

A Preliminary Study of Fashion Design Students' Attitudes Towards Sustainable Practice and Transformable Fashion Design

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Abstract: *The environmental pollution caused by the fashion industry is a growing concern. Fashion design students significantly impact the sustainable fashion market in China. Previous studies have found a gap between the attitudes and behaviours of fashion designers; most of them recognise the importance of sustainable fashion, but only a small proportion acts on it. To explore the mechanisms that shape the behaviour of undergraduate fashion design students in Guangdong Province, the Theory of Reasoned Action (TRA) and Theory of Planned Behaviour (TPB) were introduced into sustainable fashion design behaviour. This study used quantitative research methods to obtain data. To predict the results, hypothesis statements were created to highlight the gaps between the variables based on previous sustainable practice and transformative fashion design literature reviews and theoretical studies. A questionnaire was also designed, which consisted of two parts: the first part was the respondent's personal data, and the second part was the drivers influencing the students' intentions towards sustainable and transformable fashion design, using a five-point Likert scale from "strongly disagree" to "strongly agree" with 1-5 indicating the level of satisfaction. A small pre-survey was also conducted to determine the reliability and validity of the questionnaire, which was administered online to 100 Guangdong undergraduate fashion design students. The reliability and validity of the questionnaire and basic descriptive statistical analysis of the pre-survey data were also analysed using SPSS software. The results showed that the questionnaire was designed with good reliability and validity, and that Guangdong fashion design undergraduates have positive attitudes and behavioural intentions towards sustainable fashion practices.*

Keywords: Sustainable Fashion, Attitudes, Fashion Design Students

1. Introduction

Nature provides humans shelter and resources and is the basis for survival and development. Since the Industrial Revolution, people have begun to realise that environmental resources are no longer unlimited, and that it is equally important to protect nature while asking for it. In the early period, some European philosophers believed that to make the social life of human beings more secure and balanced, human beings as individuals need to make a certain degree of sacrifice (Huang et al., 2019). At a time when the issue of environmental protection is constantly mentioned, environmental awareness influences the values and lifestyles of the general public through public welfare activities, news, public opinion, and other types of channels (Mensah, 2019). Among them, the concept of sustainable development has been

increasingly accepted and recognised by people, and the concept of sustainable development, which seeks to strike a balance between environmental protection and technological development, has significantly impacted the development of various industries today. Among them, the fashion industry has been particularly affected by the concept of sustainable development in recent years.

The fashion industry, a global behemoth renowned for its dynamism and influence on culture, has recently witnessed a profound transformation (Atik et al., 2022; Evans, 2023). Sustainability has emerged as a central theme, transcending its initial status as a trend to fundamentally redefine the dynamics of fashion production, consumption, and societal values. Sustainability in fashion is "a necessity and an opportunity," offering a pathway to reduce environmental impact and champion ethical considerations (Schaltegger et al., 2016). In the context of Guangdong Province, China, a hub of the global fashion industry, the pursuit of sustainable fashion holds the potential to reshape the sector and significantly impact the environment and society.

The significance of sustainable fashion cannot be overstated, as it aligns with the global imperative to address pressing environmental issues and ethical considerations within the fashion industry (Ashby, 2018; Moon, 2007). Sustainable fashion seeks to minimize environmental impact, reduce waste, and promote ethical labor practices (Henninger et al., 2016; Niinimäki, 2015). Additionally, it resonates with an increasingly conscientious consumer base, which values eco-friendly and socially responsible products (Lee & Cho, 2019; Piercy & Lane, 2009). Therefore, understanding and promoting sustainable fashion is imperative for a more responsible and sustainable future in the industry.

In the ever-evolving landscape of the fashion industry, the pursuit of sustainability has become imperative, transcending its trend status to reshape the fundamental dynamics of the sector. This preliminary study delves into the nuanced and intricate relationship between sustainable practice, transformable fashion design, and students' perspectives, attitudes, and intentions toward sustainable fashion, specifically in Guangdong Province, China. Our exploration begins with a comprehensive preliminary study, underlining the global significance of sustainable fashion and the pivotal role of education in fostering its growth. Drawing attention to Guangdong Province, we uncover this region's distinctive sustainability practices and challenges, shedding light on a local context. The core of our investigation revolves around the conceptual framework of sustainable practice and transformable fashion design.

