supported
H5c: SDE→GOR	0.428	6.654***	<0.001	0.224	Moderated	Supported
H5d: SDE→CON	0.260	3.656***	<0.001	0.073	Week	Supported

Notes: *p<0.05; **p<0.01; ***p<0.001; n.s.=not significant. R²: IUS =0.34; ATT =0.68; FU =0.07; EU =0.06; MU 0.05=; HU =0.14; EAW =0.12; EAN =0.19; GOR =0.18; CON =0.07.

Source: Authors own work

Table III. Mediation analyses results-Study 1

Predictor effect	Coefficient	t-test	p value	F	R ²
<i>Direct and total effects</i>					
SDE→FU	0.211**	3.132	0.002	9.808	0.041
SDE→EU	0.303***	4.918	<0.001	24.186	0.095
SDE→MU	0.207**	3.124	0.002	9.759	0.041
SDE→HU	0.408***	6.770	<0.001	45.835	0.166
SDE→EAW	0.304***	4.739	<0.001	22.465	0.089
SDE→EAN	0.383***	6.095	<0.001	37.148	0.139
SDE→GOR	0.417***	6.862	<0.001	47.091	0.169
SDE→CON	0.201**	3.039	0.003	9.241	0.039
SDE→ATT (<i>total effect</i>)	0.269***	4.269	<0.001	18.226	0.073
SDE→ATT (<i>direct effect</i>)	-0.117**	2.706	0.007	59.784	0.708
FU→ATT	0.010 ^{n.s.}	0.201	0.841	59.784	0.708
EU→ATT	0.178**	3.187	0.002	59.784	0.708
MU→ATT	0.289***	6.309	<0.001	59.784	0.708
HU→ATT	0.375***	7.363	<0.001	59.784	0.708
EAW→ATT	0.052 ^{n.s.}	1.066	0.288	59.784	0.708
EAN→ATT	0.041 ^{n.s.}	0.898	0.370	59.784	0.708
GOR→ATT	0.191***	4.223	<0.001	59.784	0.708
CON→ATT	0.033 ^{n.s.}	0.842	0.401	59.784	0.708
<i>Bootstrapping results for indirect effect</i>					
	<i>Estimate</i>	<i>Boot SE</i>	<i>CI (LLCI-ULCI)</i>		
Via FU	0.002	0.012	-0.021	0.029	
Via EU	0.054	0.027	0.009	0.115	
Via MU	0.059	0.028	0.014	0.122	
Via HU	0.153	0.043	0.076	0.242	
Via EAW	0.016	0.019	-0.019	0.059	
Via EAN	0.016	0.022	-0.026	0.062	
Via GOR	0.079	0.029	0.029	0.144	
Via CON	0.007	0.009	-0.009	0.029	

Notes: *p<0.05; **p<0.01; ***p<0.001; n.s.=not significant.

Source: Authors own work

Table IV. Results of the structural model-Study 2

Relations	Coefficient	t value	p value	f ²	Effect	Conclusion
H1: ATT→IUS	0.371	5.034***	<0.001	0.160	Moderate	Supported
H2a: FU→ATT	0.035	0.736 n.s.	0.462	0.004	Insignificant	Not
H2b: EU→ATT	0.026	0.550 n.s.	0.582	0.002	Insignificant	Not
H2c: MU→ATT	0.566	7.456***	<0.001	0.889	Strong	Supported
H2d: HU→ATT	0.390	4.619***	<0.001	0.434	Strong	Supported
H3a: EAW→ATT	0.088	1.618 n.s.	0.106	0.030	Week	Not
H3b: EAN→ATT	-0.029	0.626 n.s.	0.531	0.003	Insignificant	Not
H3c: GOR→ATT	-0.050	1.033 n.s.	0.302	0.010	Insignificant	Not
H3d: CON→ATT	-0.025	0.605 n.s.	0.545	0.003	Insignificant	Not
H4a: SDE→FU	0.164	1.615 n.s.	0.106	0.028	Week	Not
H4b: SDE→EU	0.279	2.840**	0.005	0.084	Week	Supported
H4c: SDE→MU	0.167	1.986*	0.047	0.029	Week	Supported
H4d: SDE→HU	0.122	1.386 n.s.	0.166	0.015	Insignificant	Not
H5a: SDE→EAW	0.454	7.453***	<0.001	0.163	Moderated	Supported
H5b: SDE→EAN	0.374	4.621***	<0.001	0.260	Moderated	Supported
H5c: SDE→GOR	0.453	7.179***	<0.001	0.258	Moderated	Supported
H5d: SDE→CON	0.162	1.140 n.s.	0.254	0.027	Week	Not

