



# Edmodo learning media and meeting room help grasp simple and major ones: Circulatory System

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## Abstract

Biology is complex for students because of a lack of interest, uncertainty regarding healthy blood circulation, small and large blood circulation systems, remembering the order of blood circulation, and fast-paced education. Students need microcirculation groups. Significant and minor blood circulation groups must be understood and circulated by students. Old biology teaching methods failed students despite adopting technology. Teachers must master and use learning technology in our globalized environment. Online learning is current education technology. This research can help educators choose instructional resources, especially the exciting part of practitioners contributing to academic biology research. This study evaluates student motivation and circulation system learning with Edmodo and meeting room media. Classroom Action Research met twice. Research rigour evaluation needs learning and assessment criteria alignment. Planning, Action, Observation/Evaluation, and Reflection comprise each learning cycle. This study includes 20 grade 11 controls. Teachers and practitioners utilize Edmodo and Zoom for online learning. In the lesson plan, a 40-question two-level multiple-choice exam and a motivation survey assess student learning. The study is quantitative. From inception to finish, data analysis grades data quality 1–4. Researchers use observation, interviews, and questionnaires. Microsoft Excel averaged descriptive analysis data. It measures efficacy by the percentage increase in learning outcomes during learning. This essay analyzes how Edmodo impacts classroom learning, outcomes, and motivation.

**Keywords:** Biology, Circulatory System, Edmodo, Meeting rooms.

## Introduction

Technological advancements in education pose new problems for instructors and aspiring educators in Indonesia regarding communication and social interaction during the learning process (Hidayatullah et al., 2023; Jatmiko, 2022; Rahmansyah, 2020). Technological advancements have led to tremendous development in education, resulting in the emergence of mobile learning (Khoiriyah et al., 2022). The education sector has to transition the classroom learning

system, according to (Arif et al., 2022). Education necessitates administrators, teachers, and students to advance in learning and teaching, according to Enriquez (2014). A teacher's primary duty is to assist pupils in gaining new concepts and principles to enhance their social productivity (Ekici, 2017). Teachers must find suitable teaching methods and utilize resources effectively to involve students in meaningful and engaging learning activities (Kramer, 2021). Online learning from home requires changes to optimize the learning process (Gunawan et al., 2021). Students desire contemporary technological gadgets for accessing knowledge at all times and in any location (Utaminingsih et al., 2023).

The school frequently utilizes technological devices like mobile phones as educational tools to support online learning. Nevertheless, not all educators can fully use this educational tool (Hasanah et al., 2022). Some teachers do not use learning media and solely rely on verbal explanations, which can decrease learning quality and ultimately impact the overall quality of education. At YALC Pasuruan High School, teachers are involved in the learning process. Teachers utilize a solely virtual method during the instructional process. Assignments are sent over mobile devices without in-person instruction, highlighting the advantages of using WhatsApp to share educational content. It is compatible with a limited number of devices. WhatsApp currently only allows access from one device at a time (Laila et al., 2023), preventing simultaneous app usage on several devices using one account. Not all pupils can access the video simultaneously when a teacher shares material in video format. The primary discrepancy may stem from issues with the internet network.

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The teacher cannot verify if the students have received or comprehended the content (Vedianty et al., 2023). Students typically readily grasp information explicitly presented by the teacher. Users need to be connected to the internet to utilize this programme, which, when integrated, enhances the learning experience.

Furthermore, teachers are more engaged with Google Classroom. The content is distributed through a link on WhatsApp for pupils to read individually. After 30 minutes, the teacher enters the class and inquires about their understanding. The constraints faced by students and teachers in traditional courses, together with the significant workload of teachers and the necessity for teachers to be more efficient in selecting appropriate educational materials, are challenges. Furthermore, biology education focuses on comprehending complex topics that necessitate pupil proficiency, like information regarding the human circulatory system.

Students frequently require assistance comprehending the content related to the circulatory system in humans (Hudha et al., 2023). Students learning issues stem from a lack of interest in biology studies and aversion to reading material on blood circulation. The information regarding the human circulatory system is intricate and abstract, involving numerous organs and interconnected processes, which might lead to challenges for pupils. Students sometimes confuse the minor and significant circulatory systems when classifying them. Students are questioning how they may learn and seek reasons when time constraints hinder them. There is no opportunity to meet the teacher in person. We are required to read, summarise, and complete tasks. Efforts must be made to address this issue, such as establishing a virtual classroom platform like Edmodo.