The current research is based on a rigorous literature review, which includes a wide range of academic writings and empirical studies, revealing a multifaceted relationship between sustainable practice, translatable fashion design, and student perspectives. The initial investigation of this study is a comprehensive look at how sustainable practices and translatable fashion design are reshaping the future of the fashion industry through the lens of student perspectives. This study presents actionable recommendations for various stakeholders, from educational institutions to policymakers, to further nurture sustainable fashion growth in Guangdong Province and beyond. This study serves as a critical resource for researchers, educators, industry professionals, and policymakers, providing a deep dive into the dynamic world of sustainable fashion and its potential to influence the next generation of fashion leaders.

2. Literature Review

2.1 Definitions and trends in sustainable fashion

The essence of sustainable development is in adequately managing the relationship between man and man and nature to achieve the orderly use of resources, with the ultimate goal of recycling them (Mebratu, 1998). The World Commission on Environment and Development (1987) defined sustainable development as "development that meets the needs of the present without jeopardizing the ability of future generations to meet their own needs" (Byrne & Glover, 2002). sustainable development in the fashion industry became a familiar term after the 1992 Rio Earth Summit (Grubb et al., 2019). Sustainable fashion is a subset of the slow fashion movement, with terms such as eco-fashion, green fashion, and ethical fashion often used as synonyms (Carey & Cervellon, 2014). The concept of sustainable fashion design, as a product of the industrial age with a combination of economic, social, cultural, and natural factors, focuses on solving substantive problems and emphasizes the natural development of humanistic attributes and social laws (Niinimäki, 2013). This concept has evolved from its inception to its maturity and has gradually developed across various industries. The fashion industry has been paying increasing attention in recent years. It has been promoting a series of sustainable fashion design studies around the industry's benign development needs, building bridges that effectively link fashion, natural resources, and environmental protection elements. Sustainable fashion design has become one of the most discussed topics in academia and industry as a research hotspot in the academic world, with scholars continuously exploring and researching it from different perspectives.

Sustainable fashion represents a transformable paradigm within the fashion industry, grounded in principles that prioritize environmental responsibility, ethical labor practices, and social consciousness (Nguyen et al., 2021). It encompasses a broad spectrum of practices and principles, including; Eco-Friendly Materials that sustainable fashion emphasizes the use of environmentally responsible materials, such as organic and recycled fabrics, to minimize the ecological footprint of fashion production (Mukherjee, 2015); Ethical Labor Practices that it advocates for fair wages, safe working conditions, and ethical treatment of workers throughout the fashion supply chain, from production to retail (Yu, 2008); Waste Reduction that sustainable fashion seeks to minimize waste by encouraging practices such as upcycling, recycling, and reducing overproduction (McEachern et al., 2020); Circular Economy that the adoption of a circular economy approach, in which products are designed for durability, reuse, and recycling, is a crucial tenet (van Dam et al., 2020); and Consumer Education that it promotes awareness among consumers about the ethical and environmental implications of their fashion choices, encouraging more responsible consumption (Kang et al., 2013; Shen et al., 2013).

The American designer Victor Papanek, in his book *Designer for the Real World*, states that "designers have a social responsibility rather than a commercial interest" (Papanek, 1984). The new regulations adopted by the British Designers' Association state that "designers have a responsibility to make their work as little as possible in terms of direct or indirect harm to the ecological environment, which directly affects all kinds of organisms, endangered plants, and animals, the atmosphere, rivers, and oceans"; China's Tsinghua University Academy of Fine Arts, the College of Fashion in London, ESMOD and other designers have also adopted new regulations and regulations. College of Fashion, ESMOD, and other colleges and universities have also opened courses related to sustainable fashion. Sustainability is receiving widespread attention at all levels of society (Li et al., 2015). Despite their different statuses, more and more people are beginning to contribute to the harmonious development of humanity and nature.

Sustainable design has become a consensus, and designers know their responsibilities. Many designers have taken action to carry out environmentally friendly publicity and practice activities and show people the concept of sustainable fashion through different ways and means (Ray & Nayak, 2023).

