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EXPLORING THE LEARNING EXPERIENCES OF CHINESE INDUSTRIAL DESIGN STUDENTS IN THE GLOBAL STUDIO

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ABSTRACT
Literature suggests that for designers to be able to work successfully in cross-disciplinary teams they need both job specific technical (hard) skills as well as interpersonal (soft) skills. To enable design students to develop both the hard and soft skills, it has been suggested that student design project should incorporate activities so that the students can practice and experience the interpersonal skills, such as cross-cultural communication, alongside the specific discipline technical skills, such as CAD. For example, for students to be able to practice cross-disciplinary teamwork they should be able to work together on a design project with students from other disciplines. This means that the design education should not be isolated, but rather it should try to establish links between disciplines, such as Industrial Design, Engineering Design, Multimedia Design, Ergonomics, Business and Marketing.
When design education is mostly done in silo mode, in which the focus is on the design specific technical skills, the students are provided with a limited experience to practice interpersonal skill. We share an example of Design Education which aims to provide students with a learning environment in which the students are encouraged to practice and experience interpersonal skills by undertaking a design project cross-cultural team.

Keywords: Design decision, culture communication, self-evaluation, teamwork

1 INTRODUCTION
Scholars such as Brisco, Whitfield and Grierson [1], Ghassan and Bohemia [2], pointed out that Industrial and Engineering Design Education should enable future design professionals to develop skills to collaborate in physical and virtual New Product Development teams. Bilen et al. [3] suggested that the engineering designers should be able to work in different environments, with different technical specifications, standards and procedures, as well as different cultures and languages. Thus, Bilen et al. [3] suggested that "economic and cultural globalisation must be a focal point of training" engineering designers (p. 29). Nevertheless, Chen et al. identified that in China teachers, delivering industrial design courses, are still focusing on imparting a knowledge and thus limiting students' abilities to development design thinking [4]. According to the survey conducted by Hu et al, the traditional mode of industrial design education in China pays more attention to improving students' hard skill design abilities, such as painting and drawing, but pay less attention on improving and cultivating students' cross-integration and innovation abilities, and pays a little attention for students to develop abilities connected with the design thinking such as "discover, analyse and solve problems" and teamwork [5]. Moreover, if the course is led by the teacher, then it is largely limited by teachers' own knowledge and cognitive domain [2]. To overcome this identified limitation, several Chinese universities, such as Tongji University and Guangdong University of Technology, try to reposition the design discipline by carrying out reforms in undergraduate and master courses. They implemented strategies such as hiring foreign professors to teach jointly, setting up interdisciplinary product development to build a design major with its own characteristics and advantages [6-7]. Nevertheless, in the learning

process, these students still have few opportunities to collaborate with design students from different cultural backgrounds collocated cross-cultural student teams or through using a distributed design model to work virtually with international student design teams.
In this paper, we will discuss learning experiences of Chinese undergraduate design students, who participated in the 2023 Global Studio international project. The aim was to provide these students with a cross-cultural learning experience by working in distributed international teams.
The Global Studio project activities aim to mitigate limitations of time, region and space, and to enable students to experience the cultural background of different countries withing a reasonable operation cost mode to better understand the roles and functions of designers and clients in the design process. This study is based on 2023, a 10-week design project, jointly carried out by five universities located in the following countries: China, Russia, Turkey, Italy and Brazil. First, we introduce the teaching objectives, and then we outline students' roles. Afterwards, we introduce the research objectives, followed by the data summary and we will conclude with a discussion and recommendations.

2 TEACHING OBJECTIVES

The 2023 Global Studio was undertaken in partnerships with 5 universities from around the world to build teams of design teachers and students with interdisciplinary and cross-cultural backgrounds. The skills, that teachers, aimed for students to improve by end of the course were students' ability to expand more ways of designing to solve problems through the method of design process, to convey design concepts in the communication process through drawings, conceptual models and practice design thinking skills. As Cross said, design as the "third culture" of human knowledge and ability, is the dissemination of knowledge about a certain research phenomenon. Through appropriate investigation methods, a deep understanding of the culture is achieved and determined [8]. The course learning and teaching objectives aimed to support development of the following skills:

- Understanding of the impact of culture and context on design.
- Ability to use primary user research to generate a specific design brief related to the local culture.
- Use distance communication technologies to effectively communicate with counterpart student teams.
- Provide timely and effective feedback to counterpart working team members.

