The Application of Student-Centred Learning Method in Theory-based and Studio-based Online Courses.

Ofita Purwani
Associate Professor, School Architecture
Faculty of Engineering
Universitas Sebelas Maret
Surakarta, Indonesia
o.purwani@staff.uns.ac.id

M. Muqoffa
Senior Lecturer, School Architecture
Faculty of Engineering
Universitas Sebelas Maret
Surakarta, Indonesia

Abstract

This paper focuses on the application of the Student-Centred Learning method in three architecture courses conducted in 2021 with online learning. As Covid 19 pandemic hit, online learning became compulsory and all stakeholders have to adjust to the situation. The main difficulties with online learning are that the students become less active, and more difficult to control the quality of learning. Another difficulty such as the lack of internet access in remote areas also present. To deal with those problems, we use synchronized learning through Video Conferenceing Software (VCS) – with video off- to encourage interactions. The Student-Centred Learning (SCL) method was used to activate the students so that the lecturers can control the output. We used three courses with different states of application of SCL in comparison. Out of three courses, two of them are theory-based and another is studio-based which is very different to that from the former. We used a similar method for three of them, which is the Jigsaw method. Despite the differences in the conditions of each course, students become more active in learning. The course which has full student-centred learning has more benefits than the others in which the method was only applied partially. In the studio-based course, however, SCL brings the smallest effect, which is due to the nature of the studio-based learning which is more hands-on on individual projects. Generally, the students are happier dan appreciative of the application of the student-centred learning method.

Keywords
Online learning, architecture education, learning method, student-centred learning, Jigsaw method.

1. Introduction
The global Covid 19 pandemic has forced schools and universities around the world to switch to online learning in 2020 and 2021 (Iranmanesh and Onur 2021; Komarzyńska-Świeściak et al. 2021). Students and teachers were forced to learn new skills and adjust accordingly to the new situations which vary from one place to another. The challenges brought by the pandemic on online learning are varied from one country to another. They are mainly human resources, the lack of direct interaction, and resource issues.

The teachers or instructors, along with the students had to learn new skills to optimize the new media for online learning. Students usually have no problem with using technology as they are more familiar with digital media. The teachers and instructors, on the other hand, had to embrace new skills (Hickling et al. 2021). In developing countries like Indonesia where digital skills in the older generation are low, the shift to online learning makes it difficult for them. Another challenge related to human resources is stress and mental health during the pandemic which can intervene in teaching and learning (Mukhtar et al. 2020).

One main effect of online learning is the lack of direct interaction (Frolova et al. 2021). Teachers and instructors had to change conventional learning -which depends on direct interaction- to online learning with a lack of direct interaction. This brings significant problems. A conventional method will not help online learning students as there tends to be low engagement, a long silence and less response from the students. Apart from the problems during scheduled meetings, there are also problems in learning outside of class. Students need to have good self-regulation (Biwer et al. 2021) to succeed in online learning. However, some pieces of literature have highlighted one of the benefits of online learning which is students can learn at their own pace, in their own preferable time. This means that giving students access to resources to learn in their own preferable time will bring valuable effects.

There have been various methods developed for online learning during the pandemic, some of them are synchronous – by using video conference software - while some others are asynchronous –by using pre-recorded videos and materials. However, the effectiveness of the method varies according to the nature of the course. For a general course that delivers theoretical materials, it is still possible to use the video conference software whether synchronous or asynchronous or a combination of both. It becomes more difficult in courses that need practical hands-on activities and interaction.