Fashion is a superficial feature of modern society, reflecting the degree of acceptance and, to a certain extent, marking the direction of modern society and indicating the trend of popularity (Entwistle, 2023). In essence, fashion is not extreme wastefulness, simplicity, frugality, or novelty. Fashion is a popular or up-to-date way of dressing, hairstyling, decorating, or behaving based on a particular period, place, and context (Kaiser & Green, 2021). Fashion is likewise a way of self-expression and cultural construction of embodied identities, driven by social demands that constantly change social patterns, clothing habits, aesthetic judgments, and the whole style of human expression (Simmel, 1957). It is, therefore, a product that is designed according to the needs of society and has considerable influence on society, especially the upper class and the female population (Simmel, 2020). Sustainable fashion aims to address this issue by designing, creating, and marketing socially and environmentally responsible products (Ray & Nayak, 2023). As industrial development brought about technological advances, changes began to occur in all sectors, and the fashion industry was no exception, in the fashion industry, as the fashion cycle time was drastically reduced, fashions began to change rapidly, giving rise to fast fashion (Linden, 2016). Fast fashion is the practice of producing popular designs quickly and at low cost, increasing the system's material throughput to produce abundant, low-cost clothes. Low-cost clothes do not last as long and are discarded more quickly, thus exacerbating the problem of waste (Linden, 2016). How to satisfy consumers' pursuit of fashion, aesthetics, etc., while taking into account environmental, social, and ethical factors, and realising the compatibility of fashion design with the concept of sustainability, should be the pursuit and responsibility of every fashion designer today.

The global significance of sustainable fashion is underscored by its critical role in addressing environmental, social, and ethical concerns within the fashion industry (Caniato et al., 2012; Rathore, 2018). Sustainability in fashion has transitioned from a mere trend to a fundamental paradigm shift. As highlighted by Ojukwu and Tariq (2020), sustainable fashion is not just a matter of choice but an imperative in response to the industry's substantial carbon emissions, resource depletion, and environmental degradation (Ojukwu & Tariq, 2020). Consequently, sustainable fashion encompasses a range of practices, including eco-friendly materials, ethical labor conditions, waste reduction, and carbon footprint mitigation (Islam et al., 2021). Emerging trends in sustainable fashion encompass diverse approaches such as circular fashion, slow fashion, and upcycling (Gazzola et al., 2020; Murzyn-Kupisz & Hołuj, 2021; West et al., 2021). Circular fashion, for instance, focuses on closing the loop in the fashion lifecycle, emphasizing recycling, reusing, and remanufacturing, thus reducing waste and conserving resources (Colucci & Vecchi, 2021; Dissanayake & Weerasinghe, 2021). These trends reflect a broader movement toward responsible and ethical consumption in the fashion industry.

2.2 Sustainable Fashion in Guangdong Province

Guangdong Province, located in southern China, is renowned as a major epicenter of the global fashion industry (Di Tommaso et al., 2013). The province's vibrant fashion sector encompasses various facets of the industry, including manufacturing, design, retail, and distribution. Its importance is underlined by prominent fashion hubs such as Guangzhou, Shenzhen, and Dongguan, which house numerous fashion production units, research institutions, and fashion-related businesses (Chen, 2016).

The scale and significance of the fashion industry in Guangdong are exemplified by its substantial economic contributions and employment opportunities. According to (Ling & Segre-Reinach, 2018), Guangdong is not only a fashion powerhouse within China but also a crucial global player (Ling & Segre-Reinach, 2018). The province's fashion exports, production capabilities, and fashion-related infrastructure have led to its recognition as a dynamic fashion region with national and international prominence.

While Guangdong's fashion industry continues to thrive, it faces unique sustainability challenges, stemming from the high levels of production and consumption associated with the region. Despite its economic success, the environmental and ethical consequences of mass production and rapid fashion turnover are evident. One of the primary challenges is environmental pollution and resource depletion. The intense manufacturing processes in Guangdong result in significant waste generation and energy consumption. These challenges align with global concerns related to the fashion industry's carbon footprint and the depletion of finite resources (Ke et al., 2022; Wang et al., 2020).

To address these challenges and mitigate the environmental and ethical impacts of fashion production, the fashion industry in Guangdong has begun embracing sustainable practices, such as the adoption of eco-friendly materials, improved waste management, and ethical labor initiatives. However, the journey towards sustainability is still ongoing, and the extent to which these practices have been embraced, implemented, and integrated into educational curricula remains a subject of inquiry in the context of this review. As we delve deeper into this study, we will explore the impact of sustainable practices, particularly transformable fashion design, on students' perspectives, attitudes, and intentions toward sustainable fashion in Guangdong Province. Understanding the existing sustainability landscape and challenges is vital to contextualizing the effects of education and awareness campaigns, thus offering a holistic view of sustainable fashion in this dynamic region.