2.1 The collaborative model led by student design team

Twenty-four students at the Chinese university were supported by a team of 5 teachers from the following backgrounds: English, new media, design management and product design. Teachers' disciplinary diversity was helpful to support student multifaceted learning. The Chinese students from industrial design, fashion design and new media were allocated by a teacher to 6 cross-disciplinary teams, with each of the teams having a member who was confident to converse in English. These six teams were paired by a teacher to student teams located at one of the other international university projects partners.

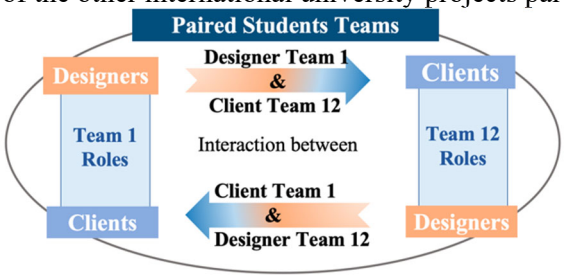

Figure 1. The collaborative model

The students participating in this international design project perform in parallel these two roles: (i) designers and (ii) clients. (see FIG. 1 and FIG. 2). When communicating with their clients located at one of the other universities, design teams needed to promote the design process based on the cultural background of their clients. In the process of generating, promoting, developing, testing and optimising the design, the students in their roles as clients provided the feedback to their counterparts. This process provided students with an opportunity to handle an activity which is generally undertaken by the teachers. The aim was to

provide students with a learning opportunity to better understand how to process the key information during the design process, to deepen their understanding of what is their function during the New Product Development process.

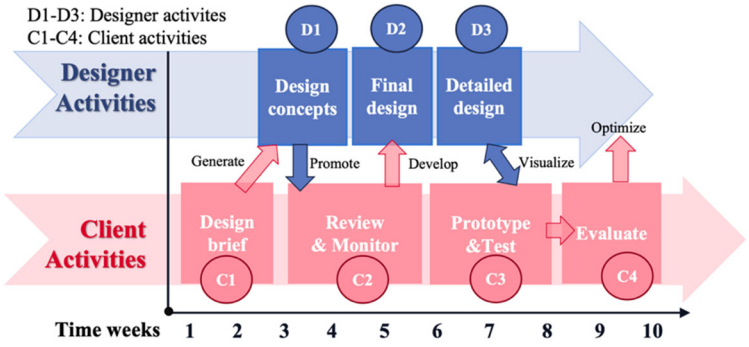

Figure 2. Tasks and processes undertaken by different roles

Figure 3 shows the Chinese student design teams presenting their final design plans to their "Clients" through a meeting held online using Zoom platform. On the other hand, the Chinese student teams acting in their roles as the "Clients" needed to provide evaluation feedback on designs presented by their paired "Designer teams" located in other countries. During the design process updates, teachers observed and listened, but have not interfere, so that the student could promote and evaluate the design progress more independently.

Figure 3. The "designers" reports the design proposal

3 DATA COLLECTION AND RESULTS

According to the course progress, in the C2 and D3 stages of the course (in FIG. 2), a questionnaire survey on the feedback of the design project was conducted among Chinese students majoring in design in the middle and final stages of the project. Before that, we have completed the pre-test of the questionnaire, and the questionnaire has high reliability and validity.

The more than half of the students (54%) perceived the language of different countries to be the most challenging as it limited communication between the paired student teams (see Figure 5). This was followed by difficulties related to the time zone differences (25%) and cultural backgrounds (25%). Nearly a fifth (17%) of the students cited both the challenges of communicating with the clients and being far away as problematic, while only 4% cited the difficulty of switching between the two roles (designers and clients) and working in teams as challenging. Only small number of the students (4%) indicated having difficulties with a novel way of participating in a design project and experiencing difficulties with a teamwork.

