Research article

รูปแบบพื้นที่ทำงานสร้างสรรค์ภายในสตูดิโอเรียนออกแบบ ของการกลับเข้าใช้งานพื้นที่หลังสถานการณ์แพร่ระบาด หลักสูตรการออกแบบภายใน มหาวิทยาลัยวลัยลักษณ์

Creative works areas in a Design Studio for the return to use of area after the pandemic situation, Case Study: Interior Design Program, Walailak University

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บทคัดย่อ

สตูดิโอสำหรับการเรียนออกแบบระดับอุดมศึกษาทั่วโลกที่ผ่านมาคล้ายคลึงกันในแง่ของการใช้งาน ทั้งกระบวนการเรียนการสอนและรูปแบบพื้นที่การใช้งาน รวมถึงเฟอร์นิเจอร์,อุปกรณ์สนับสนุน แต่การกลับมาใช้งานพื้นที่หลังการแพร่ระบาดเชื้อไวรัสโควิด 19 ลักษณะกายภาพของสตูดิโอยังตอบสนองพฤติกรรมและความต้องการของผู้ใช้งานอยู่หรือไม่ แนวทางการจัดพื้นที่เพื่อให้การทำงานสร้างสรรค์ที่มีประสิทธิภาพตามโจทย์ของชั้นเรียนจะมีลักษณะอย่างไร โดยการวิจัยนี้ศึกษาในบริบทการเรียนออกแบบระดับอุดมศึกษาของประเทศไทย จึงได้สำรวจพฤติกรรมและความต้องการใช้งานพื้นที่ ของนักเรียนออกแบบภายในและอาจารย์ผู้สอน ค้นพบว่าพฤติกรรมนั้นมี 2 รูปแบบสำคัญ คือ "พฤติกรรมที่เกี่ยวข้องกับการทำงานสร้างสรรค์" โดยตรง และ "พฤติกรรมที่ไม่เกี่ยวข้องกับการทำงานสร้างสรรค์" แต่เป็นพฤติกรรมการใช้งานที่มีความเชื่อมโยงกัน การศึกษาค้นพบว่าความต้องการใช้งานพื้นที่หลังการแพร่ระบาดไม่มีความแตกต่างกัน เนื่องจากรูปแบบ บวิธีการเรียนการสอนและพฤติกรรมผู้ใช้งานยังเหมือนเดิม แต่มีความต้องการที่ชัดเจนมากขึ้นในการสร้างสภาพแวดล้อมที่เหมาะสม เมื่อออกแบบพื้นที่ทำงานสร้างสรรค์ภายในสตูดิโอ ต้องคำนึงถึงเค้าโครงของพื้นที่ที่รองรับพฤติกรรมและความต้องการของผู้ใช้ ทั้งนักเรียนและครู ซึ่งอาจแตกต่างกันไปในแต่ละบริบทของสถาบันการศึกษาหรือหลักสูตรการเรียน

คำสำคัญ: รูปแบบพื้นที่ทำงานสร้างสรรค์ สตูดิโอเรียนออกแบบ การใช้งานพื้นที่

Abstract

The global higher education design studios in the past have been similar in terms of functionality, both the teaching process and the usage area format, including furniture or supporting equipment. The question is whether the physical appearance of the studio still meets the behavior and needs of users after

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returning on-site after the COVID-19 pandemic? How should the space arrangements for creative work or design projects be adequate according to the classroom problems? This research was conducted in the context of learning design at the higher education level in Thailand, and therefore the user behavior and requirements of interior design students and instructors were surveyed. The result showed that there were 2 essential patterns of behavior, namely "Creative work-related behaviors" and "non-creative work-related behaviors", which were related behaviors. The study found that before pandemic and post-pandemic spatial needs were not different, as teaching methods and user behaviors remained the same, but there was a clearer need to create suitable environments. When designing creative workspaces within studios, consideration must be given to the layout of the space that supports the behaviors and needs of users, both students and teachers, which may vary across different educational settings or curricula.

Keywords: Creative works Areas, Design studio, Use of area

1. Introduction

The design studio is a practical classroom that aims to support user behavior and activities in the teaching and learning process to achieve learning objectives of each curriculum. The design studio has been passed down in the design school for practicing practical skills through a variety of methods to communicate ideas to solve design problems (Dutton, 1987; Lukman & Nangkula, 2012). Problem-based learning (PBL) is recognized as effective for practice-based teaching. This is how design schools learn (Eilouti, B. 2007). This is because design is not just a one-stop action based on the concept of Uluoğlu (2000), but also requires multiple skills. Creative use of tools and knowledge to solve problems has been a challenge in the past for those studying design, including globalization and climate change. Increasing urbanization has transformed society, yet design studios have persisted in using the same methods over time. (Koch, 2002). Studio work behaviors arise from through teaching with a design project that has obstacles and problems according to the different problems of each individual or group. Open-ended questions facilitate judgment between students and teachers in design analysis and collaborative design. (Nazidizaji et al., 2014). The environment in a design studio is therefore seen as a collaborative space for presentations, reviews, and informal discussions (Lotz et al., 2015).