2.3 Theoretical Framework for Sustainable Fashion

Analyzing the impact of sustainable fashion and transformable fashion design on students' perspectives, attitudes, and intentions often draws from theoretical frameworks. Two key frameworks that have been influential in this context are the "Theory of Planned Behavior" and the "Theory of Reasoned Action."

The theory of Planned Behavior (TPB) was developed by psychologist Ajzen in 1985 to explain and predict individual behavior. The application of TPB to sustainable fashion can help understand the behaviours and attitudes of consumers and designers, thus facilitating the adoption and implementation of sustainable practices. This widely recognized psychological model posits that individual behavior is influenced by three key factors: attitudes, subjective norms, and perceived behavioral control. Applied to sustainable fashion, it suggests that students' intentions and behaviors toward sustainability are influenced by their attitudes toward sustainable fashion, subjective norms (influence of peers and societal expectations), and their perceived ability to act sustainably (Ajzen, 1991; Leclercq-Machado et al., 2022; Rausch & Kopplin, 2021; Williams, 2021).

The theory of Reasoned Action (TRA) was developed by social psychologists Martin Fishbein and Ajzen in 1975. TRA is primarily used to explain how an individual's behaviour is shaped, particularly how an individual determines his or her behaviour based on attitudes and subjective norms. Sustainably, TRA can be used to understand and predict the behavior of consumers and

designers to promote sustainable fashion adoption and development (Jalil & Shaharuddin, 2020).

Research has shown that consumers' attitudes towards sustainable fashion significantly impact their purchase intentions (Mandarić et al., 2022; Sesiniet al., 2020). For example, consumers are more likely to purchase sustainable fashion with positive attitudes towards its environmental and ethical values (Mandarić et al., 2022). Many studies have assessed consumer attitudes towards sustainable fashion through questionnaires, analysing their perceptions of product quality, environmental friendliness, price and brand image (Mandarić et al., 2022; Sesiniet al., 2020). These findings have helped brands design attractive marketing strategies to appeal to environmentally-conscious consumers. Designers' attitudes significantly impact the adoption of sustainable design practices. Designers with positive attitudes towards sustainable design are likelier to incorporate environmentally friendly materials and production methods. Several studies have investigated designers' attitudes towards sustainable fashion and found that those designers who identify with the concept of sustainable design are actively involved in green design practices (Mandarić et al., 2022; Sesiniet al., 2020; Jalil & Shaharuddin, 2020). Training and education programs are dedicated to raising designers' environmental awareness to promote sustainable design (Watkins et al., 2021).

3. Research Methodology

In this study, we adopted a quantitative research methodology to obtain data for in-depth analysis and prediction of the research questions. Quantitative research methods can systematically collect and analyse large amounts of data (Watson, 2015; Rahman et al., 2023; Luoma & Hietanen, 2024; Chan et al., 2024). Through structured questionnaires or scale measurements, attitudes and behavioural intentions of fashion design students towards sustainable fashion design can be effectively quantified to obtain statistically significant data. Researchers can design standardised questionnaires, use Likert scales to measure students' attitudes and behavioural intentions and use statistical software to analyse the data. Quantitative research provides an objective method of analyzing attitudes and behavioral intentions, and through statistical analysis, students' attitudes can be accurately described and interpreted (Rahman et al., 2023; Luoma & Hietanen). Moreover, quantitative research can improve the representativeness of the research results through a larger sample size. For the student group of fashion design majors, a wide range of questionnaires can cover designers from different universities and backgrounds, increasing the diversity of samples and the general applicability of research results. Meanwhile, the sample's representativeness and the research results' validity are ensured by designing an appropriate sampling method.