Notes: *p<0.05; **p<0.01; ***p<0.001; n.s.=not significant. R²: IUS =0.14; ATT =0.81; FU =0.03; EU =0.08; MU =0.03; HU =0.02; EAW =0.14; EAN =0.21; GOR =0.21; CON =0.03.

Source: Authors own work

Table V. Mediation analyses results-Study 2

Predictor effect	Coefficient	t-test	p value	F	R ²
<i>Direct and total effects</i>					
SDE→FU	0.164*	2.068	0.040	4.277	0.027
SDE→EU	0.279***	3.617	<0.001	13.084	0.078
SDE→MU	0.167*	2.108	0.037	4.442	0.028
SDE→HU	0.123 n.s.	1.539	0.127	2.362	0.015
SDE→EAW	0.374***	5.022	<0.001	25.218	0.139
SDE→EAN	0.454***	6.348	<0.001	40.291	0.206
SDE→GOR	0.453***	6.327	<0.001	40.026	0.205
SDE→CON	0.169*	2.128	0.035	4.529	0.028
SDE→ATT (<i>total effect</i>)	0.140 ⁺	1.760	0.080	3.098	0.019
SDE→ATT (<i>direct effect</i>)	-0.013 n.s.	-0.282	0.778	68.746	0.808
FU→ATT	0.035 n.s.	0.791	0.430	68.746	0.808
EU→ATT	0.028 n.s.	0.591	0.555	68.746	0.808
MU→ATT	0.567***	11.445	<0.001	68.746	0.808
HU→ATT	0.389***	7.934	<0.001	68.746	0.808
EAW→ATT	0.089*	2.098	0.038	68.746	0.808
EAN→ATT	-0.025 n.s.	-0.559	0.577	68.746	0.808
GOR→ATT	-0.047 n.s.	-1.079	0.282	68.746	0.808
CON→ATT	-0.024 n.s.	-0.605	0.546	68.746	0.808
<i>Bootstrapping results for indirect effect</i>					
	<i>Estimate</i>	<i>Boot SE</i>	<i>CI (LLCI-ULCI)</i>		
Via FU	0.0057	0.0088	-0.012	0.0242	
Via EU	0.0078	0.0149	-0.0227	0.0383	
Via MU	0.0946	0.0496	0.0008	0.1971	
Via HU	0.0477	0.0346	-0.0177	0.1178	
Via EAW	0.0335	0.023	-0.0104	0.0815	
Via EAN	-0.0114	0.0216	-0.0564	0.0309	
Via GOR	-0.0211	0.0232	-0.0684	0.0247	
Via CON	-0.004	0.0079	-0.0231	0.009	

Notes: +=p<0.10; *p<0.05; **p<0.01; ***p<0.001; n.s.=not significant.

