

Multidimensional Integration in Higher Education: Exploration and Practice in Sustainable Fashion Cross-Disciplinary Workshop

Xinxin Huang*, Yuan He, Shuchang Zhang

School of Art and Design, Guangdong University of Technology, Guangzhou, Guangdong, 510006, China

ABSTRACT

This study takes sustainable fashion design courses as an example to explore a multidisciplinary workshop teaching strategy. By incorporating students and mentors from various professional backgrounds, the course achieves deep interdisciplinary collaboration and cross-fertilization of knowledge. This strategy not only enhances students' understanding of sustainable design concepts but also improves their innovative thinking, teamwork, and ability to solve complex problems through practical course projects. The results indicate that the integrated workshop strategy effectively bridges the gap between theory and practice, enhances students' professional competencies, and stimulates their initiative and creativity in learning. This paper further analyzes the advantages of this strategy in sustainable fashion design education, and provides theoretical foundations and practical recommendations for future educational reform.

KEYWORDS

Multidimensional integration; Sustainable fashion design; Cross-disciplinary workshop; Innovative thinking; Combining theory with practice

1 Introduction

In recent years, the "New Liberal Arts" initiative proposed by China's Ministry of Education aims to cultivate applied liberal arts talents that meet the demands of the new era. It seeks to develop new professionals who transcend existing disciplinary limitations and possess high professional competence, strong academic ability, comprehensive strength, and creative vision, characterized by integration, interdisciplinarity, and flexibility. This initiative is not only a proactive response from higher education institutions to the new era and a necessary requirement to adapt to the new technological revolution and industrial transformation, but also a driving force for universities to deepen the reform of liberal arts disciplines and create "first-class majors" and "golden courses". As an important component of the liberal arts, the field of art and design, centered on artistic aesthetics and mediated by new technologies, embodies a unique advantage in achieving multidimensional integration of art and engineering within the broader disciplinary system. This integration is a necessary response to the development of modern disciplines and the demand for skilled professionals in industry. Following the United Nations' Sustainable Development Goals (SDGs) proposed in 2015, governments, universities, and enterprises worldwide have increasingly emphasized the circular and sustainable development of industries. China has also introduced the "dual carbon" plan. The fashion industry ranks high in resource consumption and carbon emissions. Therefore, incorporating sustainable fashion design into the undergraduate art and design curriculum, as well as focusing on the integration and application of art design with new sustainable materials and technologies, is an international trend in higher education for art under the "New Liberal Arts" framework. It is not only a responsibility of art educators but also an essential path for cultivating professionals in the field of art for the new era.

Sustainable design refers to a strategic design activity that integrates "products and services" to create "sustainable solutions" that meet specific consumer needs, replacing the consumption of material products with "outcomes" and "benefits." Its ultimate goal is to reduce resource waste and environmental pollution while improving the quality of social life (Liu 2010). Although the urgency of sustainable design is widely recognized in the design community, there are few practical projects in domestic undergraduate classes, most of which are confined to teaching concepts. This phenomenon could be attributed to three main reasons: (1) Sustainable design is an evolving concept with inherent ambiguity, and there is currently no applicable evaluation system in China, making it difficult to estimate or assess the "sustainability" effects of projects; (2) Most students learn sustainable design theories from the West, but even in Western countries, there is often a disconnect between theory and practice. Moreover, the different cultural contexts lead to the failure of the applications in China of many theories; (3) Instructors have not achieved cross-disciplinary integration of art and engineering, often discussing sustainable technologies or design theories only at a conceptual level, failing to provide practical guidance on the application of relevant technologies and theories. As a result, facing practical design projects in this field, students often recognize the problems but feel confused about how to proceed.

In the realm of fashion, current courses and practices mainly focused on fabric redesign, and most instructors majored in fashion design. The instructors with a single professional background neither teach students the mechanism of sustainable technologies, nor tell them how to apply these technologies on design, severely impacting teaching quality

and student recognition. Additionally, the teaching methods for this course are outdated, project-based learning is weak, industry participation is low, and there is no connection between students' practice and industry needs. These teaching problems result in that the design in class fails to meet industrial demands, and the cultivation of design talents fails to meet the social requirement for highly qualified professionals in this field. On this basis, this paper takes the sustainable fashion design course as an example and explores the reform of the teaching strategies of cross-professional workshops by means of multidisciplinary integration.