In order to construct a scientifically sound research framework, we first conducted a systematic literature review to review the theoretical and practical literature related to sustainable practice and transformable fashion design. Based on these literature reviews, we developed preliminary research hypotheses designed to reveal potential gaps and relationships between variables. Based on the theoretical research and literature review, we formulated hypotheses with the expectation that we would be able to validate these hypotheses through data analysis. These hypotheses focused on students' attitudes and intentions toward sustainable fashion design and its drivers. To this end, a questionnaire was designed and divided into two main sections. The first part is the respondents' data, which collects basic background information about the respondents, including gender, age, and educational background. The personal data section was intended to provide a demographic background for data analysis and to help understand the different perceptions and attitudes of different groups toward sustainable fashion design. The

second part was about the drivers influencing the students' intention towards sustainable and transformable fashion design on a five-point Likert scale ranging from Strongly Disagree to Strongly Agree, with a value of 1-5 to indicate the level of satisfaction. A small pre-survey was conducted to determine the reliability and validity of the questionnaire.

Part one: The respondent's viewpoint and the demographic variables and probabilities. This demographic section consisted of ten personal numbers of questions like age, gender, college/university, major, support for sustainable fashion design, how to deal with retained/damaged clothing, concerns about the environment/pollution/waste, perceived ease of purchasing sustainable fashion, budgeting when purchasing clothing.

Part two: Focuses on investigating how students may have different attitudes and intentions towards sustainable fashion design due to variables such as environmental knowledge, materials, environmental influences, service systems, promotion of sustainable consumption, and subjective norms.

This study aims to systematize the questionnaire data based on the pre-survey results, which are expected to reveal the students' views, attitudes, and intentions towards sustainable fashion design. The proposed hypotheses were tested using statistical analyses to examine the relationships and gaps between variables. Combining case studies and empirical data, the influencing factors were synthesised and analysed further to understand the impact of sustainable fashion design on students. An initial mini pre-survey was conducted to ensure the reliability and validity of the questionnaire. The purpose of the pre-survey was to assess the questionnaire's design for soundness, the questions' clarity, and the scales' validity. Through the pre-survey, we identified and corrected potential problems in the questionnaire, thus improving the quality and reliability of the formal survey.

In this research study, the target population is students studying at Guangdong universities among the three selected universities. According to Statista.com (2022), in 2021, the number of public colleges and universities in China reached up to 2,756, including 1,270 universities and 1,486 higher vocational colleges. There were more than 1 million students, and due to the high data population, this study will adopt non-probability and purposive sampling.

4. Analysis and Discussion

In this pre-survey, the reliability and validity of each scale were tested using SPSS26.0 software. SPSS (Statistical Package for the Social Sciences) is a powerful statistical analysis software widely used in social sciences, market research, health sciences, and other fields (Rahman & Muktadir, 2021; Allen et al., 2014). Before data analysis, data first needs to be cleaned and processed. SPSS provides powerful data organization and processing functions, including data entry, missing value processing, outlier detection, and data conversion. Through data processing and cleaning, the accuracy and completeness of the data can be ensured, the bias of the analysis results can be reduced, and the reliability and validity of the research can be improved.

4.1 Descriptive Analysis

Descriptive statistics summarises and describes the essential characteristics of a data set (Anthony, 2023). SPSS can generate various descriptive statistics, such as mean, median, standard deviation, frequency distributions, and so on (Anthony, 2023). Descriptive analysis helps researchers quickly understand the overall characteristics of the data, identify the

distribution and concentration trends of the data, and provide the basis for subsequent in-depth analyses (Anthony, 2023). In this test, 100 samples of predictive questionnaires were distributed through Wenjuanxing, as a result, 100 valid samples were collected. University A collected a sample of 27; University B collected a sample of 20; University C a sample of 53 for 100.

Table 1: Demographic Profile of Respondents

Statistical items	Variables	Frequency	Percent (%)
Age	15-19 years old	39	39
	20-24 years old	56	56
	25-29 years old	4	4
	Above 30 years old	1	1
	Total	100	100.0
Gender	Male	68	68
	Female	32	32
	Total	100	100.0
University of study	University A	27	27
	University B	20	20
	University C	53	53
	Total	100	100.0
Undergraduate	Undergraduate Year 1	10	10
	Undergraduate Year 2	51	51
	Undergraduate Year 3	20	20
	Undergraduate Year 4	19	19
	Total	100	100.0
Subjects Professional	Fashion and Costume Design	32	32
	Fashion Design and Engineering	67	67
	Others: (Please specified)	1	1
	Total	100	100.0

The results of the 100 questionnaires returned show that the majority of undergraduate fashion design students support sustainable fashion design. The data shows that 78% support sustainable fashion design, 16 % support sustainable fashion design sometimes, and only 6 % do not support sustainable fashion design (Question 6).

