Effects of the Wall-Faced Seating Arrangement Strategy on the Behavioural Patterns of the Students in the Architecture Thesis Design Studio

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Abstract

The results of the exercise on the Wall-Faced seating arrangement in an architecture thesis design studio reveal the positive effects on the progress, concentration, and design of the students. The seating arrangement encouraged the students for more design products and development through increase the sense of competition. The seating arrangement changed the concentration of the students from the central part of the studio as a location for social interaction toward the drawing board as the learning target of the studio with more concentration on the drawing boards. The seating arrangement changes the concentration from the people in the studio as subject to the drawing board and design development as the object. In the new seating from the level of the collaboration between the students enhanced and the students communicated consistency to enhance the level of the design project in the studio. The research findings reveal that the students present five behavioural patterns in the design studio in the seating arrangement including collaborative, individual, separated, isolated, and disruptive. The level of collaboration, sharing of design ideas, and design development in collaborative behaviour are sufficient and effective although the level fades out in the other behavioural patterns.

Keywords: Architecture Design Studio, Behavioural Patterns, Wall-Faced Position, Seating Arrangement, Students

INTRODUCTION

Studies on the seating arrangement demonstrate a wide range of effects on the learning outcomes (Kaya & Burgess, 2007; Bicard et al., 2012), performance (Marx, Fuhrer, & Hartig, 2000; Kaya & Burgess, 2007; Yang, Becerik-Gerber, & Mino, 2013; Xi et al., 2017), and personality (Haghighi & Jusan, 2012; Hemyari, et al., 2013). Particularly, the studies highlight the circular form of the seating arrangement as one of the effective forms to encourage social interaction (Haghighi & Jusan, 2012; Van den Berg & Cillessen, 2015), collaboration (Kregenow, Rogers, & Price, 2011), and the communication (Fernandes, Huang, & Rinaldo, 2011). In fact, this form also called half-circular, face-to-face, seminar, horseshoe, and U-shaped seating arrangement (Moreno, 2010; Chinn, 2011), which concentrated directly on the central part (Tanner, 2009). This form in the studio design creates a free space that could apply to the physical model making, store materials, and other common activities. Perhaps, for this reason, the students applied this seating arrangement spontaneously in the studio.

Furthermore, the studies highlighted that the seating arrangement influences both the level of the lesson learning and the improvement of the behavioural pattern of the students. For example, studies reported positive aspects of the U-shaped seating arrangement on social interactions and collaboration (Haghighi & Jusan, 2012; Van den Berg & Cillessen, 2015). However, other studies demonstrate some

off-tasks behaviours in U-shaped in terms of disruptive behaviours (Fernandes, Huang, & Rinaldo, 2011; Simmons et al., 2015), which negatively affected the students' collaboration and learning outcomes. Although a wide range of studies take the place on the effects of the circular seating position on the learning outcomes of students such as the advantage (Wannarka & Ruhl, 2008; Simmons et al., 2015) and disadvantage (Wasnock, 2010; Yang, Becerik-Gerber, & Mino, 2013), there are a few studies took the place in the design studios.

The seating arrangement and position of students in design studios is one of the key factors to form the educational environment in an architecture design studio. Students change the seating arrangement to array based on their personal interests, friendship, and the facilities in the design studio. Despite the instructors, departments, and studios dictate the form of seating arrangement based on the form, size, furniture, the students normally are free to arrange the form of the seating arrangement in a studio. The students are also permitted to select the location, position to sit, arrange, and adapt to the location with their tasks. Commonly, the thesis students arrange the seating and drawing tables in a horseshoe or U-shaped form, close to the walls toward the central part of the studio (Row 1-3 Table 1). The thesis studio is encompassed the senior students those passed classes and studios to arrive in the final year, which are supposed to personalize their learning process achievements through their own individual experience (Williams & Robert, 1997). In fact, the architectural students interested in personalising the location based on their experience, which is observed that some locations, areas, or positions are more crowded by the students (Moreno, 2010; Tafahomi, 2020).

It is common to observe that the students pay more attention to their own drawing boards on the walls of the studio when they are in the presentation position. The students pinned posters and drawing boards up on the walls of the studio for the discussion, comments, critics, and evaluation in each semester, which calls in terms of mock and CAT (continuous assessment test) presentations. Thus, the students focus on the drawing boards to improve the quality of the drawing and productions in this position.