In the wake of the COVID-19 pandemic, education systems around the world must make decisions about how to conduct teaching with safety in mind so that they are in line with public health measures, which have been adjusted rapidly to handle on campus facilities, including design studio space (Hodges et al., 2020). The inappropriateness of learning design was consistent with previous studies. With a limited budget use of changing technology, the higher education institutions used online practice as the primary learning tool instead of hands-on practice (Tucker et al., 2013). Fleischmann (2019) found that the sense of classroom community is statistically lower compared to in-person design studios. As reported in the study by Nubani and Lee (2022), this change has far-reaching consequences, including studying design at the higher education level in Thailand. After the pandemic subsides, the return to on-site study reverted back

to the use of campus spaces as before. The purpose of this study is to explore physical and behavioral factors to identify the characteristics of creative workspaces within a bespoke design studio in the current post-pandemic.

At present, it was found that the design studio for the Interior Design Program of the School of Architecture and Design Building, Walailak University can support the number of users despite having large areas and all standard facilities, but the amount of learners' access to the operating classroom has decreased. After using the room, there are problems of disorganization. The room is unsafe and prone to accidents. This together with inconsistent user behavior and lack of clarity, makes the design studio is difficult to manage.

2. Objective of research

2.1 To explore the physical characteristics of the design studio of the Interior Design Program before the pandemic, Faculty of Architecture and Design, Walailak University.

2.2 Study the behavior and requirements of design studio. To discuss the results of requirement for the design studio areas for Interior Design Program after the pandemic situation.

3. Literature review

3.1 Effects of Education

Before the COVID-19 pandemic, many studies found that there were some barriers to studying architecture and design. The study focused only one-on-one tutoring as opposed to e-learning and online blended learning, and were not suitable for studio classes (Mohammed, 2017). Learning is irreplaceable because most designs are difficult to express entirely in words (Fleischmann, 2016). Working within a social, tangible, role-playing, and collaborative space fosters creativity in students (Vyas et al, 2012). Collaborative critique is linked to effective learning principles (Sawyer, 2012), which resulted in students scoring slightly higher with no statistical significance (George, 2018). Concerns arose as students were separated from their classmates. Instruction for on campus workplaces and facilities included creative tools (Nubani & Lee, 2022), all of which interacted and connected in many dimensions. A study by Figlio et al. (2010) found that students with low GPAs were more likely to experience problems with online learning than those with high GPAs. Referring to Nubani & Lee, (2022) the urgency of this change might affect the quality of learning amid this crisis and might reduce the effectiveness of the student learning experience (Ubell, 2016).

However, in this situation, efforts have been made to study previous research on the integration of on-site and online classes to effectively adapt teaching and learning to evolving technologies. Bender and Vredevogd (2006) stated that combining traditional studios with online technologies is a good alternative to enhance student learning. In the past decade, there has been an increase in online learning in many disciplines including architecture and design. Yu et al. (2021) found that students had a better learning experience in online courses. Due to its flexibility, according to Al Maani et al. (2021), highly flexible studios

of technology solutions offer lasting benefits. Factors that promote design learning were found by examining online studio experiences to develop teaching methods (Milovanovic et al., 2020; Megahed & Hassan, 2022).

3.2 Design studios

Schön (n.d., as cited in Kvan & Yunyan, 2005) concept states that learning styles within design studios start with ambiguous issues. This is a general aspect of education in the practical profession of designers. Being developed through a learning process called Reflection-in-action is an integral part of students' university life. In the design studio, students are given imaginary problems by the instructor. The aim is to present a suitable solution in terms of design. This allows students to learn through real work and develop their projects within the studio space (Oh et al., 2012). In this scenario, students practice two working skills simultaneously. The challenging experience is "to design and learning to design" (Karslı, 2015), to receive and to analyze the case study. Preparing a spatial design program including creating a 3D model under a similar working environment was an interaction between other students in the design studio. In addition, social science and education researchers have proven that classroom climate has a strong effect on various academic outcome variables. (Hill, 2008). A powerful tool for design educators as they seek to respond to changes is to create an educational environment that increases academic achievement. Therefore, it is important to support these learning processes effectively.

As recommended by Uluoğlu (2000), providing supportive facilities at students' houses may enhance students' experience and help design studies achieve more positive outcome as well as prevent unwanted professional practices in the future.

3.3 Design studios of School of Architecture & Design, Walailak University

This study scoped out a survey of one studio out of four existing studios in the building of the School of Architecture & Design, Walailak University, all of which are unique from other universities in Thailand. It is a large hall with a total area of approximately 1,125 SQ.M., runs parallel to the corridor opposite both lecture classrooms, has a height from floor to ceiling of 7 meters, and is open-air without internal partitions. From the management approach of the design course, there are a total of 117 students, divided into 4 grades, thus there are 5 main studios with usage space of 2 poles per 1 grade of students. Each studio has an internal area of 160 SQ.M. with 30-40 available seats (Figure 1).