The students' attitudes varied regarding what to do with damaged clothing, with 26 % choosing to 'dispose' or 'throw-away' and 39 % choosing to 'repair' or 'throw away.' Discarded, 39% chose to repair or redesign, 7% chose to resell, 27% chose to donate or gift, and 1% student chose other, which allows damaged clothing to be used as rags (cleaning tools) for a secondary purpose (Question 7).

The student respondents also varied in their concern about the environment/pollution/waste. Firstly, 49% of students surveyed chose concerned to a certain extent, 24% of students surveyed chose limited concern, 21% chose highly concerned, and 21% chose not at all concerned (Question 8).

The students also responded to the ease of purchasing sustainable fashion in their area. 39% of students think it is convenient to buy sustainable fashion in their area, 31% of students think it

is not convenient to buy sustainable fashion in their area, and 30% of students are not sure if it is convenient to buy sustainable fashion in their area (Question 9).

In the survey on whether respondents had a budget when purchasing clothing, 77% of students had the budget, and thirteen of the students gave a budget price range of between 200-1000 RMB. 33% of students had no budget for clothing purchases (Question 10).

Table 2: Descriptive table of questions (6, 7, 8, 9, 10)

Statistical items	Variables	Frequency	Percent (%)
Question 6: Do you support sustainable fashion design?	Yes	78	78
	No	6	6
	Sometimes	16	16
	Total	100	100.0
Question 7: How to withhold / damaged clothes?	Dispose/Discard	26	26
	Repair/Redesign	39	39
	Resale	7	7
	Donate or Gift	27	27
	Other (please specified)	26	26
	Total	100	100.0
Question 8: How concerned are you about the environment / pollution/waste?	Highly concerned	21	21
	Concerned to a certain extent	49	49
	Limited concern	24	24
	Not at all concerned	6	6
	Total	100	100.0
Question 9: Do you find it easy to buy sustainable fashion in your area?	Yes	39	39
	No	31	31
	Unsure	30	30
	Total	100	100.0
Question 10: Do you usually have a budget when purchasing apparel?	Yes	64	64
	No	23	23
	If so, how much will you spend?	13	13
	Total	100	100.0

4.2 Questionnaire Reliability Analysis

Measuring the reliability and validity of a questionnaire is a critical step in ensuring the reliability and accuracy of a research instrument (Taherdoost, 2016; Ranganathan et al., 2024). This is not only critical to the quality of the questionnaire itself but also has a direct impact on the validity and credibility of the research results. The main purpose of reliability is to ensure the consistency and stability of the questionnaire's measurements over time and in different situations (Ranganathan et al., 2024). High reliability means that the questionnaire can provide consistent results when repeated measurements are taken (Taherdoost, 2016). It is expected to test the stability and consistency of a questionnaire by calculating an internal consistency coefficient (e.g., Cronbach's alpha). Reliability analyses assess whether a questionnaire reliably measures the construct for which it was designed (Ranganathan et al., 2024). If the reliability of a questionnaire is low, it indicates that its measurements may be unreliable. A high-reliability questionnaire ensures consistency in the results of the study, making them more credible and valid.

Instruments with high reliability can reduce measurement errors and provide more reliable data. In the reporting and discussion of research results, high-reliability questionnaires can enhance the credibility and acceptance of the results. When research results are based on high-confidence questionnaires, decision-makers can use them more confidently to formulate policies, make interventions, or improve practices. Often quantified in quantitative research by the Cronbach's alpha coefficient, Cronbach's alpha values greater than 0.7 ($\alpha > 0.7$) or higher indicate a good correlation between items; lower Cronbach's alpha ($\alpha < 0.5$) indicates that the items are poorly correlated with each other, and very high alpha ($\alpha > 0.9$) implies that certain items may be redundant (Tsang et al., 2017; Ranganathan et al., 2024).

The questionnaire was designed and sent to 100 students to test the questionnaire. Moreover, reliability analysis was conducted using Cronbach's alpha, the most commonly used method of reliability analysis in social research, to measure the reliability of the questionnaire and detect the level of respondents' attitudes. Therefore, the 100 test samples were analysed for reliability using Cronbach's alpha. The results showed that: The Cronbach's alpha coefficients of this questionnaire regarding the behavioural intention, environmental knowledge, environmental influences, system services, and promotion of sustainable consumption samples are all greater than 0.8 and less than 0.9, which indicates that the reliability of this questionnaire regarding the behavioural intention, environmental knowledge, environmental influences, system services and promotion of sustainable consumption is considered acceptable and very good reliability.