The research questions are arranged as 1) How changing the direction of the seating arrangement from the central part of the studio toward the drawing boards could support the learning process of the students? 2) How does the form of seating arrangement affect the products? 3) How do the students behave in the new form of the seating arrangement? In this regard, it is assumed that arrangement of the students' seating position toward the walls of the studio in terms of a fixed drawing board could enhance the level of concentration of the students on the architectural thesis project. In other words, this research targets to evaluate the association between the wall-faced seating arrangement and the level of collaboration between the students in the architecture thesis studio. This research follows the exercise to discover the effects of the seating arrangement on the thesis progress in the final year study in the architecture program.

THE SEATING ARRANGEMENT DISCOURSE

The study discussed the seating arrangement in terms of the effective factors on the learning process (Cinar, 2010) with a wide range of variety and specifications. For example, Chinn categorized the seating arrangement as the physical design of the classroom with four patterns including traditional row, groups, pairs, and U-shaped (Chinn, 2011). Moreno redrew this classification in the four categories named offset, auditorium, seminar, and face-to-face arrangements (Moreno, 2010), and then Santrock developed in more detailed graphical example for each arrangement (Santrock, 2011). Another classification aimed to discover the relationship between the seating arrangement and the environment of the classroom (Dunn & Dunn, 1979; Barrett & Zhang, 2013; Cheryan et al., 2014), physical elements in classrooms (Doctoroff, 2001; Kaya & Burgess, 2007; Bicard et al., 2012), and effects on the behavioural patterns (Tanner, 2009; Vander Schee, 2011; Burke & Sass, 2013; Kregenow, Rogers, & Price, 2011). The studies revealed that the seating arrangement gradually has evaluated from the row-column to the joined, grouped, and circular form with the purpose to change the education paradigm from the lecturer-oriented to the student-oriented (Gremmen et al., 2016).

The U-shaped form of the seating arrangement was presented as an effective form with results in more asking question (Marx, Fuhrer, & Hartig, 2000), effective on the learning process (Wannarka & Ruhl, 2008), more interaction between the students (Fernandes, Huang, & Rinaldo, 2011), and

increasing the relationships (Van den Berg & Cillessen, 2015). In addition, studies discovered that this seating form creates a better view for students and instructor (Vander Schee, 2011), a free space for activities and interaction (Eugene & Melaine, 2013), direct eyes contact (Simmons et al., 2015), and an adapted form with the student-oriented learning objectives (Gremmen et al., 2016).

Furthermore, the psychological reactions of the students in the classroom took into consideration as one of the effective factors in education (Lee, 2005; Tafahomi, 2020). The studies highlighted three themes in this category including the personality of the students (Kaya & Burgess, 2007; Hemyari, et al., 2013), cultural background (Haghighi & Jusan, 2012), and the interface between the physical aspects of the classroom and the students (Dunn & Dunn, 1979; Cheryan et al., 2014). For example, the report about the disruptive behaviours in schools exposed bullying, intimidation, and incivility in the USA (Salkind, 2008) as three common misbehaviours. However, the on-off tasks behaviours of the students were represented by competition in higher education (Wannarka & Ruhl, 2008; Burke & Sass, 2013).

In the opposite point of view, studies criticized some problems with the U-shaped seating arrangement. For example, the size of the classroom in the U-shaped and seminar form limited due to the number of participants in the classroom (Hilal, 2014). In addition, this form resulted in an empty space in the central part, which encouraged disruptive and distractive behaviours (Wasnock, 2010). Moreover, the critiques on the higher education specification argued that the building and the environment of the universities designed with the old fashion style of design, which less included the new generation of the educations (Fry, Ketteridge, & Marshall, 2009). Seemingly, in this perspective, not only the seating arrangement is an outdated concept for discussion (Xi et al., 2017), but also buildings and rooms no longer are effective elements in higher education (Yang, Becerik-Gerber, & Mino, 2013).