2. Review of Literature (Theoretical Framework)

Most architectural education focuses on design training in the design studio, which refers to the practice in Ecole Des Beaux Arts in France in the 19th century (Mahmoodi 2001). This system has been adopted internationally. The importance of a design studio can be seen in the requirements for international accreditation for architecture programs to provide a 24-hour design studio for all the students ("Korea Architectural Accrediting Board" n.d.). In studio courses, the students are expected to work on a particular project under the supervision of an instructor who periodically checks on the progress. Students are also expected to interact with each other so they can give feedback to each other. This interaction is very important in the design process, as the design process needs continual feedback to make better outcomes (Mahmoodi 2001). When design studio courses have to switch to online learning, some of the main characters are missing. The interactions among students and interactions between the students and the instructors become less optimal. Some schools of architecture use blended learning and virtual design studio software (VDS) (Iranmanesh and Onur 2021; Komarzyńska-Świeściak et al. 2021). However, the use of virtual design studio software might not be accessible to students. Some instructors use social media such as Instagram, Flickr and Pinterest as a virtual studio ("Virtual Design Studios" 2020) which is more accessible to students.

Online learning in different places might bring different problems. In Indonesia, some of the problems are related to the availability of resources such as internet access and financial resource. Internet access in Indonesia is relatively low if compared to other countries based on the global index by Speedtest ("Speedtest Global Index – Internet Speed around the World" n.d.) with the average download speed of fewer than 20 Mbps for mobile networks and 21 Mbps for fixed network. In reality, however, there is a considerable disparity in internet speed in Indonesia. This is obvious in the difference found between urban-rural areas. Many remote areas do not even have internet access. The internet penetration rate in Indonesia in 2020 is only around 69.8% ("Indonesia: Internet Penetration Rate 2026" n.d.), leaving more than 30% without internet. Online learning will also need good quality internet, which is costly. To help people with online learning during the pandemic, the Indonesian government gave subsidies to school children with free monthly internet data in 2021 ("Pusat Layanan Pembiayaan Pendidikan" n.d.) which can be used only for learning platforms such as Zoom, Google Meet and Cisco Webex. While the subsidies can help with the cost of the internet partly, they cannot help overcome the unavailability of internet access and the low-speed internet.

This paper focuses on the experience of three courses in the Department of Architecture, Universitas Sebelas Maret. During the early pandemic, we spent time trying to figure out the right learning method for online platforms. Some used social media for learning by chat to minimalise the internet cost, which turned out to be ineffective, some others recorded their lecture and put the recording on a video platform such as YouTube. Learning through pre-recorded videos also turned out to be ineffective as there is minimal engagement. After the Ministry of Education gave free internet data for learning platforms, many of us turn to synchronous learning through video conference software. This method is better than the former method, but still not optimal as there is still a lack of engagement with students getting less and less active.

To deal with this problem, we try to activate the students by using Student Centred Learning on the online platform. This method has not been introduced to the students before, so what we discuss in this paper is about the adoption of

Student Centred Learning at the early stage. We use three courses, two of them are conventional courses and one is a design studio course.

3. Method

In this research, we applied Student Centred Learning method particularly using Jigsaw method in three different courses with different characteristics. In the first course, APDM, the lecturer has full control over the class so that the Student Centred Learning was applied completely. In the second course, the ABP, the lecturer did not have full control over the class, where half of the class was held in plenary sessions with other classes, so that the Student Centred learning method can not be applied fully. The last course, ADS 2, was a Design Studio course, which has significant difference in characteristic as mentioned in the previous section. It significantly depends on the interactions between students and instructors.

To see the result of the application of the learning method, we gave feedback forms to the students at the end of the course. We also measure the activity of the students during each class.

4. Result and Discussion

Student-centred learning has been applied to three courses in the second semester of 2021/2022. These courses were Advanced Planning and Design Methods (APDM), Architecture and Behavioral Psychology (ABP), and Architectural Design Studio 2 (ADS2). APDM and ABP courses are theory-based courses, while ADS2 courses are studio-based courses. Student-centred learning was carried out in full from beginning to end in the APDM course, while in the ABP and ADS2 student-centred learning courses were implemented in the second half of the semester.