2 Background to the research: sustainable fashion cross-disciplinary workshop

2.1 Adjustment of target students

The target students for Sustainable Fashion Cross-disciplinary (SFC) workshop differs significantly from that of traditional classes. Traditional classes typically consist of students from the same discipline with similar knowledge accumulation and skills. In contrast, SFC workshops involve students from various design disciplines, such as fashion design, visual communication, product design, digital media technology, and digital media arts, etc. They bring unique expertise and perspectives, enriching classroom discussions and fostering interdisciplinary collaboration. The diverse member structure not only enhances the quality of discussions but also encourages students to engage in creative problem-solving through collaboration. It helps them learn to communicate and cooperate with individuals from different backgrounds, thereby improving their communication and teamwork skills. This experience prepares students to tackle interdisciplinary challenges in their future careers and broadens their perspectives and knowledge base.

2.2 Innovation in teaching instructors

The teaching team for SFC workshops consists of instructors from various backgrounds, including sustainable textile technology, plant dyeing, smart materials, and fashion design. These educators come from different disciplines, institutions, and industries, providing students with multidimensional perspectives and expertise. For instance, instructors in fashion design focus on imparting creativity and aesthetics, while those majored in engineering or materials offer theoretical instruction and practical guidance on sustainable materials and technologies. Industry mentors incorporate real-world fashion industry demands and the latest trends into the curriculum, enabling students to understand and keep pace with developments in the fashion industry. This diverse teaching team ensures that students receive comprehensive guidance and training in sustainable fashion design on the SFC classroom, fostering their holistic thinking, and problem-solving abilities, as well as broadening their understanding of the sustainable fashion evolution.

3 Methodology and methods

This research is grounded in Vygotsky's (1978) theory of social development, which emphasizes the importance of social interaction in meaning-making and cognitive development. It posits that individual growth is deeply rooted in social and cultural contexts, where cognitive functions are influenced by cultural values, beliefs, and tools. Additionally, learning is often facilitated through collaborative dialogue. The study also incorporates situated learning theory (Lave & Wenger, 1990), highlighting how various groups, environments, and settings shape the learning experience. The aim of this study is to explore the impact of interdisciplinary teaching methods and student backgrounds on sustainable fashion courses. The research team includes leaders from industry who can introduce students to the latest social and cultural contexts, helping them understand contemporary societal needs and development. The teaching process employs group collaboration, allowing students from different professional backgrounds to form teams freely within the interdisciplinary framework. Additionally, the team utilizes real project-based learning to encourage students to approach their classes and create their final projects with a production-oriented mindset. This research seeks to investigate the integration of teaching and practice to promote the development of sustainable fashion education.

Accordingly, two methods were mainly employed in this research, e.g. (1) recording such as photographic, notes, etc. for semi-structured discussions among teachers and students. The discussions utilized a modified focus-group approach aimed at enhancing learning outcomes while also facilitating the collection of research data, ensuring this process complement without interrupting students' learning. These semi-structured dialogues were structured to allow students to express, refine, and reassess their experiences through debate, enabling them to engage with, incorporate, or challenge the perspectives of their peers. Throughout the research process, the teaching team kept an eye on the impact of the research on the students. (Lyon, P et al. 2018) In addition to obtaining ethical approval and informed consent from students at the outset, the team encouraged students to actively engage in the research, and freely express their opinions. The project provided a closer relationship with tutors, leading to a shared commitment and engaged learning experience of discovery, speculation and intellectual rigour (Sigurjonsson, 2014). The final data were recorded in the form of video or audio recordings, along with written notes; (2) questionnaires for the participated students after finished all

sessions in the course. The contents of questionnaire were developed through rigorous discussions. It was designed and implemented by specialized teachers from our university, ensuring its content validity and analytical capacity. This questionnaire has 11 questions which are primarily designed with four sections: a) feedback from students on the cross-disciplinary teaching strategy; b) students' feedback on different topics; c) students' feedback on various teaching methods; and d) the challenges faced by the cross-disciplinary workshop. The survey focusing on a small, specific sample of all 36 students participating in the SFC workshop. Among these, 19 were from the Clothing and Apparel major, 7 from Visual Communication, 5 from Digital Media, and 5 from Product Design. The results of the questionnaire were analyzed by means of SPSS software.