Within it, there are allocated facilities for students to work on design work. The main piece of furniture for practical learning is a large foldable writing desk that students mainly use for work such as architectural drawing, model cutting, drawing, and painting, and a simple table for placing things or equipment used in design projects. A large conference table can accommodate 6-10 seats for meetings or discussions. There are shelves for placing materials and equipment used for making projects and model work from design as well as hard copy sources, such as design books material lists and product catalogs. Each studio is separated so that it is sufficient for students to use. Losse-furniture allows students to move furniture around in relation to their learning activities. This makes it possible to flexibly divide the space according to your own needs. Additionally, general support, such as power sockets, air conditioning fans, Internet Wi-Fi signals are available.
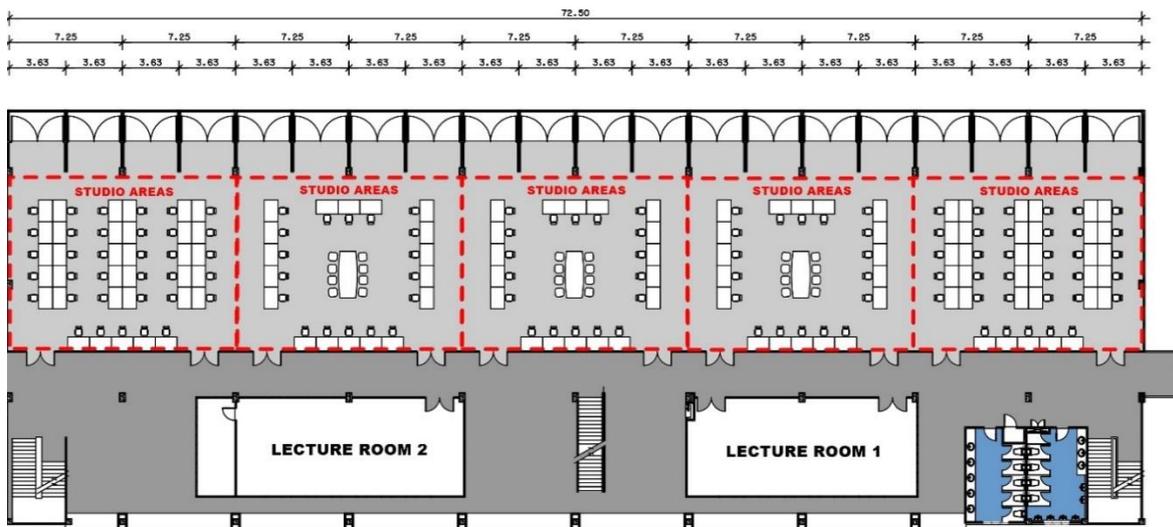
Figure 1 Studio floor plan of School of Architecture & Design, Walailak University.

4. Research methodology

4.1 Participants and Inclusion Criteria

This study was conducted from a sample group consisting of users of interior design labs. Located at the Architecture and Design Building, School of Architecture and Design, Walailak University. Teachers in interior design courses and students in interior design courses were included. This is a curriculum certified by the Architect Council of Thailand (ACT). The population is divided according to their behavior and purpose of using the studio space.

1) Instructors of interior design courses regardless of gender, having experience in teaching courses that utilize the interior design studio for more than 1 year. The reason for selecting this group is because during this period, the instructors will have taught their courses within the studio, therefore this sample group had direct experience in using the area in every activity that occurred.

2) Students of interior design courses regardless of gender with age from 18 years up, having experience in using a design studio classroom within 1 year or more. The reason for selecting this group is because within 1 year, these students will have studied subjects that used the studio space. Therefore, the sample group directly experienced and had a clear demand for use of the area.

4.2 Sample Size

This study exploited inclusion criteria and exclusion criteria for the sample. Several informants in each group were divided for obtaining preliminary data from interviews and further in-depth information using questionnaire developed from the data from the interviews. The interior design course had a population of 110 students and 8 teachers.

1) Selection of 110 interview groups consisting of interior design students. The number of first-year students: 32 people (29.09%), the number of second-year students: 39 people (35.45%), the number of third-year students: 20 people (18.18%), the number of fourth-year students: 26 people (23.64 %), and the

number of lecturers: 8 people (7.27%), with 100 interview participants, representing 90.91% of the population. All, of course, used this studio space.

2) Selection of the sample for the questionnaire. Specific (Purposive Sampling) of 68 people. Data were not collected for first-year students because this group of people still did not have enough understanding and planning skills. Collecting data from students with grade results in interior design with a space planning measure of 3.00 GPA or higher, the numbers are as follows. The number of second-year students: 26 people (66.67%), the number of third-year students: 16 people (80.00%), the number of fourth-year students: 18 people (69.23%), and number of lecturers: 8 people (100%).

4.3 Data Collection

The researcher conducted an on-site survey of the physical and functional characteristics that occurred within the design studio classroom using participatory observation after resuming the on-site interior design course within one semester by taking pictures and taking notes where the content of activities and learning procedure were similar to the pre-pandemic period. There may be slight differences related to public health protection measures.

4.3.1 Interview Data Collection

The demographic group interview process was to collect data on the general base area, and in terms of behavioral characteristics of the current design studio space usage to find the key points to develop the questionnaire of the sample. The interview period was set per person per time. The average interview time was 15-20 minutes, conducted at a time and place convenient for the interviewee. Audio and video were recorded during the interview. The researcher requested permission from the interviewee before starting the interview. The interview issues were divided into 3 parts as follows. Part 1: General information of the interviewees, Part 2: Characteristics of the use of the interior design laboratory space, and Part 3: The need for the use of the interior design laboratory space. After that, suitable and comprehensive questions were asked about the use of the area; the questions included usage requirements.