Edmodo is a platform that delivers services to enhance the accessibility of education. Teachers and students can interact via online classrooms. You can access it at any time and from any location. Teachers can design courses based on their preferences and provide enrolment codes to students interested in participating. Highlight the significance of acquiring knowledge in media, such as Information and Communication Technology (ICT), to improve student motivation and educational achievements. Alghasab (2019) noted that electronic learning media, especially Edmodo, is not extensively used in education. Utilizing Edmodo as an online educational platform enhances efficient execution (Cao, 2019; Suranto, 2020). Edmodo, like Facebook, is user-friendly and provides a platform for teachers, students, and parents to improve teaching and learning (Kongchan, 2012). Using this medium is expected to boost pupils' motivation and academic performance.

Edmodo is an educational social networking platform that enables teachers, lecturers, and students to create productive, innovative, creative, and fun learning experiences. Edmodo technology in the classroom allows students to submit their work to the teacher from a distance, removing the need for face-to-face communication (Darmayanti et al., 2022). Edmodo is a hugely popular and regularly used programme with a large user base globally. Ainiyah (2015) states that Edmodo has multiple educational functions: it can substitute for scheduling subjects with limited face-to-face time, a companion for independent student learning, and provide complementary features such as assignment tools and quizzes for teachers to offer activity sheets and daily evaluations. Edmodo has advantages and disadvantages, as described by Ekayati (2017). Advantages: The user interface is similar to Facebook, making it easy for newcomers. Support for multiple file types including doc, Swf, ppt, HTML, pdf, and more; Available on PC and Android social networks. Edmodo has restrictions on social network integration, offers language options only in English, and lacks a video conference capability.

In Brazil and Indonesia, some institutions have substituted traditional classroom instruction with live-streaming technology (Rigling, 2018). This study utilizes Zoom as a supplementary educational tool in meeting spaces due to the absence of video conferencing and live streaming features in Edmodo. The Zoom meeting application is a video-based platform for educational purposes (Latipun et al., 2022), meetings (Tegyi, 2020), seminars (Shekharappa, 2020), and other activities (Piniel, 2014). The library component archives course information, assignment elements, quizzes, and discussion forums (Swales, 2014). Some students had constraints in mobile learning using Edmodo due to issues including low-capacity batteries and restricted storage space, but they did not encounter challenges in storing resources (Wang, 2022).

Using technology-based educational tools can enhance students' self-motivation and improve learning results. Learning motivation is influenced by internal factors, including health, attention, interests, and abilities, as well as external factors, such as teaching methods, school timetables, and educational materials. According to Keller (2016), the level of determination and perseverance in student behaviour is crucial in shaping attitudes. Motivation is the determination that drives a person to try to complete a goal (Smolinski, 2010). Teachers must prioritize the learning process, as indicated by (Senisum, 2022). Learning outcomes refer to the capability of pupils to achieve a specific level of proficiency in a fundamental skill (Varisa As indicated by (Senisum, 2022), teachers must prioritize the learning process& Fikri, 2022). (Shaw, 2019) examines many components that affect learning results, such as physiological,

psychological, social, and non-social environmental elements. Enhanced learning results are linked to engaging and accessible educational resources (Nurrita, 2018).

Extensive research has been conducted on Edmodo and Biology about material on the human circulatory system. This research is unique because it presents a challenging lesson for students. It is characterized by a lack of interest, uncertainty about circulatory health, the intricacies of small and large circulatory systems, the need to memorize the order of blood circulation, and the fast-paced nature of teaching. Students require a microcirculation group. Students must comprehend and know about major and minor blood circulation systems. Traditional biology teaching approaches are ineffective for students even when including technology. Educators need to utilize educational technology in the current global landscape proficiently. Online learning represents contemporary educational technologies. This study can assist educators in choosing educational materials, particularly from the dynamic group of professionals involved in academic biology research. This study assesses student motivation and learning related to circulation systems through the Edmodo platform and virtual meeting spaces. The Classroom Action Research group convened on two occasions. Assessing research rigour necessitates ensuring that learning and assessment criteria

are in sync. The learning cycle consists of Planning, Action, Observation/Evaluation, and Reflection. This study involves eleventh-grade students. Teachers engage in the role of educational practitioners internationally to inspire pupils. Teachers and practitioners use Edmodo and Zoom for online learning. The RPP includes a two-tiered multiple-choice exam with 40 questions and a motivation survey to evaluate student learning. This study is quantitative. Data analysis assesses data quality on a scale of 1 to 4 from beginning to end. Researchers utilized observation, interviews, and questionnaires to collect data, which was then analyzed using Microsoft Excel for average descriptive analysis. Efficacy is quantified by the percentage rise in learning outcomes during the learning process. This research intends to examine the impact of Edmodo on classroom learning, outcomes, and motivation in studying the biology of the human circulatory system.