4 Course design

In response to the current talent needs in the sustainable fashion sector, a new strategy of multidisciplinary integration through cross-professional workshops has been proposed, creating innovative ideas for joint curriculum design, as shown in Figure 1. This curriculum design encompasses "teaching" and "learning" through interdisciplinary integration. The diverse "learning" involves cross-disciplinary groups composed of students from various design fields, such as product design, fashion design, visual design, and digital media. The diverse "teaching" includes instructors from different professional backgrounds, including university faculties and industry mentors. Different specialized knowledge is taught by the corresponding experts; for example, basic design theory is delivered by art faculty, while the application of smart materials is taught and demonstrated by materials and engineering instructors. Topics such as the current state and future trends of the fashion industry are introduced by external industry mentors.

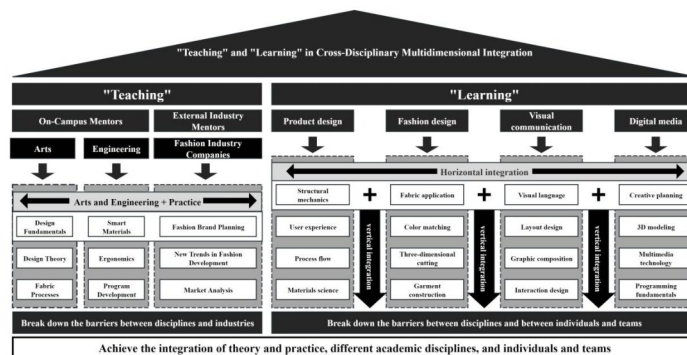


Figure 1 New strategy of cross-disciplinary workshops based on multidimensional integration

Within the defined scope of the course assignments, each cross-professional group selects a specific project theme according to the specialties and interests of its members, engaging in market research, proposal discussions, and design practice. Students from different professional backgrounds generate varying understandings and design approaches while learning unified concepts, achieving complementary collaboration through cross-professional teaming. The sequential integration and cross-fusion among different fields are guided by mentors and executed collaboratively by student teams, focusing on enhancing students' teamwork and communication skills. This approach promotes the integration among the various disciplines and comprehensively enhances students' professional competencies (Feng and Liu 2023).

4.1 Course content and schedule

This course consists of 96 class hours, covering the fundamentals of sustainable fashion design, new materials and their applications, case studies, and project practice. The course theme is "Traditional Handmade Papermaking with Recycled Fibers/Plant Dyeing/Smart Materials". It is divided into six parts, including an introduction to the background of sustainable fashion design (4 class hours), sustainable technology explanation (8 class hours), design case study (8 class hours), explanations and demonstrations of handmade papermaking and plant dyeing processes (8 class hours), presentations and guidance of group project theme (16 class hours), collection of sustainable materials and preliminary experiments (16 class hours), overall design and practice of group projects (28 class hours), and group presentations and feedback sessions (4 class hours).

The final course design projects require students to participate in relevant design competitions and create competition posters, serving to evaluate the effectiveness of the course instruction. This approach encourages students to actively apply the knowledge and practical experiences acquired over the past three years to their course assignments. This "Theory plus Practice" course structure not only enables students to learn about the cutting-edge knowledge related to sustainable fashion but also enhances their ability to integrate and apply both new and existing knowledge.

4.2 Design of teaching methods

Flipped Classroom Teaching. The flipped classroom teaching advocates for a strategy where teachers provide focused lectures while students engage in self-study and discussion, fostering independent thinking and communication skills (Ma et al. 2022). In class, students first engage in individual learning through the teacher's explanations or preparatory materials, followed by independent reflection where they record insights or answer questions posed by the teacher. This process encourages self-reflection and internalization of knowledge. Students are then divided into small groups for discussion and exchange. Within these groups, they share their perspectives and solutions, further deepening their understanding through questioning, debate, and discussion. In SFC workshops, after each teacher presents their topic, they assign 2-3 open-ended questions for students to discuss and find answers. Then, 2-3 groups are randomly selected to present their solutions, which are evaluated by the teacher and other groups, providing a comprehensive assessment of the students' grasp and application of specialized knowledge.

Cross-Professional Cooperation. This method requires that each group consists of members from at least two different professional fields to fully embody the characteristics of interdisciplinary collaboration. Students autonomously select their teammates to form groups of 3-5 individuals. This approach aims to promote deep exchange and integration among various disciplines, allowing team members to contribute their strengths and compensate for each other's shortcomings. Clear division of labor within the group ensures that each member can leverage their unique skills and assume corresponding responsibilities in the project. Cross-professional collaboration not only stimulates innovative thinking in sustainable fashion design but also cultivates students' abilities to solve complex design problems, enhancing their teamwork and interdisciplinary integration skills in future design work.