4.3.2 Questionnaire Data Collection

The questionnaire was developed from the topics raised in the interview and divided into three parts, using self-marking of the sample population. Firstly, part 1 is general background information and characteristics of the users of the studio space. Secondly, part 2 is an important issue in terms of spatial usability, including asking questions and usage requirements that are more closely related to a specific area. The format comprised 8 questions. Q1: Studio date range of entering, Q2: Studio time range of entering, Q3: Studio hours range of entering. Q4: Studio frequency range of entering, Q5.1: Creative work-related behavior, Q5.2: Non-creative work-related behavior, Q6.1: Area for creative work, Q6.2: Area for non-creative work. Each of the questions from Q5.1-Q6.2 consisted of a style of space usage according to the curriculum instruction in the course, in which the design studio was used, and the type of physical space that was used. Living in the present, including the need for space that was not currently in use, the open-ended questions in Part 3 provided suggestions or points of interest outside of this toolkit. Returned questionnaires were from 64 people (94.12%) from the entire sample population, categorized into the number of second-

year students: 24 people (92.31%), third-year students: 15 people (93.75%), fourth-year students: 17 people (94.44%), and the number of lecturers: 6 people (75.00%).

5. Results

5.1 Field Surveys and Interviews

From surveying and observing the space, the researcher found that there were two important issues in the use of design studio space: 1) usage patterns and problems of using studio space, which was related to physical characteristics, and zoning in use, and 2) studio area requirements, which were set pre-pandemic and, in addition to what was currently available in the area, in line with the increased use of online technology.

5.1.1 Usage Patterns and Problems of Using Studio Space

1) *The physical:* appearance of the current design studio in the area looked similar to the pre-pandemic period. Students were able to arrange their own studio space as appropriate. Students' writing desks were arranged in large groups, separated by class-year, and slightly spaced out taking 2 pillar-span, approximately 160 sq.m.; the area being able to contain 40 large writing desks (Figure 2). Therefore, for the first year with a small number of students, the distance between the desk was small, and in some cases there were unused tables left. Students could get one fixed desk and place another one next to each other to make a space to put materials and equipment to work creatively according to the assignments in the course. The equipment storage area in each class was a large metal shelf. There were two studios, where students kept their works. The storage was also used to store stationery supplies for students. There was also a center table that were able to accommodate 6-10 seats at the same time. This table served as a center for discussion between students, group work, and teachers giving comments for design projects and assessing assignments.

2) *The users' behavior:* in terms of teachers' behavior, there were key activities happening in a class including course introduction, project consultation during students' work process, and project discussion for developing design projects. For student's behavior, there were more details happening during the use of space. Creative works, painting, drawing, sculpture, or 3D mass models for design projects involved studying information, designing, and practicing presentations. Statistics on the use of electronic devices, computers, and technology that supported creative design work exhibited an increasing trend since before the COVID-19 pandemic. Some students installed their desktop computers on their desk for long-term use because other courses outside the curriculum were also taught through online lectures. At the same time, practical courses have returned to using the actual area as usual. It was also found that nowadays students required more space to create more interactions with other students with the behavior of talking in groups, playing music, and exchanging experiences of living in higher education.

Figure 2 Studio floor plan of School of Architecture & Design, Walailak University.

5.1.2 Studio Area Requirements

1) *Working functional areas* was the most demanding area from the survey. It was the area that supported the primary work process. Students spent most of their time in this space creating works or completing tasks assigned by the instructor. This area currently met their needs well and was called the "Working area". Students had an area for working by their behaviour by having a writing desk arranged in parallel rows within a walking distance of approximately 1.5 meters. In this area, students wore protective masks and followed public health measures. But in terms of behaviour and intimacy when working together, it was close to before the outbreak. The students argued that face-to-face collaboration was more effective in an online environment during quarantine.

There was also a lack of an "Equipment Storage Area" because there would be specific equipment needed for practicing professional skills in the design students' working process. The equipment normally had a particular form of use and size compared to general stationery. However, the area was unable to support its use well because the storage space was not physically suitable, as was the case with "finished work storage" such as works of art, models, and models, which served as examples for other classes to share ideas or work processes between students so that studying became more effective. Writing desks that exceeded the number of users were lined up to replace insufficient shelves (Figure 3.). Work was different from the quarantine period. Students had to return to do more accurate work than before the pandemic. This area was unused and teaching online had relocated to another location.

Figure 3 Studio use area organized by students.

2) *Other functional areas* supported or promoted the studio's work to increase the potential according to users' needs. Although not directly related to the work process, there were significant behavioral and psychological effects. Many students want to share a "rest area" to relax during work because they could do better with informal face-to-face conversations besides work. Having appropriate breaks was also important. Physical and mental fatigue that lasted for several minutes might cause the potential for creative work to decrease significantly, and there was a demand for a "Dining Area" because students wanted to eat together during breaks. They were worried they might have to go to a restaurant with more strangers. Students were more comfortable with students in the course who spent more than a day in the studio together. "Activity Space" was for playing music and other creative activities besides the assigned creative work. This allowed them to use various ideas and practice different skills that would support their work. Students also did not want to travel out of the studio space too often, in addition to going back to bed at bedtime or handling personal errands from time to time.

5.2 Questionnaire Result

5.2.1 General Behavior in Studio

Data on the behaviour and general usage of students' design studio space were related to the frequency of use as each year had different course content and assignments. But instead, The trend of using the studio space exhibited an increase after coming back on-site. The primary behaviour data regarding the usage can be divided into four groups according to the indicators.