Nevertheless, some of the researchers took into consideration the seating arrangement with a scepticism lens to discover any connection of the seating arrangement with the learning process of the students. For example, the result of the studies showed less evidence of any relationship between the seating arrangement and the performance of the students (Kalinowski & Taper, 2007; Armstrong & Chang, 2007), particularly in higher education (Perkins & Wieman, 2005). In this perspective, higher education is a personalized practice to accumulate knowledge (Kolb & Kolb, 2005) and learning happens through personal experience (Woolfolk, 2016), therefore higher education is more affected by the students (Lippman, 2010).

In summary, the U-Shaped seating arrangement is recommended for the face-to-face activities in a student-oriented approach to learning. This form of seating arrangement includes some positive aspects of the behavioural patterns for the students such as social interaction, increasing the relationship, and active learning process. Nevertheless, there is less evidence on the opposite seating arrangement in a U-shaped form, which the students should sit wall-faced to the central part of the studio. This blank point of the study perhaps is encountered with some limitations; however, other aspects of the studies could lead the research for an exercise to discover the results.

METHODS AND MATERIALS

Methodology

Most parts of the research about the students' seating arrangement took the place in the qualitative methods to discover the quality of behaviours of users in the context such as questionnaire, observation, and photography to carry out topics (Zomorodian, et al., 2012; Harvey & Kenyon, 2013; Eugene & Melaine, 2013; Simmons et al., 2015; Gremmen et al., 2016; Tafahomi, 2020). The studies recommended qualitative methods to involve in deep research (Groat & Wang, 2002; Ezzy, 2002; Silverman, 2004; Silverman, 2010). For example, the open-ended questionnaire was applied to discover the point of view of the students about the educational system, the personality, and the feeling (Xi et al., 2017; Harvey & Kenyon, 2013; Tafahomi, 2020). The structured observation was also applied to find out the physical and behavioural quality in the built environment (Tafahomi & Nadi, 2020; Groat & Wang, 2002; Simmons et al., 2015; Wannarka & Ruhl, 2008). The photography also in some cases

worked as an alternative for the documentation of the behavioural patterns (Zomorodian, et al., 2012; Tafahomi & Nadi, 2020; Tafahomi, 2020). The graphical techniques such as sketching and diagramming were applied to draw the sensitive environment for research as an unobtrusive technique (Bonnes & Bonaiuto, 2002; Regis, 2003; Regis, 2003; Tafahomi & Nadi, 2020; Tafahomi, 2021).

Research Design

The research applied an open-ended questionnaire, structured observation, and sketching and diagramming techniques to discover the behavioural patterns of the students and educational effects. The questionnaire was designed with both text and graphical questions to ask questions about the effects of the seating arrangement and position in the design studio. The questions targeted data about the level of the collaboration, the personal feeling about the exposure of the drawing work to the classmates, and the effects of the seating arrangement on the collaboration and communication. The students were free to respond or not. To evaluate the level of the reliability of the questionnaire, the content of the questionnaire was checked with a small group of the students to discover the precision of the questions, and then it was tested with a small group of the academic staff to find out the possible recommendation for to improve the questions. The relevant suggestions were applied to the structure of the questionnaire. The observation technique targeted some activities such as collaboration, discussion, and production of the students in the official times of the studio. The observation took the place on the studio times including systematically three times per weeks in the semester. The students were aware of the observation technique in the semester and they did all activities in the common areas of the design studio. It was supposed that the students took the position close to the wall to use the walls for the pin-up, drawing, and presentation. They were free to choose both the seating location in the different parts of the studio and taking the position close to other students as group, peer, or individual in the studio.

Research Process

The research started from the first session of the design studio. The research explained different style of seating arrangement for the students and increased intentionally the level of awareness of the students about the seating arrangement. The researcher asked the students to arrange the seating position toward the drawing boards and walls with a backward direction to the central part of the studio. Despite the some of the students explained uncomfortably in the seating arrangement, they agreed to follow the research process and explain their observation and feeling at the end of the exercise in the questionnaire. It was asked also to pin up all drawing on the wall and expose the design outputs to everyone for observation, comment, and recommendations.

The researcher observed, monitored, and tracked important activities of the students in the sessions of the studio such as changing the position, location, joining to or splitting from groups, collaboration, competition, and supporting activities in the studio. The research applied note-taking, photographs, and sketching to record the key activities of the students in the seating arrangement as data. Data analysed through graphical presentation and explanation of the relationship between data through redrawing the photographs with sketching and diagram to represent the behavioural patterns.