### Materials and Methods

The study utilized classroom action research to enhance student engagement and learning outcomes in biology, specifically focusing on the human circulatory system. Edmodo learning media was employed along with meeting room media. Figure 1 provides a summary of this research.

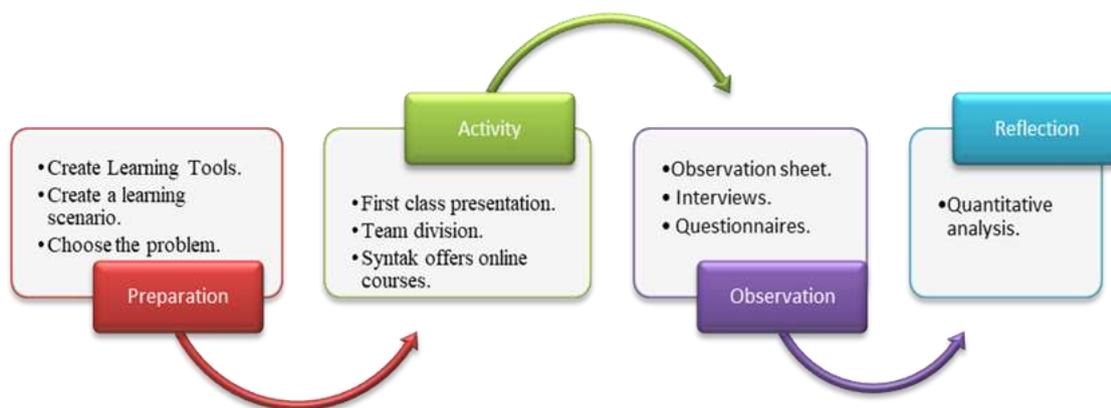


Figure 1. the study process of Kemmis & Mc Taggart's Classroom Action study approach (Lubis et al., 2024)

Figure 1 illustrates the learning process of Kemmis & Mc Taggart's Classroom Action learning technique. Kurt Lewin outlined that a classroom action research cycle comprises four stages: preparation, activity, observation, and reflection. This study utilized a single controlled group that integrated Edmodo instructional technology with meeting room technology at each step (Kusumaningsih et al., 2024). Sample/Participants/Group This study included 20 eleventh-grade control students. Educators and professionals utilize Edmodo and Zoom to deliver online education. The lesson plan consists of a two-tiered (Farhin et al., 2023), a 40-question multiple-choice exam to assess student learning

outcomes and a survey to gauge learning motivation (Safitri et al., 2023). This study relies on quantitative analysis. The data analysis procedure evaluates data quality on a scale of 1 to 4. Researchers gathered data via observation, interviews, and questionnaires. Microsoft Excel computes the average by analyzing descriptive data. This study method consists of 2 cycles. Cycle I will serve as the foundation for researchers to conduct Cycle II. Each cycle will include a multiple-choice test with 40 questions, half of which will be numerical. Cycles I and II start with a pre-action test to evaluate pupils' first skills. This test serves as a manual for researchers seeking to enhance student motivation and enhance learning outcomes that were

previously insufficient. If this is not accomplished, the outcomes of Cycle I will be transferred to Cycle II. Cycle II is the conclusion of this classroom action research. Data analysis This study utilizes quantitative data.

The data analysis process includes assessing the gathered data from beginning to end and assigning them a quality rating on a scale of 1 to 4. Researchers use several methods, including observations, interviews, and questionnaires, to gather relevant data. The data was processed for descriptive analysis using Microsoft Excel software, and the mean value was determined (Zwick, 2019). The study categorizes motivation and learning ratings. The scale for learning motivation ranges from 0 to 43 (Very Poor), 44 to 51 (Poor), 52 to 63 (Fair), 64 to 71 (Good), and 72 to 126 (Very Good), according to Sudjana (2009) (Listyono, 2018). Categorizing learning outcomes 75-83 is sufficient. The researcher uses observations of the percentage increase in learning outcomes during the learning process to gauge the success of the research. For instance, student test scores improve with each cycle. If students achieve a Minimum Completion Criteria score of 76 or higher, they are considered to have finished their biology learning, meeting the 85% class completion criterion (Mishra, 2019).