Source: Authors own work

Table A1. Measurement items and sources

Name	Mean	SD	Kurtosis	Skewness
	Study 1	Study 1	Study 1	Study 1
	Study 2	Study 2	Study 2	Study 2
Sustainable development education (Avelar & Farina, 2022)				
I am aware of the importance of incorporating the Sustainable Development Goals (SDGs) into the curricula of my studies.	3.259 3.854	1.204 0.916	-0.625 1.122	-0.435 -0.960
Sustainability is covered in more than two subjects/modules at my school.	2.931 3.783	1.264 0.912	-1.051 0.502	0.002 -0.725
The information given by my teachers influences the development of my awareness of sustainability.	2.996 3.739	1.230 0.991	-0.958 0.487	-0.202 -0.761
My school promotes sustainability projects with society.	3.315 3.828	1.178 0.838	-0.624 0.173	-0.441 -0.516
Functional utility (Kim & Jin, 2019; Zhang et al., 2019)				
They are useful.	4.103 3.459	0.941 1.056	3.152 -0.149	-1.613 -0.480
They give me flexibility when shopping.	3.991 3.178	0.866 1.080	1.850 -0.294	-1.106 -0.331
They allow me to find a wide variety of items.	4.190 3.631	0.923 0.992	2.014 0.583	-1.379 -0.703
They give me access to trendy items.	3.534 3.217	0.986 1.079	-0.068 -0.241	-0.449 -0.411
Economic utility (Barnes & Mattsson, 2017)				
They allow you to earn money.	4.009 2.930	0.969 1.089	0.838 -0.505	-0.989 -0.128
They save money.	3.776 3.248	1.079 1.155	0.281 -0.433	-0.847 -0.524
Their use is a low-cost option.	3.733 3.306	1.003 1.177	0.463 -0.500	-0.836 -0.544
Their use represents good value for money.	3.616 3.140	0.944 1.006	0.426 -0.140	-0.618 -0.399
Moral utility (Hamari et al., 2016)				
It helps to save natural resources.	3.534 3.210	1.078 1.247	-0.108 -1.002	-0.526 -0.306
It is a sustainable way of consumption.	3.681 3.369	0.988 1.147	0.095 -0.526	-0.620 -0.481
It is environmentally friendly.	3.556 3.019	1.057 1.213	-0.183 -0.967	-0.512 -0.080
Hedonic utility (Barnes & Mattsson, 2017)				
It is a pleasant experience.	3.422 2.847	0.935 1.011	0.118 -0.080	-0.299 -0.174
The process of using them is entertaining.	3.586 2.879	0.979 1.005	0.337 -0.149	-0.590 -0.247
It is fun.	3.440 2.707	0.981 0.959	0.133 -0.091	-0.423 -0.299
Ecological awareness (Malecka et al., 2022)				
I believe that all people should restrict their consumption to minimise the exploitation of the natural environment.	3.487 3.828	1.193 1.211	-0.253 -0.070	-0.721 -0.924
I believe that people's consumption can lead to the devastation of the natural environment.	3.703 3.809	1.130 1.195	-0.024 -0.244	-0.818 -0.845
Eco-anxiety (Hogg et al., 2021)				
I have felt anxious about the impact of my personal behaviours on the earth.	3.091 2.911	1.109 0.980	-0.494 0.206	-0.314 0.017

Name	Mean	SD	Kurtosis	Skewness
	Study 1	Study 1	Study 1	Study 1
	Study 2	Study 2	Study 2	Study 2
I have felt concerned about my personal responsibility to help solve environmental problems.	3.284 3.357	1.093 1.257	-0.336 -0.887	-0.445 -0.390
I have felt anxious about the possibility that my personal behaviours are doing little to help solve the problem.	3.267 3.172	1.155 1.029	-0.413 0.070	-0.486 -0.281
Green orientation (Barnes & Mattsson, 2017)				
I actively try to recycle the products I can.	3.621 4.318	1.150 0.845	-0.046 3.700	-0.812 -1.686
I try to repair or reuse items rather than throw them away.	3.716 4.178	1.097 0.934	0.459 2.148	-0.954 -1.406
I actively try to reduce my carbon footprint (the environmental impact of your everyday actions such as driving or using electricity).	3.371 3.790	1.103 0.978	-0.283 0.035	-0.542 -0.681
Consumerism (Richins & Dawson, 1992)				
I admire people who own expensive houses, cars and clothes.	3.082 1.936	1.210 1.001	-0.726 0.473	-0.217 0.936
I like to spend money on whims.	3.349 2.140	1.198 0.974	-0.615 0.913	-0.473 0.884
I would be happier if I could buy more things.	3.392 1.790	1.227 0.924	-0.582 0.353	-0.460 1.019
Attitude towards CPs (Michalak et al., 2022)				
It is the right thing to do.	3.629 2.987	0.924 1.016	0.995 -0.369	-0.780 -0.306
It is a positive thing.	3.789 3.140	0.911 1.103	1.240 -0.497	-0.876 -0.483
It makes a lot of sense.	3.793 3.064	0.929 1.092	0.509 -0.476	-0.649 -0.305
It is a good thing.	3.823 3.210	0.995 1.010	1.019 -0.013	-0.959 -0.246
Intention to use CPs (Alzamora-Ruiz et al., 2020)				
In the future, I would like to use collaborative platforms.	3.672 2.962	1.065 1.215	0.563 -0.812	-0.888 0.034
In the future, I will use collaborative platforms.	3.806 2.854	0.996 1.150	0.348 -0.717	-0.708 -0.039
In the future, I will increase the use of collaborative platforms if possible.	3.586 2.987	1.018 1.145	0.248 -0.630	-0.582- 0.180