Data Specification

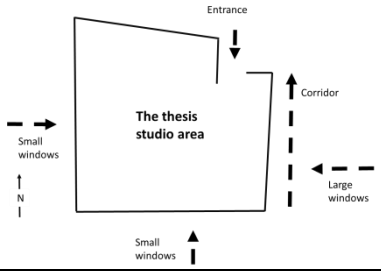
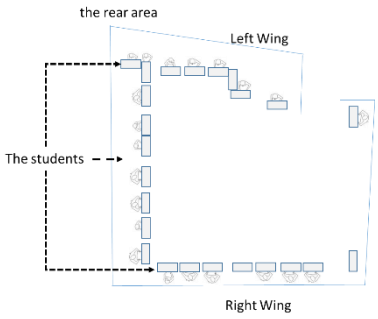
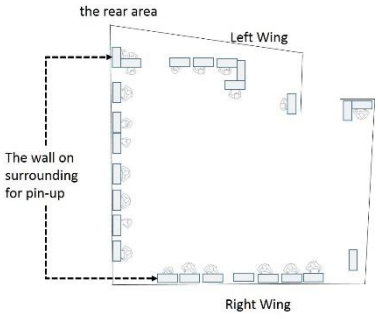
Source of data was provided from 22 thesis students in the final year of the undergraduate architecture program, who participated in the architecture thesis project in the design studio. Data of the research combined from three clusters of information. First, the answers of the students to the open-ended questions in the questionnaire that in the analysis part the relationships were revealed. The data in relation to the research mainly focused on the effects on the design products, progress, and general atmosphere of the studio. Second, the structured observation data was collected based on the specific behavioural patterns of the students and converted data to graphical diagrams to represent the physical relations between the students, drawing boards, and the environment of the design studio. Third, explanation of the observation and diagram revealed the activities in the studio. Despite the researcher photographed some of the activities, the photographs did not present in the research due to the ethical

issues with the human activities and were represented through graphical diagrams and sketches.

Time and Location

The time of the research was in the first semester of the academic year 2019-2020. The time of the students included Monday and Wednesday afternoon, and Friday morning for 12 weeks. The location of the research took the place on the second floor of the department of architecture in where all studios took the position as Table one. The architectural thesis studio located at the northeast part of the floor (1-1 Table 1) with the rectangular shape as the plan of the studio (1-2 Table 1), the normal seating arrangement of the students in a U-Shaped form (1-3 Table 1), and the proposed positions for the students in the studio (1-4 Table 1).

Table 1. The Location of the Architecture Studio and Seating Arrangement of the Students in the Studio

No	Titles	Diagram	Explanation
1-1	First floor plan of the school of the Architecture and Built Environment		The direction of the building oriented east to west and the thesis studio takes the place in the southwest part of the building.
1-2	Plan Design Studio		The studio is semi-rectangle with some openness in the south and west part on the walls as windows.
1-3	The Normal U-Shaped seating arrangement in the design studio		The students took the place in the adjacent area close to the wall with the direction toward the central part of the studio due to the facilities on the wall such as internet connection and the electrical sockets.
1-4	The proposed form for the Seating Arrangement of the students in the thesis design project		The students took the place on the south, north, and west part with facing the designed boards on the walls to work and focus on the drawing and materials. The central part is open space for the other activities such as group discussion, table of model making, and instructors.

RESULTS

The results included two data including the answers of the students to the questionnaire and the report of the observations based on the interpretation of the behaviours.

Answers of the Students to the Questionnaire

Effects on the Progress

Data in the questionnaire revealed that the students strongly believed that wall-faced seating arrangement was so effective on three factors including the product, progress, and time management. The students expressed such as 'productive, research-oriented', 'ability to think deeply about your production', 'it boosted my production', 'helped exactly what you need to do', and 'converted the idea directly on the board'. The students highlighted some aspects such as 'so communicative with the drawing board', 'a lot of comments and critics received from others', and 'sufficient communication with the board', 'It was wonderful; I saw something in the board, which I never saw in the screen of my laptop', 'seeing your works give you a new idea to correct it', and 'new idea coming when you see your project'. The students stressed the plan for progress with some sentences such as 'so effective to see your progress', 'to fulfil the task', 'it was similar to the target boards to show what you want to achieve', 'helped to follow your board', 'it was similar to everyday plan to remind you what to do', 'communication with less distracting', and 'think deeply about your production'.