4.1 Advanced Planning and Design Method Course

In the APDM course, student-centred learning is carried out using the jigsaw method using a break-out room from Zoom. From a total of 32 students, they were divided into four groups in four break-out rooms, with each group discussing a certain material that was different for each group. The material is given by the lecturer as a facilitator. After discussing in groups, each group is asked to return to the class together to present the results of their discussion so that other groups can also learn it. In the following week, a new group was formed consisting of members of each previous group. Each member in this new group is asked to teach each other what they have learned in the previous group discussion to other group members in the new group. Like the previous activity, group discussions were also conducted in a break out room from Zoom. To direct the discussion, the lecturer gave several questions to be answered by the new group. After discussion in groups, new students are randomly assigned to present the results of the discussion in their new groups. So that students do not feel disturbed and are freer in communicating with their groups, lecturers should minimally intervene in the discussion process, but still carry out random supervision by entering the breakout room several times. This is done so that students still feel supervised even though the lecturer does not intervene. All results of group discussions both in the first week and in the second week are written in the Jamboard so that all students have their files. To be able to evaluate students' understanding, a quiz was held at the beginning of the lecture after the two group discussion sessions were completed. The discussion was conducted using the Mentimeter application (www.menti.com) with five short questions. The three students with the best results will get extra scores for the midterm scores.

In one semester, four sessions were conducted with different materials, namely: history of architectural education, development of architectural design methods, city design theory 1, and city design theory 2. At the end of the semester, students are expected to be able to describe the history of architectural education and the development of design methods. architecture, and eight theories of urban design. The results of the evaluation of student learning outcomes show that all students can briefly describe all the material and apply it in a certain context. The evaluation carried out was by using the results of discussions on Jamboard, random presentations, quizzes, and written tests in the form of essay tests and peer reviews of friends in the group.

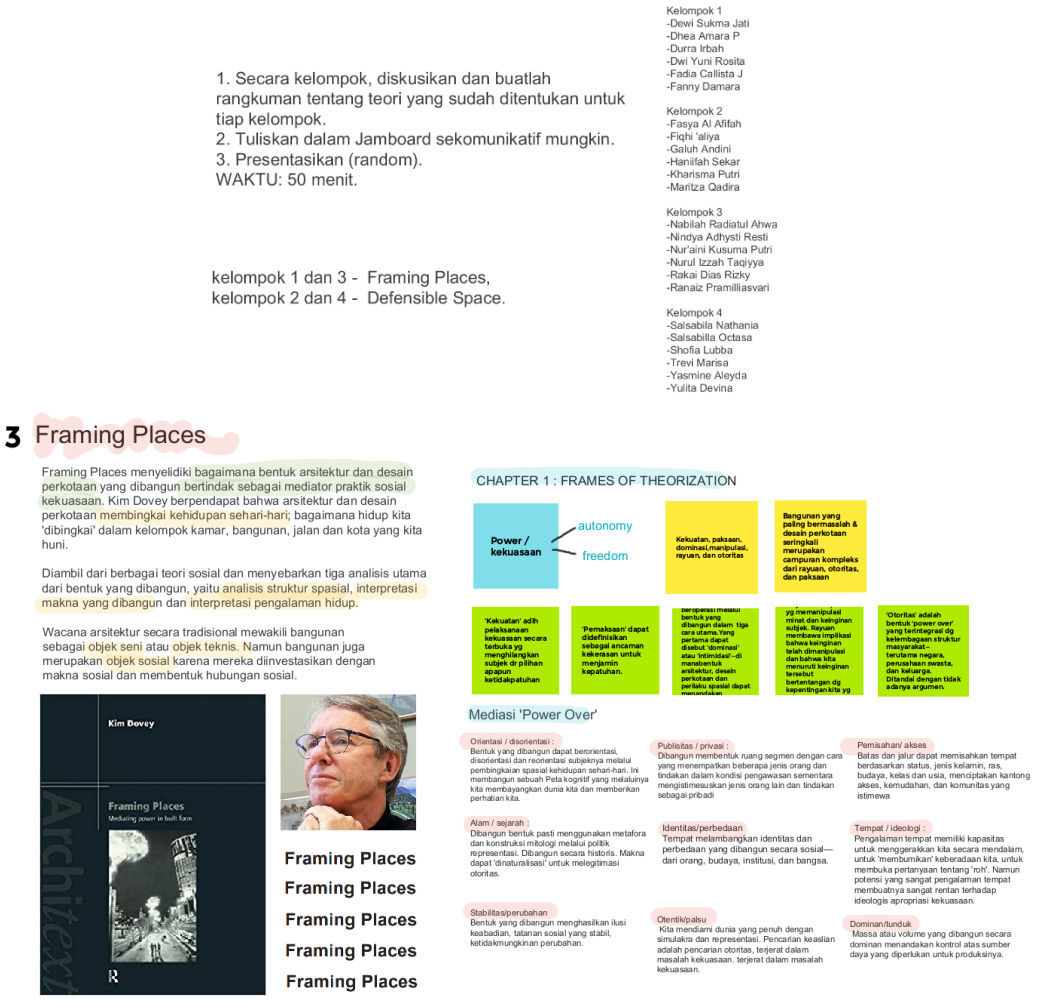
Evaluation of the implementation of learning conducted in the middle and end of the semester to get feedback on the implementation of the lectures showed that all students were satisfied with the implementation of the APDM courses. This course is considered flexible and fun, and students feel they have learned many new things, not only in terms of material skills but also in reading skills and teamwork (See Figure 1.). Two feedback for this course were the lack of material related to the development of design methods in Indonesia, as well as the fear of some students being wrong in their arguments and hoping that lecturers can provide material in more detail.