Table A2. Results of the measurement model-Study 1

Construct	Item	Loading	t
Sustainable development education (SDE) $\alpha=0.872$; CR=0.897; AVE=0.718	SDE1	0.838	43.250
	SDE2	0.842	31.637
	SDE3	0.854	32.867
	SDE4	0.855	31.386
Functional utility (FU) $\alpha=0.827$; CR=0.850; AVE=0.661	FU1	0.787	15.026
	FU2	0.852	26.752
	FU3	0.887	44.959
	FU4	0.715	14.316
Economic utility (EU) $\alpha=0.820$; CR=0.825; AVE=0.649	EU1	0.791	21.701
	EU2	0.818	23.710
	EU3	0.828	24.625
	EU4	0.785	24.099
Moral utility (MU) $\alpha=0.895$; CR=0.896; AVE=0.827	MU1	0.898	54.826
	MU2	0.933	61.933
	MU3	0.896	43.743
	HU1	0.890	60.999
Hedonic utility (HU) $\alpha=0.876$; CR=0.883; AVE=0.800	HU2	0.881	26.924
	HU3	0.912	57.254
Ecological awareness (EAW) $\alpha=0.884$; CR=0.884; AVE=0.896	EAW1	0.948	115.337
	EAW2	0.945	95.886
Eco-anxiety (EAN) $\alpha=0.897$; CR=0.900; AVE=0.829	EAN1	0.899	55.841
	EAN2	0.933	81.296
	EAN3	0.898	45.298
Green orientation (GOR) $\alpha=0.820$; CR=0.824; AVE=0.735	GOR1	0.854	33.073
	GOR2	0.863	34.914
	GOR3	0.855	37.417
Consumerism (CON) $\alpha=0.838$; CR=0.848; AVE=0.754	CON1	0.861	34.738
	CON2	0.861	25.016
	CON3	0.883	43.833
Attitude towards CPs (ATT) $\alpha=0.927$; CR=0.927; AVE=0.820	ATT1	0.881	44.789
	ATT2	0.913	49.988
	ATT3	0.920	47.770
	ATT4	0.907	57.685
Intention to use CPs (IUS) $\alpha=0.890$; CR=0.896; AVE=0.820	IUS1	0.925	69.773
	IUS2	0.933	69.594
	IUS3	0.857	29.443

Notes: α : Cronbach's alpha; CF: composite reliability; AVE: average variance extracted.

Source: Authors own work

Table A3. Discriminant validation results-Study 1

Construct	1	2	3	4	5	6	7	8	9	10	11
1. SDE	0.847										
2. FU	0.258	0.813									
3. EU	0.247	0.694	0.806								
4. MU	0.218	0.432	0.488	0.909							
5. HU	0.371	0.554	0.468	0.542	0.895						
6. EAW	0.344	0.424	0.413	0.496	0.365	0.946					
7. EAN	0.432	0.329	0.349	0.381	0.362	0.650	0.910				
8. GOR	0.428	0.379	0.381	0.415	0.344	0.530	0.471	0.857			
9. CON	0.260	0.284	0.282	0.210	0.294	0.208	0.197	0.307	0.868		
10. ATT	0.278	0.606	0.603	0.673	0.682	0.483	0.436	0.497	0.363	0.905	
11. IUS	0.362	0.553	0.539	0.498	0.464	0.458	0.424	0.448	0.337	0.585	0.906

Notes: The diagonal entries are the square root of the AVE (in bold); the others are correlation coefficients.