Concentration on the Design Project

The students also satisfied with the level of concentration on their work in this seating arrangement. They expressed this concentration on the board of the productions with some sentences such as 'high level of the concentration', 'focusing on the production', 'reduce the disruptive activities', 'I was always thinking about my productions', and 'dialogue with the boards without distracting'. Just one of the students mentioned 'no concentration' as a negative point of view in the research.

The Students' Feeling

The students were less comfortable with the seating arrangement due to the low level of privacy. Half of the students mentioned that the level of privacy was low and everyone could see what going on the screen of laptops. One of the students expressed that he always was 'curious to see what going on behinds in the studio' in the open space, which the students passed, stopped, watched, and talked. However, another half mentioned that they faced no problem with less privacy. Importantly, one of them exposed that 'the level of the exposure made a full concentration on the production due to the competition sense'.

Moreover, the students also listed some negative aspects of the drawing boards on walls and the backward seating position such as 'drawing on the wall was difficult', 'more comments more confusion', 'small area on the wall for drawing', 'laughing by the students at any undeveloped productions', and 'less collaboration'. Besides a major part of the students reemphasized that no negative effect.

The students additionally expressed that they attempted to personalize the areas to make the areas more personal, conformable, and adapted to the tasks of the studio. They counted a list of activities such as 'adding more tables', 'occupying the more areas with the personal equipment', 'occupying more areas on the walls for the drawing', 'pin-up, and posters', and 'adding physical models on the area'.

Observation

Collaborative Activities

The students were free to form their group and peer collaborative teamwork. Three spontaneous groups were formed in the studio, which they had a strong connection based on interpersonal attitudes. The members of the groups worked together and arranged some peer joined-tables based on a common understanding of the activity in the studio such as the similarity of the projects, the same supervisor, or the friendship relation. Both peer-students and group-students were collaborative, active, and productive. The pattern of the activities was not consistent in the sessions and there was a range of the activity from collaborative to separated form based on the time, task, and design process. Nonetheless, the continuum of the specific activity between the students formed a pattern or style of working such as collaborative, individual, or isolated. In other words, the students performed differently in the sessions of the studio from a collaborative person to an isolated participant although continuum of the behaviours made transparent the trends among them.

Disruptive Activities

Some disruptive behaviours also were observed through personalisation including adding tables, changing the location of tables of other students, inviting friends from other departments and schools in the studio. Other behaviours were more aggressive such as closing the passing way with tables and materials, occupying the table or board, and disrupting the research activities. Despite the attendance of the instructor in the studio reduced dramatically the disruptive behaviours, the attitude was part of the studio. The disruptive activity influenced the design process in the studio, in which some of the students attempted to find their position in the other collaborative teams although the attempt disrupted the group from the process of the design and finally was resulted in isolating the disrupted students.

Communication

This position formed a contradictory condition, which from one side encouraged the major part of the students to comment on the production, and from another side, the arrangement put the students in the exposed of the unwanted comments and interventions, in which some of the students considered this activity as disruptive behaviour. In fact, not only the students presented all the drawing on the wall in this position but also the screen of the laptop also was exposed to the rest of the studio to represent the progress. Therefore, a continuous process of communication flowed in the design studio.

FINDINGS OF THE RESEARCH

The results identify that the seating arrangement toward the drawing boards on the walls increased the level of concertation of the students on their design project. This seating arrangement changed the direction of the students from the central part of the studio to the design boards to increase the level of focus on the project, drawing, and design. The results highlight the achievements of the students in four categories including self-schedule to predicate the time allocation, self-planning to arrange the tasks, self-management to prioritize the activities, and self-correction to revise the products.