## Results and Discussion

### Descriptive analysis of learning motivation

Examining the score statistics through frequency and percentage distribution of learning motivation (Sari, 2019). Motivation for Learning the Frequency Cycle I is 2 with a corresponding value of 64-71, categorized as Good. The Percentage (%) Cycle I is 5% with a value range of 64-71, also categorized as Good. The Frequency Cycle 2 is 0 with a corresponding Percentage of 0% falling inside the excellent category of values 64-71. The Frequency Cycle I is 28, rated as "Very Good" within the range of 72-126. The Percentage (%) Cycle I is 95%, also rated as "Very Good" within the range of 72-126. Frequency Cycle 2 is 30 with a rating of Very Good (Value 72-126), and Percentage (%) Cycle 2 is 100% with a rating of Very Good (Value 72-126).

### Analysis of Learning Outcomes

An initial test was conducted at this time, consisting of a pre-action by the researcher with 20 multiple-choice questions. This test is conducted exclusively to assess the students' initial capabilities before proceeding to cycle I and II levels. Once the researcher has conducted and assessed a test on learning outcomes, the score statistics derived from the frequency distribution are presented in Table 1.

Table 1. Learning outcome frequency and percentage score distribution.

Value and Categories	Learning Outcomes		
	Pre-Action	Cycle I	Cycle II
< 75 (Less)	30	28 (93%)	0 (0%)
75-83 (Enough)	0	2 (7%)	7 (23%)
84-92 (Good)	0	0	15 (50%)
93-100 (Very Good)	0	0	8 (27%)
<b>Total</b>		30 (100%)	

Researchers utilize the Pre-Action exam score as a benchmark to enhance future learning outcomes of students, particularly in the circulation system subject. Researchers and teachers must address these shortcomings and then go on to cycle I. The outcomes of the reflection cycle are evident in the learning process of biology, namely in studying the circulatory system. However, there is a need for increased focus from students in biology classes, as some students seek attention elsewhere. Biology learning is conducted through online face-to-face interactions. Students are currently focused on learning biology by taking notes and completing projects provided by the teacher using the WhatsApp program, a new learning method. Furthermore, the network plays a crucial role in online learning as students require clear visibility of the material on the screen, sufficient internet capacity provided by schools, and proficiency in the English language. Similar issues arose

during the Cycle I test, as many students needed assistance comprehending the questions or missed the chance to respond.

The researcher and biology teacher collaborated to enhance Cycle II by providing more intensive learning improvements, such as explaining the material in-depth and relating it to everyday life, assisting students struggling with understanding, motivating and encouraging students, adjusting the language of the program, and rewarding students with points and praise for successfully answering questions at the end of the lesson. Executing this measure will enhance pupils' academic achievements in the second cycle. Reflection responses from the second stage of the cycle demonstrate students' passion for engaging in the learning process and showcasing their progress. The activity at the second cycle stage has risen overall. The observations'

findings to enhance learning cycle II indicate that it was successful as all pupils have fulfilled the completion requirements. This is seen in the learning results of cycle II. The success of enhancing the learning process in cycle II is closely linked to the reflection between the teacher and researcher in cycle I. The data indicates that the learning process in cycle II was successful.

Globalization has led to a transition in the education sector from traditional in-person sessions to a more open educational approach (Budiman, 2017). The learning process was enhanced by Monica's optimization of rapid e-learning in 2013. E-learning is an online source of information that does not require in-person interaction (Lane, 2016). Initially, E-Learning functioned as an auxiliary tool that supplemented classroom learning. Since the pandemic, E-learning has been essential for maintaining the educational process (Hermawan, 2021). E-learning innovation is a novel paradigm that plays a crucial role in education, as stated by Nadziroh (2017). Information can be readily obtained through the Internet (Hertiavi, 2020). The Internet's availability is crucial for anyone seeking knowledge in the field of education. In the Internet age, how knowledge is presented and shared has shifted from conventional approaches to online platforms (Xie, 2020). New learning methods can significantly influence learners in reshaping traditional teaching and education (Ramadiani, 2017). Applications utilized encompass e-learning, WhatsApp, Google Classroom, Zoom, and other platforms. Initial observations revealed temporary data on input, ideas, and challenges encountered by teachers and students during the deployment of online learning (Nasiha et al., 2023).