Source: Authors own work

Table A4. Results of the measurement model -Study 2

Construct	Item	Loading	t
Sustainable development education (SDE) $\alpha=0.805$; CR=0.870; AVE=0.628	SDE1	0.687	9,759
	SDE2	0.818	13,804
	SDE3	0.855	37,102
	SDE4	0.800	14,558
Functional utility (FU) $\alpha=0.820$; CR=0.879; AVE=0.646	FU1	0.815	10,463
	FU2	0.804	12,585
	FU3	0.829	10,692
	FU4	0.765	8,404
Economic utility (EU) $\alpha=0.821$; CR=0.881; AVE=0.649	EU1	0.746	11,860
	EU2	0.841	23,064
	EU3	0.807	18,230
	EU4	0.825	24,524
Moral utility (MU) $\alpha=0.944$; CR=0.964; AVE=0.899	MU1	0.954	106,895
	MU2	0.944	50,231
	MU3	0.947	100,662
	HU1	0.942	79,670
Hedonic utility (HU) $\alpha=0.947$; CR=0.966; AVE=0.904	HU2	0.958	101,719
	HU3	0.953	101,177
Ecological awareness (EAW) $\alpha=0.810$; CR=0.818; AVE=0.840	EAW1	0.907	27,857
	EAW2	0.926	49,450
Eco-anxiety (EAN) $\alpha=0.795$; CR=0.874; AVE=0.698	EAN1	0.776	9,875
	EAN2	0.888	34,187
Green orientation (GOR) $\alpha=0.757$; CR=0.861; AVE=0.674	EAN3	0.840	19,896
	GOR1	0.888	32,045
	GOR2	0.834	14,642
	GOR3	0.733	11,948
Consumerism (CON) $\alpha=0.624$; CR=0.803; AVE=0.680	CON1	0.975	2,590
	CON2	-	-
	CON3	0.640	2,085
Attitude towards CPs (ATT) $\alpha=0.952$; CR=0.966; AVE=0.875	ATT1	0.943	85,494
	ATT2	0.945	80,750
	ATT3	0.954	103,704
	ATT4	0.900	24,376
Intention to use CPs (IUS) $\alpha=0.951$; CR=0.969; AVE=0.911	IUS1	0.951	72,717
	IUS2	0.971	117,276
	IUS3	0.942	39,958

Notes: α : Cronbach's alpha; CF: composite reliability; AVE: average variance extracted.

Source: Authors own work

Table A5. Discriminant validation results-Study 2

Construct	1	2	3	4	5	6	7	8	9	10	11
1. SDE	0.793										
2. FU	0,164	0.804									
3. EU	0,279	0.541	0.805								
4. MU	0,167	0.197	0.390	0.948							
5. HU	0,122	0.261	0.371	0.650	0.951						
6. EAW	0,374	0.134	0.213	0.209	0.158	0.917					
7. EAN	0,454	0.018	0.080	0.145	0.166	0.420	0.836				
8. GOR	0,453	0.182	0.294	0.249	0.208	0.355	0.354	0.821			
9. CON	0,162	0.096	-0.039	-0.079	0.023	-0.057	0.220	-0.031	0.825		
10. ATT	0,140	0.262	0.413	0.841	0.775	0.250	0.134	0.208	-0.069	0.936	
11. IUS	0,226	0.575	0.455	0.291	0.394	0.301	0.157	0.257	0.157	0.371	0.955

Notes: The diagonal entries are the square root of the AVE (in bold); the others are correlation coefficients.

Source: Authors own work