Project-Based Teaching. This approach is project-oriented and problem-based, with students as the focus under the teacher's guidance. It starts with real-world problems and aims to cultivate students' self-learning, teamwork, and critical thinking skills throughout the problem-solving process (Liang 2019). Students encounter complex issues from the real world rather than textbook assignments, requiring them to apply their sustainable design knowledge and experience for analysis, design, and implementation (Chen et al. 2006). Throughout the project, students go through various stages from research and design to production and testing. This not only deepens their understanding of sustainable fashion concepts but also develops their practical skills. Moreover, this project-based teaching method involves multiple disciplines, helping students broaden their knowledge and enhance their interdisciplinary application. Learning in this workshop is like that in the real world, learning isn't so explicit and takes place as an integral part of generative social practice (Lave and Wenger, 1991). Whereas learning is rooted in practice, and skills are examined, labelled and prescribed through defined learning outcomes in the traditional higher education.

Comprehensive Competency Development. This approach aims to holistically enhance students' overall qualities, including but not limited to knowledge, skills, emotions, attitudes, and values across multiple dimensions (Su et al. 2012). Diversified teaching involves teachers using various educational methods tailored to specific teaching content and classroom contexts to cultivate and improve students' comprehensive qualities, achieving the educational goal of their overall development (Fan et al. 2023). This method emphasizes the development of diverse skills and competencies, such as innovative thinking, teamwork, communication skills, problem-solving abilities, social responsibility, and aesthetic appreciation. During instruction, teaching contents from different disciplines including design, environmental science, and economics, are integrated into the curriculum, encouraging students to think about fashion design issues in an interdisciplinary context. As students work through their assignments, they must consider sustainability, market demands, and cost control. This method guides students to reflect on the environmental and social impacts of the fashion industry and encourages them to design aesthetically pleasing and environmentally friendly fashion products. Throughout the design process, students continuously reflect on the sustainability and practical application of their designs, improving their professional abilities and overall competencies through feedback and revision.

5 Results and discussion

5.1 Preference for multidisciplinary teaching

The result from the questionnaire shows that 11.1% of students opted for the traditional single-teacher teaching strategy, while 44.4% of students expressed a preference for the multidisciplinary cross-teaching strategy. The other 44.5% of students reckoned that both of the teaching strategies were available. It is indicated that most students accept more collaborative and integrative approaches in education. The multidisciplinary cross-teaching approach offers a wealth of advantages. It provides students with comprehensive knowledge explanations and practical guidance that are specifically tailored to the topics they are currently exploring. This method allows instructors from various disciplines to share their expertise, conveying cutting-edge and in-depth knowledge within their respective fields. As a result, students benefit from diverse perspectives and insights that enrich their learning experience.

Moreover, the impact of the cross-teaching strategy is reflected in student perceptions, as presented in Figure 2. Over

90% of students believe that this approach effectively stimulates their design inspiration, encouraging them to think creatively and explore new ideas. Additionally, almost 90% of students feel that the cross-teaching strategy provides superior guidance and support for their design practice. This overwhelming positive feedback underscores the effectiveness of collaborative teaching methods in fostering an engaging and supportive learning environment.

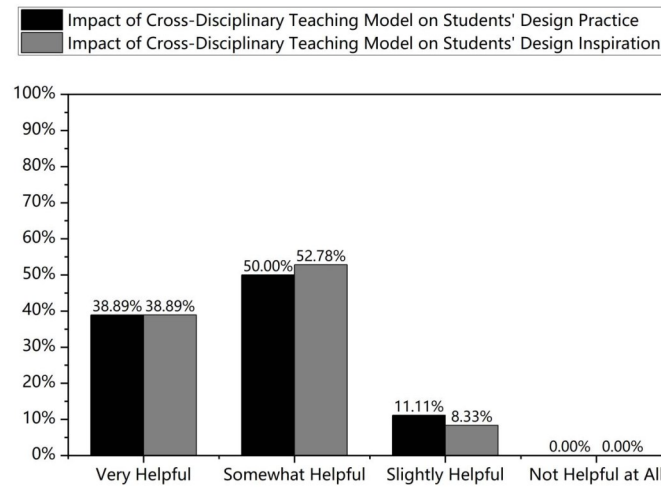


Figure 2 Students' feedback on the multidimensional cross-disciplinary teaching strategy

On the basis of these findings, it can be concluded that dividing teaching responsibilities among instructors from different disciplines could be a beneficial and feasible innovative teaching strategy. This approach not only enhances the educational experience for students but also highlights the viability of multidisciplinary workshops that emphasize integration. By leveraging the strengths of various fields, such workshops can create a dynamic and enriching learning atmosphere that prepares students for the complexities of real-world design challenges.