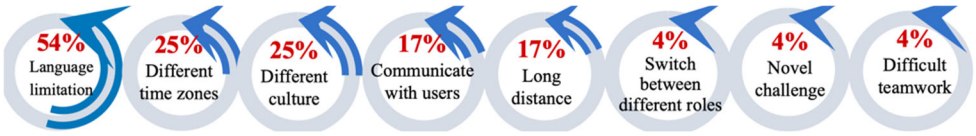

Figure 4. Challenge experience from the student's perspective（mid-stage）

Figure 5. Useful experience from the student's perspective（mid-stage）

However, as can be seen from Figure 5, the majority of the students (79%) indicated that the project provided them with the useful experience in cooperating with students from different countries. Nevertheless, only 33% of the students thought that the project was useful for them to understand the culture of different countries, and 29% indicated that participating in the project has helped them to improve their English ability, and only 8% of the students mention the importance of teamwork and design methods. The data indicate that the skills that students pay attention to in the design process of the project are basically consistent with the curriculum objectives, such as how to communicate effectively under different time differences and cultural backgrounds, and the importance of understanding different cultural backgrounds.

Schön mentioned that reflective practice is the key to successful learning for both teachers and learners [9]. Thus, in this project students were provided an opportunity to reflect on their own action capabilities through a learning and doing approach, this was meant to guide the students to better understand and reflect on the process of their own thinking development, and enhance the cultivation of critical thinking, problem-solving and decision-making abilities. Just as Dewey said "We do not learn from experience. We learn from reflecting on experience" [10]. Therefore, based on the research questions proposed in the paper, we divided students' own evaluation skills into three dimensions: (i) improving skills, (ii) acquire skills, and (iii) reflective skills. The collected students' written descriptions were clustered by keywords and then sorted by frequency from highest to lowest, as shown in Figure 6 (the value represents the frequency of key information mentioned by students).

Communication, English and teamwork skills have been mentioned many times as the skills that students think they have improved. In the process of cultivating students' soft design skills, students can basically master the ability to select and evaluate working platforms that can effectively promote team communication. The most students (96%) indicated that using an online platform (zoom/email) can better promote a teamwork. A third of the students (33%) believe that effective communication has improved their oral English, and one-fifth (21%) of students believe that they have learned to use different communication platforms with different functions. Majority (75%) of students believe that sending email is a very effective way to communicate when working remotely.

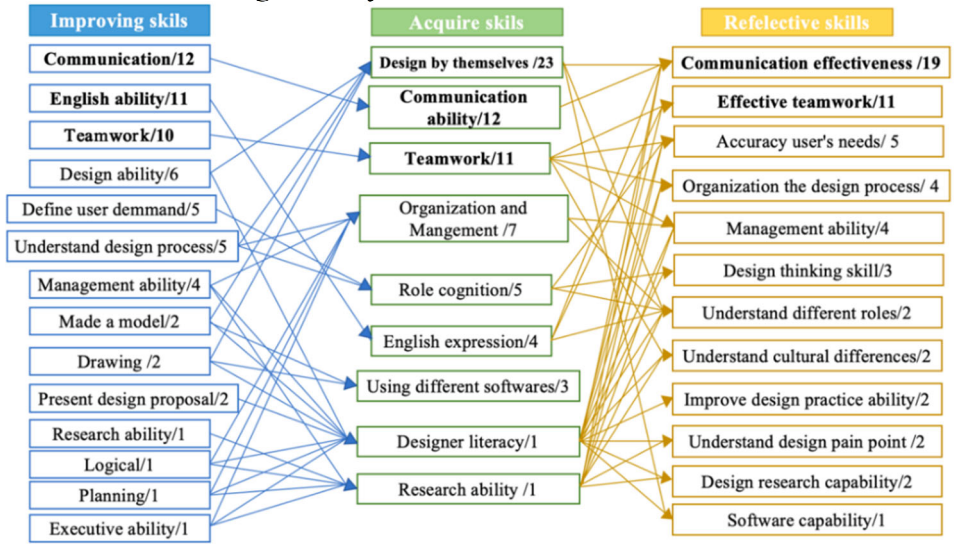

Figure 6. Student learning skills feedback

Most students think that the skills they have acquired are more reflected in the aspects of independent design, communication, teamwork, organisation and management, which is quite different from the traditional