This study found that utilizing the Edmodo learning platform along with Zoom meeting room technology can enhance students' learning motivation from cycle I to cycle II. Utilizing learning media while adapting to the environment might enhance students' learning motivation through current media (Royani, 2018). Edmodo is a platform resembling Facebook's social media interface and is described as practical, adaptable, and user-friendly (Usmiyatun et al., 2023). Edmodo utilizes meeting room media in Zoom to facilitate learning, using video conferencing and live

streaming capabilities. Edmodo does not have video conferencing or live streaming capabilities. (Pradana & Uthman, 2023) asserts that the efficient utilization of Edmodo-based learning media stimulates students to engage in learning.

Students' motivation to learn significantly increases when teachers and researchers implement learning strategies. Researchers found that all students achieved 100% classical completeness in the data assessed at the end of the second cycle. Utilizing the Edmodo learning platform and classroom technology enhances student learning outcomes by providing various learning activities, including quizzes, assignments, and polls, and fostering learning motivation (Sugianto et al., 2023). Edmodo is more efficient due to its ability to manage assignment deadlines effectively. Additionally, utilizing Zoom as a meeting room media tool encourages student engagement in the learning process. We can engage in video communication with anyone using the Zoom program. A study by Winson et al., (2024) demonstrates that video conference-based media can facilitate distance learning and enhance students' comprehension of learning material. Following these steps, by the conclusion of cycle II, students demonstrated higher engagement in the learning process, resulting in improved learning outcomes. According to the success metrics, classical completeness rose by 100% at the end of cycle II.

Biology education on the human circulatory system was conducted at YALC Pasuruan High School using Edmodo and meeting room media to enhance learning outcomes and student engagement. The Classroom Action Research group convened on two occasions. Students require small study groups for microcirculation. Students must comprehend and be familiar with major and minor blood circulation systems (Ardizzone, 2015; Gheblawi, 2020). Traditional biology teaching methods are ineffective for students even when including technology. Educators need to utilize educational technologies in today's interconnected world proficiently. Online learning is a modern form of educational technology. This study can assist educators in selecting educational materials, mainly focusing on the involvement of practitioners in academic biology research, as illustrated in Figure 2.



Figure 1. Online learning is a modern form of educational technology

### Challenges in students' acquisition of knowledge in biology

The research findings, derived from observations, assessments, and interviews, indicated that students' learning challenges primarily stemmed from misconceptions (Zamzam et al., 2023). Student misunderstandings are identified to assess their comprehension level after learning and acquiring new knowledge concepts. Identifying student knowledge involves categorizing experiences into three groups: understanding the notion, not grasping the concept, and misconceptions (Mubarok et al., 2023). The misperception category is broken into two subcategories: positive (false positive) and negative (false negative). This category focuses on students' faults in assimilation and the adjustments made after the learning process. Students who encounter false positives are a result of their lack of comprehension. False negatives happen when students get incomplete information. Various factors contribute to misconceptions among students (Suharsiwi et al., 2023), including themselves, teachers, textbooks, context, and teaching methods (Nursaid et al., 2023). Teachers,

educational techniques, and students contribute to research misconceptions. The data was collected through observations of the learning process in virtual classes, documentation, and clinical interviews with students.

The data analysis results describe the class's misconceptions about the first notion of blood component material. Students sometimes mistakenly believe that all arteries convey clean blood, but all arteries carry pure blood except for the pulmonary arteries, which contain deoxygenated blood. Additionally, when the teacher inquired whether all veins carry infected blood? Students affirm that all veins transport deoxygenated blood. The student's response indicates that all vessels contain polluted blood, with only veins carrying contaminated blood, save for the pulmonary veins, which carry both tainted and clean blood. Utilize the Lesson Delivery feature on Edmodo to understand students' concepts better. The teacher provides comprehensive information on veins across multiple internet channels, employing both spoken and written formats, as depicted in Figure 3.