5.2 Feedback on different topics

The interdisciplinary workshop included four topics: handmade paper from regenerated fibers, sustainable fashion design, plant dyeing, and pressure-sensitive luminescent materials. As presented in Figure 3, students showed the highest preference for the topic of "Handmade paper from regenerated fibers" topic, with a proportion of 80.56%. This was followed by the topic of "Sustainable fashion design" and "Plant dyeing", which accounted for 38.89% and 30.56%, respectively. The least favored topic was "Pressure-sensitive luminescent materials", which was preferred by only 22.22% of students. This may be due to the fact that the mechanism and applications of smart pressure-sensitive luminescent materials require substantial knowledge from engineering and science fields, which is quite difficult for design students to comprehend and master.

To address this issue, improvements should be made in two areas: firstly, from the first or second year, new materials and technologies should be gradually integrated into students' learning, as well as fostering an engineering thinking and knowledge foundation of design students in a step-by-step manner. Secondly, instructors should present the technical

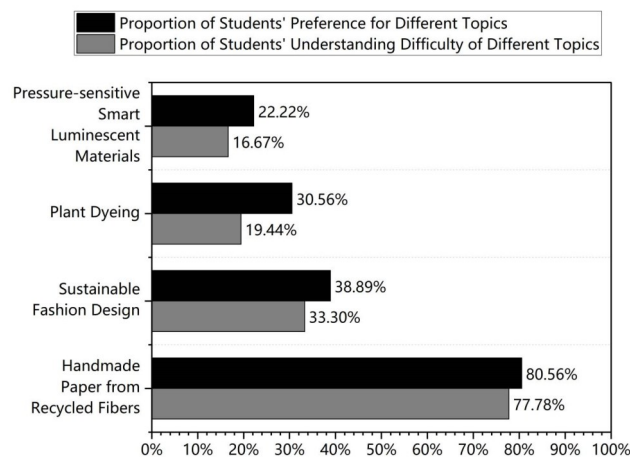


Figure 3 Students' feedback on different topics

knowledge in the engineering and science fields in a simple, clear and understandable way to facilitate the design students to understand and master them. This approach will promote a deeper integration of interdisciplinary talent cultivation in arts and engineering.

5.3 Preference on teaching aids

During the instructional process, it was observed that nearly 80% of students expressed a strong preference for experimental practice when learning new material applications. Correspondingly, only 13.89% of students opted for traditional PowerPoint presentations and 8.33% of students favored video displays. The overwhelming preference for hands-on and experimental teaching aids indicates that it is important for art and design students to learn new technics and knowledge. Therefore, when introducing new technologies and materials, instructors should move beyond conventional instruction strategy that focus on textbook and theoretical approaches. Admittedly, this teaching method has its values, but it is not sufficient for maximizing student engagement and understanding, especially for creative disciplines. Instead, teachers should put more emphasis on practical applications that align with the hands-on education nature of art and design.

Utilizing interactive methods such as live demonstrations, workshops, and collaborative projects, which allow students to physically interact with materials, can significantly enhance the learning experience. These techniques offer more intuitive and immersive ways for students to engage in the subject matter, that can foster deeper understanding and greater retention of concepts. By integrating the active learning strategies, instructors can not only stimulate student interest but also help them develop a more profound mastery of the materials and techniques. This approach aligns with the characteristics of art students, who often thrive in environments that encourage creativity and experimentation, making the learning process more effective and enjoyable.