teaching mode of design courses in which teachers focus on cultivating students' design skills. As shown in Figure 6, the arrows link similar keywords mentioned by students in three different skill categories, and it can be found that the skills students refer to they still need to focus on improving are "logic, planning, organisation, execution, and management." Among the skills that students have acquired, the corresponding and similar skills are "research ability, organisational and management ability, and design literacy". In the reflective skills, the arrows corresponding to these three abilities almost cover all the key words mentioned by the students. The high and low frequency values indicate that most students pay more attention to the efficiency of communication and teamwork and have little awareness of the logical relationships between things, planning and leadership.

Therefore, data indicate that the design quality that designers should possess should not only focus on learning technical design knowledge and skills, but it is also necessary to think about how to cover a variety of informal (soft) skills such as effective communication skills, management organisation skills, recognition of cultural cross-cutting, empathy to switch between different roles in the design process, which is like Rubbo mentioned that the goal of the global studio is to develop processes, knowledge and skills. Align what will enable future professionals to contribute to well-designed and well-planned equitable, sustainable and socially inclusive cities that support human development [11]. However, at the end of the project, survey data showed that most students found it a challenging experience to present the design proposal, communicate the design concept, review design progress, and complete the design brief (see Figure 7).

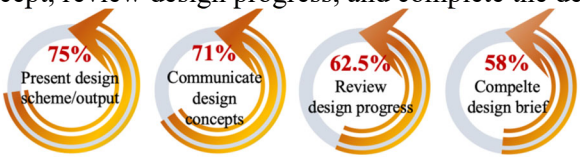

Figure 7. Challenge experience from the student's perspective（final stage）

The language difficulties and communication difficulties mentioned by students in the middle stage of the project (FIG.5) are the main reasons for the difficulties in the presentation and communication of design concepts in the final project. In addition, students believe that the course needs to provide more teachers' comments on design projects, teachers' guidance on the design process, and students' executive power in the team. Therefore, it further points out the importance of cultivating informal design skills to enhance students' personal ability.

4 DISCUSSIONS

According to the above survey data, the biggest challenge that students face in this course is more related to soft skills, such as: How to establish effective communication and efficient working environment in a team, and how to switch their roles and put forward accurate requirements when assuming different roles, are consistent with the course feedback of software engineering students in the global studio project proposed by Richardson [12]. This course requires professional knowledge and design skills, which students do not think is very difficult, but these skills are taught by teachers repeatedly under the standard course teaching mode. Therefore, students will feel that they do not know what to do when faced with the student-led course mode, and hope that teachers can provide effective guidance and suggestions in the design process. Because they have not really participated in design courses that require interaction with clients and designers in their undergraduate studies, students often find it very challenging to face complex design projects and adapt to new environments, even though they may find it a very novel and interesting design experience.

5 CONCLUSIONS

To sum up, we must rethink the skills that design talents in the 21st century need to possess. In the process of learning and teaching, what kind of design literacy and research ability should be cultivated? At the same time, it is worth our reflection that the abilities that design talents in the 21st century need to possess are not only the ability to ‘Learning by Doing’, but also the ability to cope with the cross-integration of global culture and organisations. ‘Managing by Leading’ is also the new design literacy and ability requirements put forward by designers. From the teaching and learning viewpoint, how to construct the teaching mode of

Chinese design courses that is in line with the cultivation of students' management, leadership and multi-faceted skills while learning is also the deeper consideration proposed in this paper.

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