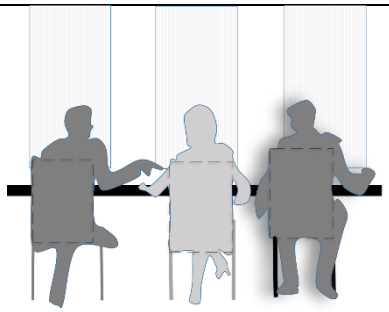
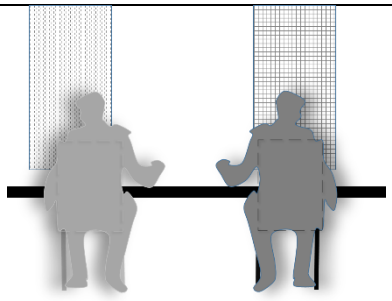
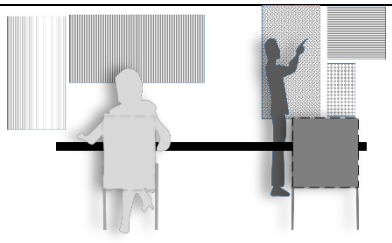
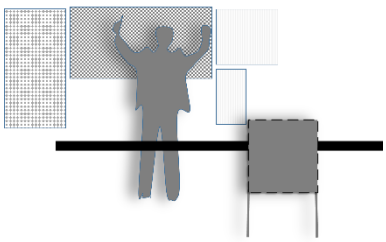
This form reduces the level of privacy in the studio. The students dissatisfied with the level of privacy in the studio. This form of seating arrangement exposes both screen of personal laptops and the boards of drawing to the rest of the students. This specification reveals both negative and positive perceptual aspects of the students. The first group believed that they need more privacy to keep their design products and ideas from any unwanted contact. They claimed that in the seating arrangement they could less use social media through the laptop for entertainment. The second group of students take into consideration this seating arrangement as an opportunity to receive more comment, interaction, and discussion to boost their drawing on the boards and screen. Furthermore, this style of seating arrangement provides an opportunity to compare their own works with other students in the studio.

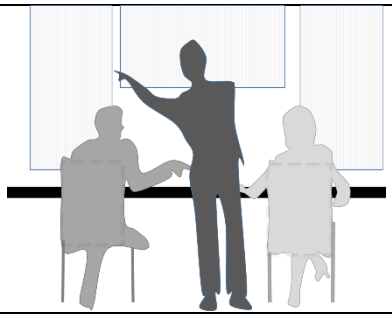
The students personalize the areas based on their attitudes. The personalization is exposed when some behaviours threatened other students such as expanding the area of working with physical models, pinup the posters, and archiving personal belonging although the area is supposed to be used by other students.

It needs to be highlighted that personalisation took the place in the studio more by groups than individual did. The grouping was based on the intention of the students to receive supports from other students. However, this personalization was not just adding tables or inviting friends from other department and school in the studio, rather than encompassed activities such as closing the passing way, occupying the table or board, and disrupting the research activities. For this reason, the students expressed the activities in terms of disruptive behaviours such as the unwanted physical contacts, unwanted comments, and disruptive attendance of the students in the backside to watch the computer, boards, and model making.

Apparently, this form of seating arrangement exposes some trends as the behavioural patterns in the studio, which could theorize those attitudes in terms of the collaborative, individual, separated, isolated, and disruptive as present in Table 2.

Table 2. The Behavioural Patterns in the Studio

No	Titles	Photo-sketches	Explanation
2-1	Collaborative 		Form of Seating: this group of students sat together at one table and shared many items. Activities: production, discussion, comments, study together Design Boards: the boards arranged close and distinguish each of them was difficult. The style of the drawing and the composition of the site layout presented similarity.
2-2	Individual 		Form of Seating: despite they sit at the same table, the area of each of them and production was clear. Activities: they work individually but paid more attention to the production of the colleague to comment. Design Boards: boards separated but at a close distance for comparison.
2-3	Separated 		Form of Seating: they sit separately with some distance although maybe shared some items and information Activities: they worked individually on their work with the competition and comparison sense. Design Boards: separated, independent, different although some influences on both sides could be observed
2-4	Isolated 		Form of Seating: the students sit in an isolated area separated from other students. Activities: reading, drawing, and production individually without communication with the rest of the studio Design Boards: the board occupied more area than others, with multilevel of progress from the primitive to advance

2-5	Disruptive 		Form of Seating: freeze seating areas, depended on the area, students, and the activities Activities: lonely among other students, which other deny his participation, using and occupying of other tables, talk loudly, used more tables Design Boards: boards mixed with the other boards, overlay with the areas of other students, equipment separated.