1) *The studio date range of entering* by weekend usage alone was at 7.1 %, which was a minority of students. Most of these groups already had ample work-at-home or dormitory equipment and did not want to travel between their residence and university due to outbreak concerns. 49.2% of students used the regular weekday schedule. Most of these groups return home on holidays. Most of the time, the studio space was used every day of the week because most students lived in dormitories and did not have enough work equipment, especially at the drawing desk, where assignments needed to be worked together with

classmates. Students wanted to talk and exchange when there were doubts or obstacles at work, and they felt comfortable when there was mutual assistance in the work process (Figure 4).
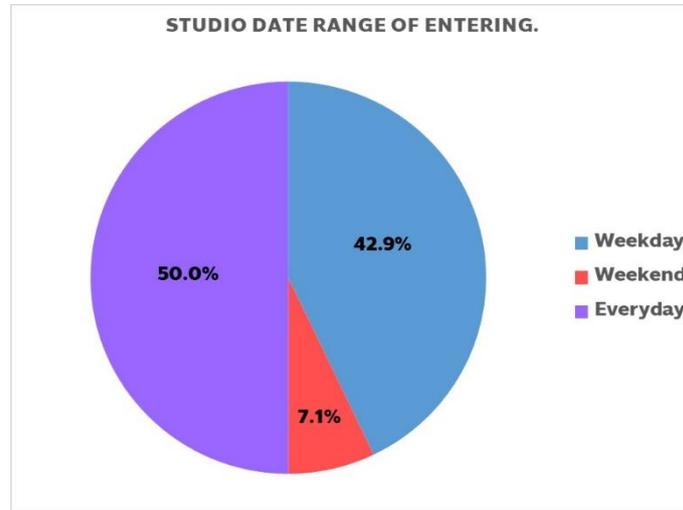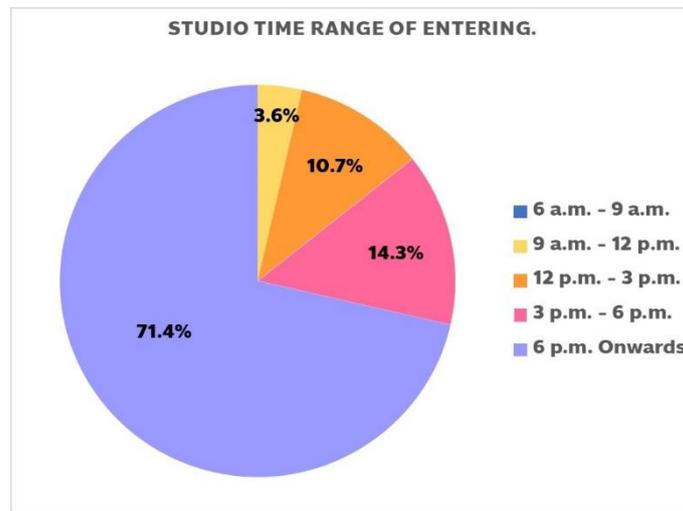
STUDIO DATE RANGE OF ENTERING.

42.9% Weekday
7.1% Weekend
50.0% Everyday

Figure 4 The studio date range of entering.

STUDIO TIME RANGE OF ENTERING.

3.6%
10.7%
14.3%
71.4%

- 6 a.m. – 9 a.m.
- 9 a.m. – 12 p.m.
- 12 p.m. – 3 p.m.
- 3 p.m. – 6 p.m.
- 6 p.m. Onwards

Figure 5 Studio time range of entering.

2) *Studio time range of entering;* most of the respondents, 71.4%, entered the studio space from 6 p.m. onwards, as the design project process was usually completed after a day. Most of the day, they spent hours lecturing professional and technical skills and general education subjects according to the study plan. They also argued that during this time, the quiet atmosphere made it possible to have optimal concentration on work. The period when no visitors used the studio was from 6 a.m. - 9 a.m., the time when the practice class had yet to start. Most of the morning part of the timetable was reserved for lectures. After noon, there was a significant increase in studio space usage, respectively, from 10.7% to 14.3%. Its

use in the morning, when combined with the afternoon, was significantly less than in the evening (Figure 5).
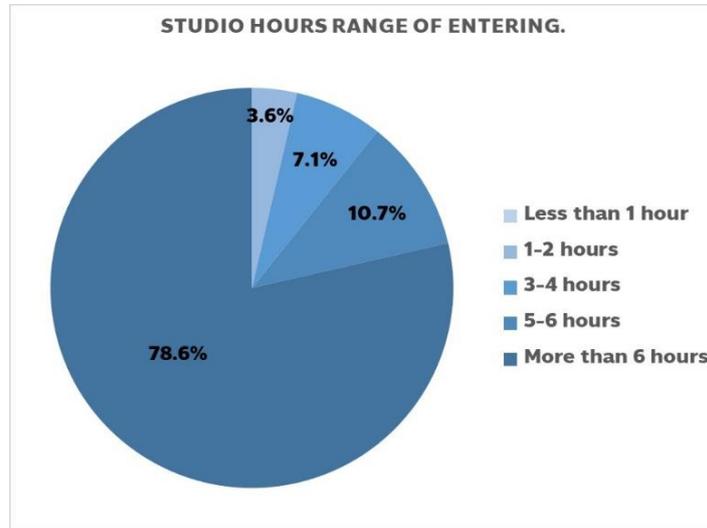

Figure 6 Studio Hours range of entering.