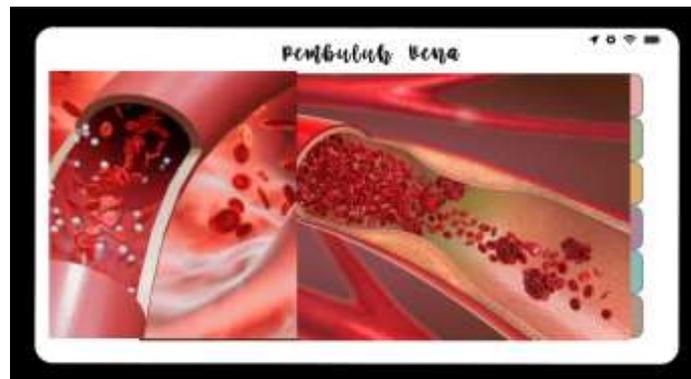


Figure 1. Veins across multiple

Picture 3 depicts the teacher explaining that veins are blood channels that transport blood from body tissues to the heart (Ching, 2018; Okada, 2014; Toma, 2022). This blood is a metabolic waste product with low oxygen levels (Alanazi, 2023; Scherb, 2020), commonly known as "dirty blood." The blood being delivered is oxygen-rich (clean blood). Observations and clinical interviews revealed that some factors hindered students from achieving optimal classroom learning outcomes. Various technical words are utilized in the circulatory system material. Students memorize concepts rather than comprehend teaching approaches that rely on lectures and teacher-centred learning activities. The teacher does not conduct verification tasks to assess students' comprehension of the ideas. The school lacks learning materials, making teachers the exclusive information providers for students.

Practitioners' clinical observations and interviews in virtual and traditional classrooms indicate that pupils exhibit suboptimal interest in biological subjects. Students perceive biology as a complex science (Schabas, 2023), leading to this

outcome. Students perceive biology as complex because of the numerous scientific words and the need to recall principles. Typically, learning occurs through the use of the lecture method. The teacher predominantly narrates stories and elucidates the learning content while the students make notes based on the teacher's instructions. The instructor should act as a facilitator and mentor to engage students in the educational process. During the learning process, students may periodically inquire about the teacher. Teachers must permit students to express their thoughts on the things they comprehend. Misconceptions arise when students do not entirely understand concepts learned during the educational process (Crotty, 2019; Haye, 2017; Visscher, 2017), highlighting the necessity for effectively communicating and clarifying students' ideas (Crowe, 2008; Paulsen, 2013). After the lecture, there were no exercises for concluding, neither from the teacher nor the pupils. Engaging in conclusion-making exercises and reinforcing the topic after the class is optimal.

Furthermore, the lack of verification activities by the teacher

on students' explanations of the material delivered during the group presentation leads to pupils feeling assured about their comprehension. The lack of confirmation exercises for concepts that students comprehend contributes to misconceptions, as students require validation if their understanding of concepts is incorrect (Smith et al., 2013; Teather, 1968; Végh, 2017). Veins transport blood from various parts of the body back to the heart. The blood being transported has low oxygen and high carbon dioxide levels, known as "dirty blood." Valves are located within veins, namely within the blood vessels (Preece & Read, 2005; Ramdiah, 2020; Schenone, 2013). This valve inhibits blood backflow to the cells or tissues and is a pathway for returning blood from the tissues to the heart. Arteries and veins in the cardiovascular system differ in the direction of blood flow they transport. Arteries transport blood from the heart to many tissues and organs. Veins return blood from the body's organs to the heart.

## Conclusion

The reason to adopt online collaborative learning is due to the sudden closure of educational institutions due to the advent of COVID-19, and with the utilization of cooperative learning in the conventional teaching process for the design subjects, it was found to be efficient, and subsequently, in this study, an attempt is made to identify the effectiveness of collaborative learning in online mode. This study result suggests that students better appreciated the adopted Collaborative learning approach online as they were shown much interest throughout the program via collaborative learning and teaching online, even when compared to virtual sessions in isolation of the entire team. The reason to adopt online collaborative learning is due to the sudden closure of educational institutions due to the advent of COVID-19. The utilization of cooperative learning in the conventional teaching process for the design subjects was found to be efficient and frequent; in this study, an attempt is made to identify the effectiveness of collaborative learning in online mode. For example, the evaluation of student group median scores was above the average for the selected and executed subject. In addition, the student feedback/comments indicated that courses with online collaborative learning in a group approach are interesting. Even in the case of the teachers, it is so informative and much more helpful in the coming days. Further, the study suggested that students perceive they have mastered communication skills in their necessary civil engineering courses. The results further indicated that the students accepted the concept of online collaborative teaching and learning, teamwork, and discussion in the online classroom. They also perceived that the development of communication skills would be a benefit to them in future endeavours. It is time for the engineering faculty to utilize

this resource and initiate the growth of online collaborative teaching/learning and teamwork in the courses under their direction. Practitioners or instructors must also recognize that future graduates may wish to apply these concepts in their workplace.

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