The Cronbach's alpha coefficients of this questionnaire regarding the attitudes toward sustainable and transformable fashion design, subjective norms, and materials samples are all greater than 0.7 and less than 0.8, which indicates that the reliability of this questionnaire regarding the attitudes toward sustainable and transformable fashion design, subjective norms and materials is considerable reliability.

Table 3: Reliability and Mean

Variable	Item	Cronbach's Alpha		Mean	Std. Deviation
		Subgroup item	Single-item		
Behavioural Intention	BI1	0.883	0.968	3.460	1.029
	BI2		0.968	3.500	1.030
	BI3		0.969	3.570	1.139
	BI4		0.968	3.660	1.047
	BI5		0.968	3.480	1.049
	BI6		0.968	3.260	1.079
	BI7		0.969	3.210	1.157
Attitudes Towards Sustainable and Transformable Fashion Design	ATT1	0.779	0.969	3.350	1.009
	ATT2		0.968	3.470	1.010
	ATT3		0.969	3.420	1.017
	ATT4		0.969	3.680	0.898
	ATT5		0.969	3.330	1.035
	ATT6		0.970	3.600	0.853
	ATT7		0.971	3.060	1.340
	ATT8		0.969	3.570	0.956
	ATT9		0.968	3.650	1.009
Subjective Norms	SN1	0.711	0.969	3.420	1.027
	SN2		0.970	3.300	1.068

	SN3		0.968	3.610	0.963
	SN4		0.968	3.510	1.020
	SN5		0.969	3.650	0.947
Environmental knowledge	EK1	0.827	0.969	3.460	1.019
	EK2		0.968	3.510	0.980
	EK3		0.969	3.720	1.016
	EK4		0.968	3.770	0.952
	EK5		0.968	3.640	0.916
	EK6		0.969	3.540	1.009
Materials	M1	0.796	0.968	3.750	0.914
	M2		0.968	3.700	0.980
	M3		0.969	3.200	1.110
	M4		0.968	3.660	1.007
Environmental influences	EI1	0.852	0.969	3.560	0.903
	EI2		0.968	3.570	0.967
	EI3		0.968	3.520	0.959
	EI4		0.968	3.650	0.957
System services	SS1	0.823	0.969	3.410	1.036
	SS2		0.968	3.680	0.942
	SS3		0.968	3.700	0.959
	SS4		0.969	3.590	1.065
Promotion of sustainable consumption	PSC1	0.843	0.968	3.680	0.942
	PSC2		0.969	3.570	1.085
	PSC3		0.968	3.650	1.019
	PSC4		0.968	3.710	0.998
	PSC5		0.969	3.670	1.016

4.3 Questionnaire Validity Analysis

The main purpose of validity is to confirm that the questionnaire accurately measures the construct or variable it is intended to measure (Taherdoost, 2016; Ranganathan et al., 2024). High validity indicates that what the questionnaire measures is consistent with the study's objectives. Validity analysis verifies that the questionnaire design is consistent with the theoretical framework or model. It ensures that the questionnaire sections are consistent with the theoretical construct and reflect the reality of the research variables. A high-validity questionnaire accurately measures the key variables of the study and ensures that the results truly reflect the phenomenon under study. This improves the scientific validity and effectiveness of the research findings. It also provides accurate measurement data when reporting the study results, making the conclusions more convincing. The high-efficiency questionnaire ensures the consistency between the measurement tool and the theoretical framework, which helps the researcher to verify and improve the theoretical model and makes the theory and practice more closely integrated (Aithal & Aithal, 2020; Ranganathan et al., 2024). The results of valid questionnaire measurements can promote the practical application of theory, improve practice, and guide policy formulation. Through validity analysis, deficiencies in the questionnaire can be identified, optimized, and amended to improve the measurement quality of the questionnaire (Aithal & Aithal, 2020; Ranganathan et al., 2024). The design of the questionnaire is improved to ensure that the questionnaire can accurately capture each key factor in the study and improve the overall quality of the study.