3) *The studio hours range of entering;* The studio hours are not short and are in line with the design process, with a detailed information search process, program analysis leading to design, which is used 78.6% of the day. The subjects spent at most 6 hours or more in the studio doing creative, work-related, and other non-productive activities. 10.7% spent 5-6 hours of use in the area, which was not much different in length. At least, there was a need to use the studio for 1-2 hours or more (Figure 6), even if the activity was unrelated to studying whether just for a break or a meeting between students.
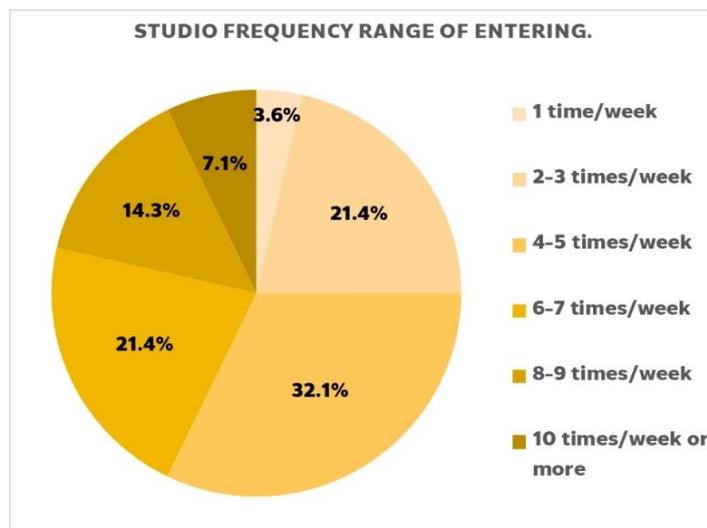

Figure 7 The studio frequency range of entering.

4) *Studio frequency range of entering*; According to the data, it was found that the average number of sessions per week was 2-7 times/week, and 32.1% of the sample group used the space 4-5 times/week at most, which was worth noticing as the numbers of visits were similar. The sample group was students in the second year and above, who had more practice sessions than the first-year students, with 10 times or more of usage. Another observation was the final year sample group that had undertaken a large design project. This, surprisingly, was the group that used the studio space the least because there is enough support equipment for working at home or in the dormitory (Figure 7).

5.2.3 Specific Behavior in Studio

Learning design is different from learning general lecture content. Because it requires practice and the creation of work using creativity. The teaching and learning processes, activities and usage behaviors are therefore unique and different. From this study, it was found that behaviour patterns could be divided into two main groups: 1) Creative Work-Related Behavior. Most of them work according to the course's study content. It consisted of 11 different types of work. 2) Non-creative work-related behavior. Most of them were for students, including faculty members, to relax and exchange experiences. The demand for this area tended to increase after the resuming of everyday school management.
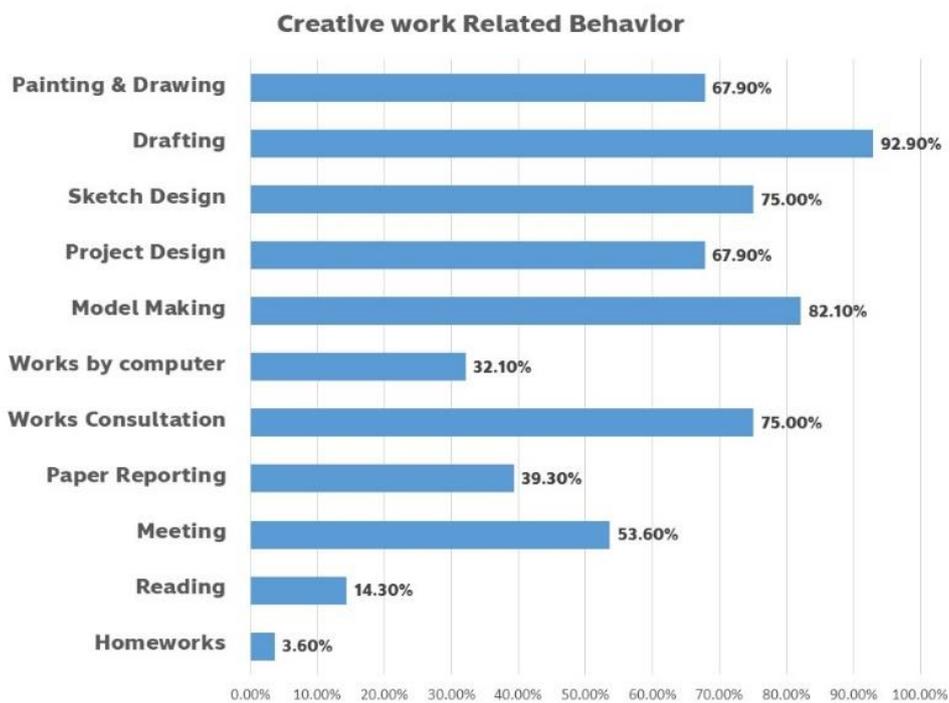

Figure 8 Creative Work-Related Behavior.