Figure 1. The results of the evaluation of the learning process carried out at the end of the semester anonymously using Jamboard (Source: Personal documentation, 2021)

4.2 Architectural Psychology and Behavioral Course

This course is a theoretical course with a focus on theories on architectural and behavioural psychology. In the first half of the semester, theories on architectural psychology are presented, and then in the second half students are expected to focus on making assignments. In the ABP course, student-centred learning is carried out in the second half of the semester. During the first half of the semester, conventional learning was carried out by delivering material in one direction from lecturers to students on the Zoom platform. In this conventional learning, after delivering the material, students are expected to ask questions but in almost every lecture no one asks. The response from students was lacking because lectures were only in one direction, while lecturers could not control student activities because they used the Zoom platform, where all students turned off the video. In the second half of the second semester, the lecturer allows students to state what they want to learn, after the lecturer gives an overview of this ABP course, it can be useful for anything and what theories can be learned. After students agree on what theory they want to study, the lecturer looks for literature sources that are not only about the requested theory but also about other theories that can be related to the first theory. Students are then divided into four groups with each group consisting of 6-7 people because the number of students in this class is 25 people. This group was asked to discuss using the jigsaw method.

Each group is given material by the lecturer to be discussed separately in a breakout room and then asked to write down the results on the Jamboard. After that, the lecturer appointed one student in each group at random to present the results of that day's discussion in class together so that students in other groups could also participate in studying the results of the discussion. The following week students were asked to change groups where this new group must have members from all groups in the previous week. The purpose of forming this group is so that each group member can share the material discussed in the previous group with the new group members so that all can learn from each other. To direct the discussion, the lecturer gave several guiding questions, namely to make students able to make connections between the theories being studied (See Figure 2). The discussion is conducted separately in a breakout room on Zoom and the lecturer does not intervene in the discussion path unless there is a special case where the group feels confused about something and cannot find common ground in the discussion. Lecturers randomly enter the breakout room to make students feel supervised in their discussion activities. The results of the discussion are then written on the Jamboard so that all students have access to the archives. After the discussion is over, the lecturer then calls the students randomly to present the results of their discussion in groups. To check the learning outcomes, an evaluation was conducted in the form of a short quiz via a Mentimeter (www.menti.com) with five questions. The three students with the best results are recorded and get additional scores for the final grade of the course. This process was carried out in two sessions and students during the two jigsaw sessions studied four theories related to human behaviour and cognition in relation to architecture. However, the implementation of student-centred learning cannot be carried out in full because the lecturer does not have full control over his class, so the task for the final grade is to follow another class in the form of a design task. Lecturers can only give assignments to students in their class to apply the theories that have been learned to their assignments.