Validity analysis refers to the accuracy and validity of the measurements, i.e., whether the measurements are expected to be used for the purpose. The main analysis is the construct validity of the questionnaire, which is mainly to test the validity of the dimensional design of that questionnaire. The main application of this study for analyzing the validity of the questionnaire survey is the KMO and Bartlett's Test to show whether the intrinsic structure of the questionnaire is valid or not. The KMO test statistic compares simple correlation coefficients and partial correlation coefficients between variables as an Indicator. Kaiser gives a measure of KMO value above 0.9 means very good; between 0.9 and 0.8 means suitable; between 0.8 and 0.7 means fair; between 0.7 and 0.6 means poor; between 0.6 and 0.5 means poor (Wu et al., 2023).

The KMO value of this questionnaire is 0.877, and according to the scholar Kaiser's determination of the criteria for the range of values of KMO, it is considered that the value of KMO is between 0.8 and 0.9, which indicates that the questionnaire has a suitable structural validity.

Table 4: Result of Pilot Test- KMO and Bartlett's Test

KMO and Bartlett's Test	
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.877
Bartlett's Test of Sphericity	Approx. Chi-Square
	df
	Sig.
	3558.930
	946
	0.000

Reliability and validity are two key aspects of questionnaire quality; reliability is the basis of validity, and without a high-reliability questionnaire, validity cannot be guaranteed (Ranganathan et al., 2024). However, a high-reliability questionnaire does not necessarily possess high validity, so these two aspects need to be considered comprehensively when designing and evaluating questionnaires. When conducting reliability and validity analyses, the researcher should first conduct reliability analysis to ensure the consistency of the questionnaire, and then conduct validity analysis to ensure the accuracy of the questionnaire. The results of these analyses are combined to optimise the questionnaire design to improve the study's reliability and validity. In summary, measuring the reliability and validity of questionnaires ensures the quality of the research instrument and improves the accuracy and credibility of the research results. Through adequate reliability and validity analyses, researchers can design more reliable measurement tools and promote the in-depth development of scientific research.

5. Conclusion

In this pre-survey of fashion design students' attitudes and behavioural intentions towards sustainable fashion design from three universities in Guangdong, we found that the designed questionnaire has good reliability and validity. The results showed that the Cronbach's alpha coefficients of this questionnaire regarding the behavioural intention, environmental knowledge, environmental influences, system services, and promotion of sustainable consumption samples are all greater than 0.8 and less than 0.9, which indicates that the reliability of this questionnaire regarding the behavioural intention, environmental knowledge, environmental influences, system services and promotion of sustainable consumption is considered acceptable and very good reliability. It also shows that this questionnaire was designed to be reliable and valid. This indicates that the questionnaire can effectively measure students' attitudes and behavioural intentions towards sustainable fashion design, providing a

solid foundation for subsequent in-depth research. The excellent reliability and validity of the questionnaire in this study indicate that it can accurately reflect the attitudes and behavioural intentions of fashion design students towards sustainable fashion design. Such results not only enhance the reliability of the research instrument but also provide strong support for a deeper understanding of the key factors in the field. With this data, researchers will be able to more clearly identify the factors influencing students' attitudes and behaviours, which can be targeted in education and practice.

Based on the results of this pre-survey, the validity of the questionnaire can be further validated in a more extensive and geographically diverse sample. This will help ensure the general applicability of the results and reveal more factors that may influence students' attitudes and behaviours. Universities and industry organizations can also establish support networks to provide more resources and platforms for students to promote their innovation and practice in sustainable fashion design. Meanwhile, based on the survey results, educational institutions can adjust and optimise the content of fashion design courses, strengthen the knowledge and skills training related to sustainable fashion design, and enhance students' attention to and practical ability in sustainable development. Students are encouraged to participate in more practical projects and case studies to deepen their understanding of sustainable fashion design. Through practical experience, students can better apply their theoretical knowledge to real-life work and enhance their career competitiveness.

The questionnaire showed stable reliability and validity, indicating good internal consistency and reliability. It can be used as a formal questionnaire. This study provides strong data support for academic research in sustainable fashion design and is an essential reference for improvement in educational practice. By clarifying students' attitudes and behavioural intentions in sustainable fashion design, stakeholders can more precisely formulate educational policies and practice strategies to promote the sustainable development of the fashion industry. The study also lays the foundation for subsequent in-depth discussions, which will help to explore further how to enhance fashion designers' competence and awareness in sustainable design through education and practice.

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