1) *Creative Work-Related Behavior*. Data from the sample group comprised 11 topics covering work patterns in all subjects with professional practice skills training. Creative use and work processes that led to students' future work and the most common behaviour in studios (92.9 %) was "Drafting". As most of the

furniture was already a fully functional drawing table, drawing was the basis of every design project, followed by the "Model making" area for creating mockups (82.1 %). This was an essential component of every design project and allowed students to see an overview of the designs they created. This also included developing other types of 3D pieces, such as sculpture and interior space models. It was worth noting that even in today's era, when students used technology and application support programs to help them design and create creative work, only 32.1% accounted for the behaviour of computer usage in this studio space. This may include security reasons, as the studio was always open. The least common behaviors were reading books and doing homework, which were at only 14.3% and 3.6% (Figure 8).
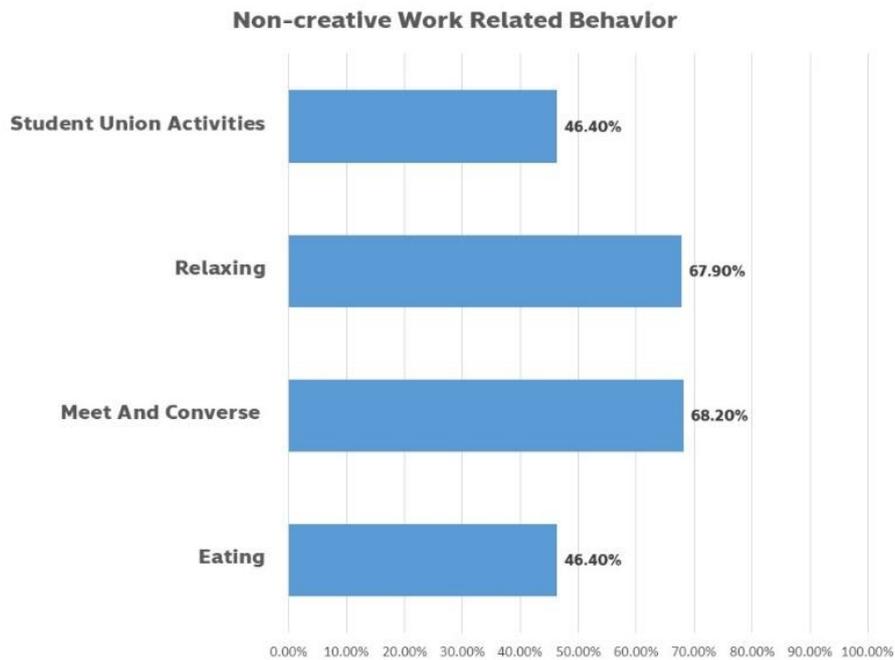

Figure 9 Non-Creative Work-Related Behavior.

2) *Non-Creative Work-Related Behavior.* Only four main behaviors together, 67.9% at most, were "Relaxing", and always occurred during long working hours. It was linked to the previous studio hours range of entering information that most students spent 5-6 hours or more in the studio. The respondents said their subsequent behaviour was "Meet and Converse," a necessary process that helped them work more efficiently. Of the discussions and knowledge exchanges with others, at least 46.4% involved dining and student union-related activities (Figure 9).
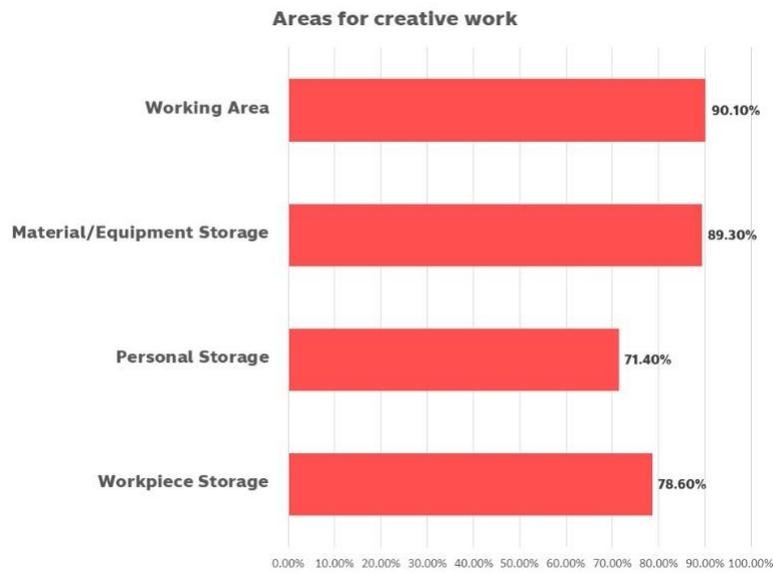
Figure 10 Area for creative work.