5.4 Challenges of the interdisciplinary workshop

This interdisciplinary workshop course is primarily aimed at senior students, with the goal of allowing them to apply their knowledge learned from the three-year higher education to the design of workshop projects. However, many students often encounter difficulties in focusing on design practice, primarily due to the pressures associated with graduation internships and final projects. In this context, students may struggle to concentrate their time and energy on actual design work. Furthermore, their limited prior knowledge about new materials and technologies hinders them from fully understanding and proficiently applying the technics taught in the course, leading to their frustration and reluctance to invest time in trying new methods. Consequently, it limits the effectiveness of enhancing students' interdisciplinary innovative thinking and capabilities. As illustrated in Figure 4, 19.44% of groups reported challenges in collaboration that hindered their design practice. Additionally, 27.78% of students indicated difficulties in finding design inspiration, which may stem from an insufficient understanding of new materials and technologies.

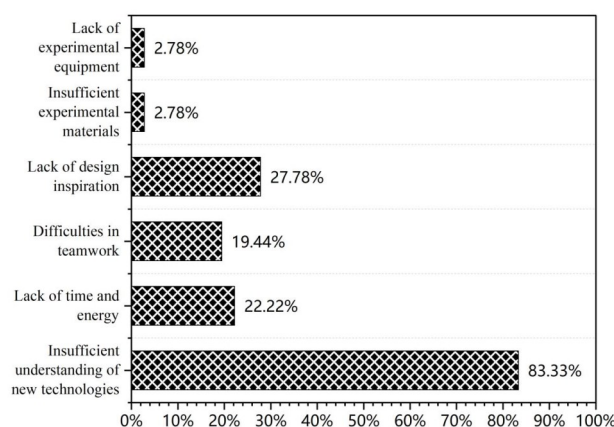


Figure 4 Challenges faced by the cross-disciplinary workshop

In summary, when optimizing the teaching strategy of the interdisciplinary workshop, it is essential to consider the actual circumstances of design students. For instance, adjusting course schedules and improving the teaching methods for new knowledge and technologies to better accommodate students' learning needs. Moreover, instructors should actively address the existing challenges faced by students and provide timely guidance to help them overcome difficulties. Through these measures, the course can more effectively enhance students' practical skills and innovative thinking, enabling them to achieve better results in the field of design.

5.5 Interdisciplinary design works

In the interdisciplinary workshop, students were tasked with developing their final projects, applying the knowledge and skills they had acquired throughout the course. The topics of these projects were established by each group. The members of each group could explore their interested information related to the topic from their own perspective. Additionally, the instructors provided toolkits containing various sustainable materials, smart materials, plant dyes, etc. for students to incorporate into their designs.

Two standout projects emerged from the class, showcasing the diverse ways students approached the concept of sustainable design. As illustrated in Figure 5, one of the representative works is a cultural creative packaging design crafted from biodegradable seed paper (Figure 5a). This innovative approach not only emphasizes the use of eco-friendly materials but also draws inspiration from agricultural culture, imbuing the design with cultural significance. The core design concept is to integrate plant seeds into the paper pulp, using handmade paper to package masks. After the user removes the mask from the packaging, the discarded paper can be planted in soil, allowing the seeds inside to germinate and grow into plants. This design showcases how sustainability can intersect with creativity and cultural expression. The students who designed this project have participated in competitions, and the design has been granted a Chinese patent (Patent Number: ZL 2024 2 0282884.3), highlighting the academic and professional opportunities such creative efforts can generate.