First, the collaborative activities are common among the students and presented in two way including group or peer students. The collaborative students are specified with harmony and support in the activities based on production, presentation, and discussion (row 2-1 in Table 2). Second, the individual students take place with other students very closely although these students have their own individual style in working and production. It means the individual student works individually on the topic and activity; however, they are ready to help the peer group member for comment, discussion, or other supports (row 2-2 in Table 2). The separated students take place in the adjacent areas of the other students with a gap in space. Although they are so close due to the location, they are separated based on the works, progress, and relationship. Therefore, they collaborate at minimum not only with both sides' students but also with the rest of the class (row 2-3 in Table 2). The isolated students are secluded physically from the rest of the studio due to the location and the position. This attitude takes place in the studio based on either personal selection or social pressure. In the self-selected case, he took the distance to do more concentration and production deliberately. However, in two other cases, although they placed in the group and peer, both of them were alienated from the group gradually. The isolated students have a minimum chance to corporate with other students, but full of competition sense (row 2-4 in Table 2). The disruptive students are isolated in the relationship, without a permanent location in the studio, with low quality of the production; however, continuity is attempted to attach to other students. Despite the rest of the class was uninterested to work with the attitude, the disruptive students pushed themselves to location, relationship, and position. Consequent of this attitude resulted in the reaction with other students in terms of vacating the area after a while to leave him alone (row 2-5 in Table 2). Table 2 represents the predominated behavioural patterns of the students although those behavioural patterns are the general trends between students.

DISCUSSION

The findings of the research identified a high level of concentration by the students on the architectural thesis project in the backward seating arrangement. This result approved the theory of effects the seating arrangement on the behavioural patterns of the students in classrooms and studios, which discussed widely in studies such as (Tanner, 2009; Vander Schee, 2011; Burke & Sass, 2013; Kregenow, Rogers, & Price, 2011; Tafahomi, 2020). The emphasis of the students on the concentration and the activities also referred to the environment of the studio in terms of the productive, concentrative, and interactive in the line with findings of studies especially (Dunn & Dunn, 1979; Barrett & Zhang, 2013; Cheryan, Ziegler, Plaut, & Meltzoff1, 2014).

The outcomes of the research highlighted the effects of the backward seating arrangement on the process of the thesis activities in the studio. Despite the research reoriented the form of the U-shaped seating arrangement toward the drawing boards on the walls, the outputs demonstrated similarity to the findings of studies such as interactive students (Fernandes, Huang, & Rinaldo, 2011), more asking questions (Marx, Fuhrer, & Hartig, 2000), progressive learning (Wannarka & Ruhl, 2008), and sufficient relationship between students (Van den Berg & Cillessen, 2015).

The backward seating arrangement created an open space in the central part of the studio, which the students used as a place for the model making, movements, and discussion. This result contradicted the theory of Wasnock in terms of the dead space in the classroom (Wasnock, 2010). The backward position encouraged the students to present competitive behaviours in the central open space similar to

the findings of Kaya and Burgess and Bakare (Kaya & Burgess, 2007; Bakare, 2012). In fact, the central part of the studio was the location for interchanging the information through observing the development of the design boards in terms of social interaction (Haghighi & Jusan, 2012) and increasing the relationship (Burke & Sass, 2013).

The research outputs revealed the positive effects of shifting the eyes contact (Vander Schee, 2011) from the face-to-face (Moreno, 2010) between the students, to the face to drawing boards in terms of mew learning style in this new seating arrangement. This new experience shifted the topic from the subject to the object in the opposite way with the previous study by Gremmen (Gremmen et al., 2016). In detail, the drawing boards in front of the students created a continuous dialogue between the subject as the students and the object as the idea, production, and progress to form an object-oriented learning process than subject-oriented. This strategy increased the level of concentration of the students on their work as sufficient performance (Xi et al., 2017). In addition, the expression of the students revealed that the level of communication in the studio was in a sufficient level to communicate, comment, and discussion in the same alignment with the precedents studies such as (Fernandes, Huang, & Rinaldo, 2011; Burke & Sass, 2013).