3) *The area for creative work* currently in use, and most in demand was the "Working Area" (90.1 %), which was the primary purpose of the studio space. The "Material/Equipment Storage" area (89.3 %) was the storage space for materials used in design projects. Currently, this area was not very responsive. Interestingly, the sample group showed less preference for "Personal Storage" (71.4%) than "Workpiece Storage" (78.6%), demonstrating the importance of collecting students' completed work. The reason was that these pieces not only helped them utilize these as case studies to develop their skills further but also had sentimental value. As for "Material/Equipment Storage", this type of storage was not yet sufficiently functional to meet the needs (Figure 10).
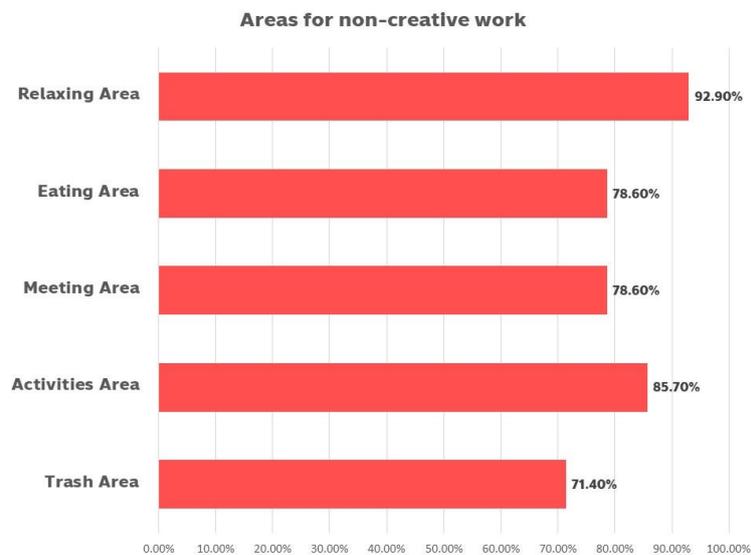

Figure 11 Area for non-creative work.

4) *Area for non-creative work*. The demand for space in this issue is also consistent with non-work-related behavioral data. Figure 12 shows that the "relaxing area" was the most desired at 92.9%, followed by the "Activities Area", where the sample group needs space to use for social interactions between themselves, including organizing activities that will support the efficiency of creative work in the studio, followed by "Eating Area" and "Meeting Area", which are 78.6%, with the reason that studios currently do not have enough space to support the use.

6. Discussion

This study revealed that the COVID-19 outbreak has resulted in the need for online teaching and learning of architecture and design. Both students and faculty experienced sudden adaptation (Al Maani et al., 2021) which may result from social isolation (Nubani & Lee, 2022). Studio environments are, therefore, still viewed as co-working space by students. Users want to engage socially with peers or interact with faculty, essential for learning design (Lotz et al., 2015). Students can efficiently research on the job or exchange with faculty remotely while sitting with their peers in the design studio. The demand for space usage can be divided into two important forms.

1) *Area for Creative work within the studio*. Physical space management design is essentially in line with Uluoğlu (2000), which mentions that course content-based activities are constantly being updated. Therefore, the studio space must accommodate a variety of working styles. Not only drawing or painting, there should be a "Model Making Area" for creating interior mass models, building models, or sculpture-like works because it is an important part that allows students to see the overall picture of the project design more clearly. There should also be a "Meeting Area" for exchanging information or working experience of each project because the project design consists of several steps from the beginning of receiving the problem from the teacher (Afacan, 2012), including data research and analysis, design programming, preparation, and presentation. These processes are shared between students. Each design project becomes more efficient and diverse. An area to support the application of digital technology in learning and practice to develop an environment that is more suitable for creative work is also needed.

2) *Support area* within the studio regarding behaviour and needs in addition to work, teaching, and learning in normal subjects. There is still a demand for other formats. The study found that demand for "Meet and Converse" was similar to "Relaxing," as users sought an atmosphere of physical interaction long lost during quarantine. This gives a feeling of relief from stress from work. A sense of community in an interior design learning environment is essential for enhancing learning motivation (Nubani & Lee, 2022), which stimulates creativity. In terms of space, there is a need for space for joint activities. The sample group reasoned that the activity was practical and impacted creativity. This is what is completely missing in online learning. Moreover, from the quarantine situation, students know that their potential for creative work has decreased significantly.

7. Conclusions and recommendations

In summary, creative workspaces within design studios worldwide have had similar usage patterns and behaviors as they share the same approach to teaching and learning, which is to practice and use creativity. After resuming everyday use of the drying area, the study found little change compared to before the COVID-19 pandemic. However, the feelings of users were highly aware of the interaction. According to Hill (2008), understanding the atmosphere within a design studio space is essential for design students. The study found a more apparent need to create the right environment. When designing a creative workspace within a studio, it is essential to consider the space layout that accommodates the behaviors and needs of users, both students and teachers. This may differ from institution-to-institution behaviors that can be divided into two types: "Creative-related Behavior", which is often related to work during study, and "non-creative-related Behavior", which is not directly related to design-learning but is an important part. This supports the creative work of students to significantly have more potential. Therefore, it has resulted in the creation of a space that accommodates these two needs: the "Area for creative work" which is the main area within the studio that serves to support work, experiments, and practicing professional skills, and the "Area for non-creative work" which is a space that encourages interaction. Exchange of information between students includes becoming a space to discover ideas and design ideas from activities that are more relaxing than work.

It must also be considered that technology has dramatically changed how learning is done in higher education, with Bender & Vredevogd (2006) finding that physical studios are ideal for collaborative learning. Moreover, online studios are great for lectures. Teachers may have to understand the hybrid studio between face-to-face and online systems in the future as students can quickly adapt to digital technology (Nubani & Lee, 2022). However, this research is a single university survey and data collection compared to existing theory. Other research can also be collected and compared to make observations or essential issues related to the studio space layout, which can be expanded to develop a wide range of knowledge.

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