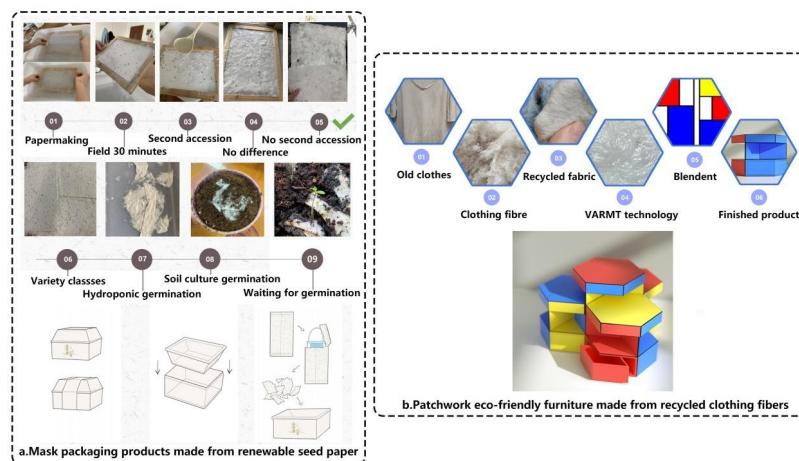


Figure 5 Showcase of representative works

Another noteworthy project is a multifunctional storage cabinet made from recyclable materials (Figure 5b). The main design concept of this project involves breaking down old clothing into specific sizes, then processing them using the VARMT technology to create a specialized slurry. This slurry is then laminated and high-temperature pressed to form board materials, which are used to design a modular, detachable honeycomb storage cabinet. This project demonstrates how sustainable design can extend beyond aesthetics, incorporating functionality and environmental responsibility. The student's innovative use of recyclable materials in a practical household product exemplifies the real-world applications of the course's teachings. The success of this project is underscored by the fact that it has already been granted a patent in China (Patent Number: ZL 2022 2 2517194.5), reflecting the high level of design and innovation involved. This achievement not only marks a significant milestone for the student but also emphasizes the practical and marketable potential of sustainable design solutions.

6 Conclusion

The application of a multidisciplinary, integrative interdisciplinary workshop teaching strategy in sustainable fashion design courses demonstrates significant teaching potential and innovation. The research indicates that by introducing students and mentors from diverse professional backgrounds, interdisciplinary collaboration not only deepens students' understanding of sustainable fashion design but also significantly enhances their teamwork, communication, and complex problem-solving skills. Lessons were learnt from previous years, and how to contextualise the disciplines students were studied so that they understood their relationship with a 'creative practice'. The multidimensional cross-teaching strategy is particularly favored by students, effectively sparking design inspiration, while hands-on demonstrations in the classroom greatly facilitate the mastery and practical application of knowledge. Although the workshop faces challenges related to time management and students' prior knowledge, optimizing the teaching contents and enhancing students' engineering thinking still render this strategy an effective pathway for cultivating well-rounded

talents. In summary, the multidisciplinary integrative workshop strategy provides an innovative practical foundation for sustainable fashion design education, and warrants further promotion and application in future educational reforms.

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***Corresponding Author:** Xinxin Huang, hxxsophie@163.com;hxx@gdut.edu.cn

References

- [1] Chen Ziqiang & Sun Tiye & Xu Dixiong. (2006).A Brief Discussion on the Feasibility of PBL Teaching Method in China. *Journal of Southwest National Defense Medical*, (4):433-435.
- [2] Fan Hongxia, & Chai Chengwen, & Wang Chen. (2023) Research on Multi-faceted Physical Chemistry Experiment Teaching Emphasizing Comprehensive Ability Cultivation. *Laboratory Science*, 26(2): 109-112.
- [3] Feng Jingjing & Liu Chuanxiao. (2023) Research and Practice on the Reform of Diverse Integrated Joint Graduation Design Teaching. *Higher Education Journal*,9(29):149-152.
- [4] Lave J. & Wenger E. (1990) *Situated Learning: Legitimate Peripheral Participation*. Cambridge: Cambridge University Press.
- [5] Liu Xin.(2010) .Concepts, Development, and Practice of Sustainable Design.*Creativity and Design*, (2): 36-39.
- [6] Liang Lili.(2019). Application Research of PBL Teaching Method in Finance Courses. *Knowledge Economy*, (18):131-132.
- [7] Lyon, P & Letschka, P & Ainsworth, T & Haq , I.(2018).Drawing Pedagogies in Higher Education: the Learning Impact of a Collaborative Cross-disciplinary Drawing Course.*International Journal of Art & Design Education*.37(2):221-232.
- [8] Lave J. and Wenger E. (1991) .*Situated Learning: Legitimate peripheral participation*. Cambridge University Press: Cambridge.
- [9] Ma Ling & Chen Xin & Lin Baitong. (2022).Practice of the Diverse Integrated Flipped Classroom Model in "University Physics" Teaching. *University Physics*,41(8): 65-70.
- [10] Su Ying, & Cao Wuqi & Huang Guanqing.(2012) .Reform and Development of Diversified Experimental Teaching Organization in Higher Education. *Research on Laboratory Work in Higher Education*, (1): 1-3.
- [11] Sigurjonsson J. (2014). Positioning Industrial Design Education within Higher Education: How to face increasingly challenging market forces? (online). Available at: http://www.idunn.no/uniped/2014/02/positioning_industrial_design_education_within_higher_educa (accessed 28 February 2015).
- [12] Vygotsky L. (1978). Interaction between learning and development, in M. Gauvain & M. Cole [Eds] *Readings on the Development of Children*. Cambridge, MA: Harvard University Press, pp 19–30.