This form of seating arrangement exposed some of the common behavioural patterns of the students in the architecture studio. The behavioural patterns were fluctuated in different sessions based on the personal, interpersonal, and social activities (Van den Berg & Cillessen, 2015), which in the precedent studies analysed as the effects of the seating arrangement on the behavioural patterns (Tanner, 2009; Vander Schee, 2011; Burke & Sass, 2013; Kregenow, Rogers, & Price, 2011). The research categorized five behavioural patterns among the students including collaborative, individual, separated, isolated, and disruptive. These categories included the common tendency among the students although differed from the personality or character, which was required another research to highlight effects on the behaviours (Lee, 2005).

The personalization attitude among the students apparently referred to the shortage of equipment in the studio, which resulted in the competition to access more facilities such as drawing boards' areas, tables, and space for physical models. In the precedents studies also such kind of the behaviours observed in other studies (Wiles, 1978; Kaya & Burgess, 2007; Bakare, 2012; Tafahomi, 2020) to use the personal materials and equipment to personalize the area. In detail, personalisation took into consideration as a process to adapt the environment of the class to their own style of learning (Williams & Robert, 1997).

Importantly, some negative attitudes also were observed in the studio, which in the precedents studies mentioned as disruptive behaviours (Wannarka & Ruhl, 2008; Burke & Sass, 2013; Kaya & Burgess, 2007). In fact, the students stressed some of the unwanted contacts and uninvited intervention, which disrupted the normal process of studio activities. This condition challenged the theory of Eugene and Melaine in terms of the reduction of disruptive behaviour through the circular seating arrangement (Eugene & Melaine, 2013). The unwanted contact and disruptive attitudes also mentioned in the precedents studies as the major problem in schools including bullying, intimidation, and incivility (Salkind, 2008). This kind of activity was inherited from school to extend in higher education as a behavioural habituation process although the level of and specification of the behaviour require detailed research.

CONCLUSION

The wall faced seating arrangement supports the learning process of the students effectively as mentioned highly by the students. The wall-faced seating arrangement changes the connection from the subjects to objects in the studio. It means that the wall-faced position enhances the concentration of the students on the drawing boards on the walls. The seating form exposes the drawing boards, the screen of laptops, and the models to the rest of the studio with a high level of transparency. Apparently, the students receive effective comments from the tablemates, groupmates, and classmates to develop the architectural thesis project sufficiently. This form encourages the students to learn from other students and get inspiration from peer students in the studio.

The seating arrangement creates a competition between the students for more design products. The students revealed that the studio environment requested more design products due to the explosion

of the all works for the comment of the students. The students observe three important learning outputs in this seating arrangement including their own design products development, the peer students design products as learning outputs, and the process of getting ideas by the rest of the class in the ideas interchanging. The seating arrangement enhances the level of the design products in the design studio through a continuous process of comparison, inspiration, and design development in terms of learning outcomes of the exercise.

The wall-faced arrangement elucidates common behavioural patterns of the students in the studio. In fact, the students behave differently, which the research classifies in five groups including cooperative, individual, separated, isolated, and disruptive. Although the studio reveals the behaviours of the students, they are resultant of the interpersonal selection and the social interaction in a cultural context, which the level of the effects needs to be developed in further studies.

However, the wall-faced seating arrangement reveals a contradiction between privacy and communication in the studio. Despite the students need privacy to prevent unwanted comments, unexpected intervention in the design process and changing the location, they participate actively in communication, interaction, and collaboration in the design studio.

RECOMMENDATIONS

The studio requires a sufficient number of equipment such as drawing tables, standing boards, walls for pin-up, and power sockets. The missing of equipment creates an unwanted competition on the facilities that change the direction of the activities in the studio than design. To reduce the possibility of false attitudes a balance between the capacities of the studio with the number of students could support the training process.

The gender balance is another key factor in the environment of the studio. Unbalanced studio due to gender creates an unstable condition for educational purposes in the studio. The creation of a representative team of the students with a gender balance could support the students in an unexpected condition in the unofficial times of the studio that normally disruptive behavioural patterns takes the place.

To mitigate the negative effects of unwanted intervention in the design process, sharing a specific handout with the topic of studio culture and policy could support more effective results from the seating arrangement.

Understanding the cultural background of the students is important to predicate interpersonal relationships and the interaction style in the studio. Some official talk with the students individually could lead them to more professional communication, social interaction, and effective participation in the design studio.

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