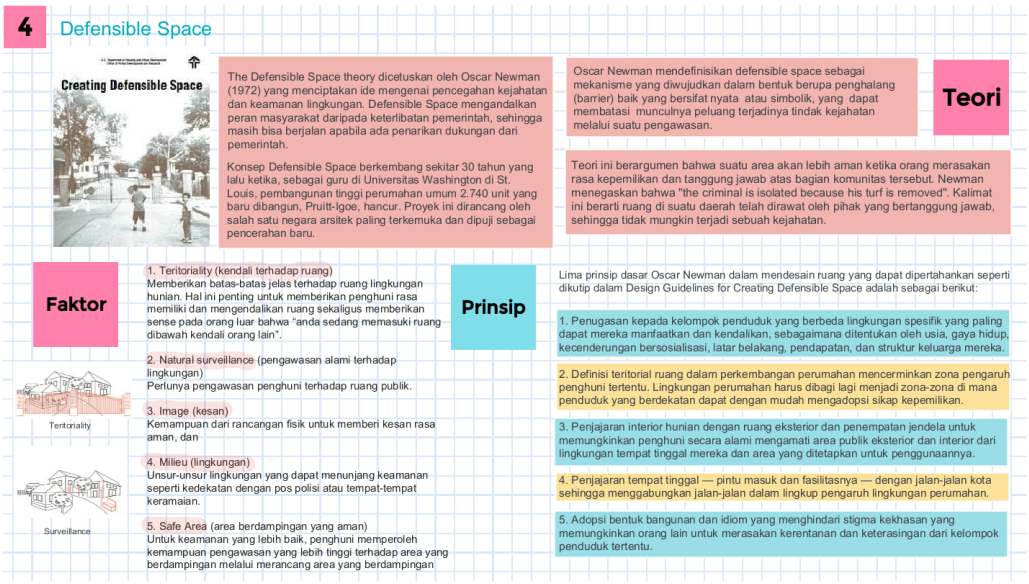


Figure 2. Examples of questions and results of group discussions written on the Jamboard for ABP courses (Source: Personal documentation, 2021)

4.3 Architectural Design Studio 2

In studio-based courses; ADS2, the application of student-centred learning is carried out in the middle of the semester. Architectural design studio learning has a different character from learning in theory courses. This learning is usually carried out in the studio for half a day or a full day, where students can interact freely with each other. The advantage of this learning model is that students can give each other input on the results of their respective designs. With online learning during the pandemic, the benefits of the studio are not obtained because all students are in different places. There is no communication and discussion between students. In addition, because each student cannot see the progress of the other students, his design project becomes only fixated on his own design and does not receive input from others. This can slow down design progress. This happens in ADS2 learning in the first half of the semester, where learning is not very effective because it runs only in one direction. Students consult with lecturers using the Zoom platform, and while waiting for their turn, students cannot communicate with each other as if learning is carried out in a studio. This results in fatigue for lecturers and students because the learning process takes a long time and is less effective. After the middle of the semester, the lecturer then decided to form small groups consisting of four students where students during lecture hours were expected to share their respective progress and give each other input. For this reason, each group is welcome to enter a separate break-out room, and communicate with each other before the lecturer then enters the break-out room to check the results of each student's design. This method allows students to give each other input and ideas on their respective project designs so that they can learn from each other. In practice, the time spent in consultation with lecturers becomes more effective. If in the first half of the semester the lecturer completes consultations with sixteen students in two meetings (a week), then in the last half of the semester the lecturer can complete the consultation with sixteen students in one and a half hours. Although it cannot completely replace direct communication in learning in the studio, the division into small groups in each breakout room can support the transfer of knowledge from one student to another and help students progress. In addition, this process can also save time, where student waiting time can be minimized. Evaluation of the learning process carried out at the end of the semester through Jamboard - so students can provide input anonymously - shows good results (Figure 3.). Most of the feedback stated that grouping into small groups made student design work more focused and effective. However, there are two pieces of feedback from the students for improvement, namely students requesting that there are clear targets in each meeting, also consistent, not contradictory feedback on the students' progress so that students are not confused. In the implementation of the Jigsaw method in the ADS2 course, group formation and discussion are not intended to discuss theories, but rather to provide opportunities for each student to communicate with each other about their respective designs. The method used is not a Jigsaw method as in the APDM and ABP courses. This is due to the character of studio learning where each student works on his own project while the design process itself always requires feedback from others. The grouping of students into small groups is only meant to fill the lack of communication between students caused by online lectures.

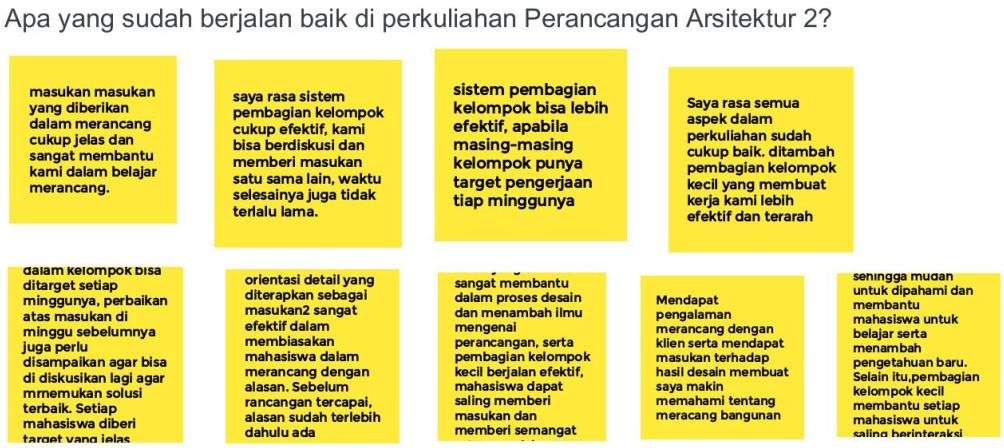


Figure 3. The Feedback at the end of the course for the ADS2

From the cases of the three courses above, it can be seen that the Jigsaw method is quite effective in being used in theory-based learning. In the case of APDM and ABP courses, this method speeds up the student learning process through group work. Students in the APDM course can learn eight general urban design theories in half a semester, which is almost impossible for individual students to do alone. In addition, this Jigsaw method can fill the disadvantage of online lectures where students in online lectures usually become more individual because of the disconnection of communication with other students. The ability to work together is made possible in the Jigsaw method because each group must solve problems in the form of questions given by the lecturer in a limited time. This limited time is also an exercise for students to read quickly. This was acknowledged by students in their evaluation of the APDM course, where they wrote down several skills they had learned in APDM, namely: 'speed reading', 'quick thinking', 'teamwork', 'discussion', and 'improving English' because the works of literature provided by the lecturer were in English. This shows that this method not only gives students a way to build their own knowledge but also gives them collaboration skills, reading skills in international languages, and discussion skills, which are considered soft skills. Online and conventional learning cannot provide these soft skills, while by slightly changing the learning method these soft skills can be achieved by the students. The use of small groups in ADS2 courses which should be in the form of studio learning, although not the Jigsaw method, can still activate students in their respective groups. This small change made in the middle of the second semester managed to overcome several problems in learning studio courses online at ADS2 such as the lack of communication between students which can affect design performance, the long waiting time for each student and the exhaustion of the lecturers. This learning also gives students the ability to communicate and empathize with one another. However, in this ADS2 course, the dominance of the lecturers is still visible because students are still very dependent on the lecturers as seen in the results of the evaluation of the learning process where students ask the lecturers to provide targets and provide non-contradictory feedback. This requires further evaluation for future architectural design studio learning which is more active and more student-oriented.

5. Conclusion

The adoption of Student Centred Learning in online courses during the Covid 19 pandemic can help to increase their effectiveness. This can be seen from what happened in three architectural courses with different characters and at different stages of adoption. APDM, which was designed to be SCL based in the first place shows a very good outcome and satisfaction from the students. ABP and ADS2 which adopted SCL in mid-semester also show improvement even when not optimal. ADS2 which is a studio-based course shows the least satisfaction, which is mainly due to the character of design studio learning that needs more interactions among the students and instructors to yield a better outcome.

References

Biwer, Felicitas, Wisnu Wiradhany, Mirjam oude Egbrink, Harm Hospers, Stella Wasenitz, Walter Jansen, and Anique de Bruin. "Changes and Adaptations: How University Students Self-Regulate Their Online Learning During the COVID-19 Pandemic." *Frontiers in Psychology* 12. https://www.frontiersin.org/articles/10.3389/fpsyg.2021.642593, 2021.

Frolova, Elena V., Olga V. Rogach, Alexander G. Tyurikov, and Pavel V. Razov. "Online Student Education in a Pandemic: New Challenges and Risks." *European Journal of Contemporary Education* 10 (1): 43–52, 2021..

Hickling, Siobhan, Alexandra Bhatti, Gina Arena, James Kite, Justin Denny, Nancy L. I. Spencer, and Devin C. Bowles. "Adapting to Teaching During a Pandemic: Pedagogical Adjustments for the Next Semester of Teaching During COVID-19 and Future Online Learning." *Pedagogy in Health Promotion* 7 (2): 95–102. https://doi.org/10.1177/2373379920987264, 2021.

"Indonesia: Internet Penetration Rate 2026." n.d. Statista. https://www.statista.com/statistics/254460/internet-penetration-rate-in-indonesia/. Accessed September 8, 2022.

Iranmanesh, Aminreza, and Zeynep Onur. "Mandatory Virtual Design Studio for All: Exploring the Transformations of Architectural Education amidst the Global Pandemic." *International Journal of Art & Design Education* 40 (1): 251–67, 2021.

Komarzyńska-Świeściak, Elżbieta, this link will open in a new window Link to external site, Britt Adams, this link will open in a new window Link to external site, and Laura Thomas. "Transition from Physical Design Studio to Emergency Virtual Design Studio. Available Teaching and Learning Methods and Tools—A Case Study." *Buildings* 11 (7): 312. https://doi.org/10.3390/buildings11070312, 2021.

"Korea Architectural Accrediting Board." n.d. http://eng.kaab.or.kr/. Accessed September 9, 2022.

Mahmoodi, Amir Saeid M. "The Design Process in Architecture: A Pedagogic Approach Using Interactive Thinking." Leeds, 2001.

Mukhtar, Khadijah, Kainat Javed, Mahwish Arooj, and Ahsan Sethi. "Advantages, Limitations and Recommendations for Online Learning during COVID-19 Pandemic Era." *Pakistan Journal of Medical Sciences* 36 (COVID19-S4): S27, 2020.

"Pusat Layanan Pembiayaan Pendidikan." n.d. https://puslapdik.kemdikbud.go.id/artikel/pemerintah-kembali-berikan-bantuan-kuota-internet-gratis. Accessed September 8, 2022.

"Speedtest Global Index – Internet Speed around the World." n.d. Speedtest Global Index. https://www.speedtest.net/global-index. Accessed September 8, 2022.

"Virtual Design Studios." 2020. *Distance Design Education* (blog). https://distancedesigneducation.com/2020/03/19/virtual-design-studios/. March 19, 2020.

Biographies

Ofita Purwani is an associate professor in the Department of Architecture, Universitas Sebelas Maret. She received her PhD from the University of Edinburgh, and her master degree from Sepuluh Nopember Institute of Technology. In 2020 she was a visiting fellow at Yale-NUS College Singapore and a research fellow at Asia Research Institute, the National University of Singapore 2022. Her interests range from traditional architecture, heritage, spatial politics, urban studies, Southeast Asian architecture, and heritage. She can be contacted at ofita92@yahoo.com.

Mohamad Muqoffa is a senior lecturer in the Department of Architecture, Universitas Sebelas Maret. He received his doctorate from Institut Teknologi Sepuluh Nopember Surabaya. His interests range from the history of architecture, architectural theory, vernacular architecture and gender.