Using virtual platforms in Architectural Education to manage covid-19 An applied study at Horus University-Egypt

Associ. Prof. Dr. Amira Fawzy Helmy Almaz
Associate professor of interior architecture-Architecture department- Horus University
aalmaz@horus.edu.eg
Dr. Islam Rafaat Mohamed
lecturer of architecture-Architecture department- Horus University ,
iraafat@horus.edu.eg
Dr. Riham Salah Mohamed
lecturer of architecture-Architecture department- Horus University
rsalah@horus.edu.eg

Abstract:

In view of the changes that afflicted the world during the pandemic period of covid-19, which led to a different international perspective of digital technology and e-learning, which highlighted the urgent need to develop educational platforms to cope with those variables and different fields of education so that they can simulate and develop the full form of traditional education. Consequently, the term hybrid education, a concept that is not new, has emerged. It aims to mix teaching methods and strategies with various technological means to produce a hybrid learning system. The study aims to show the most important prerequisites for teaching the design curricula as they represent scientific contents of a special teaching nature that requires direct communication with the students and methods to teach them in light of the future developments using electronic platforms to bridge the gap between the tangible reality of traditional teaching systems and the aspired future towards adopting atypical teaching trends and employing the capabilities of electronic platforms to support the teaching requirements of the practical curricula and to assist those in charge of teaching with the modern methods that are compatible with the requirements of the curriculum and ways of activating those methods during crises time, such as the covid-19 pandemic. In addition, the study aims to promote the idea that the teaching process is a system of joint cooperation between the staff members and the students and between the students themselves in the form of an interactive collective work. The research adopted the application of the experiment on Microsoft platform for the first year students in the Department of Architecture, University of Horus. Being the first years of specialization in the university in addition to the university's modernity with no previous design experience, it was highly complicated**.**

Key words:

Platforms, E-training, Collaborate Spaces, Hybrid education, Design process

الملخص:

تفرض الادارة الفعالة للكوارث البيولوجية (أزمة كورونا) تحديات بحثية كبيرة علي انظمة ادارة الازمات الخاصة بالنظام التعليمي للطالب الجامعي الذي يدرس في الكليات العملية و خاصة كلية الهندسة و المتضمنة اقسام ذات طبيعة خاصة و التي تتطلب التعامل مع الطالب بصورة يومية ومباشرة من خلال دورات و محاضرات داخل المراسم و الاستوديوهات للمقررات النظرية والتطبيقية التي تحفز قدرة الطالب على التصميم والإبداع.

نظرا للمتغيرات التي واجعت العالم خلال فترة جائحة فيروس **covid-19** و الذي أدي إلي تغيير نظرة العالم إلي التكنولوجيا الرقمية و التعليم الإلكتروني مما أظهر الحاجة الماسة إلي تطوير المنصات التعليمية لتتواكب مع تلك المتغيرات و مجالات التعليم المختلفة بحيث تعمل علي محاكاه و تطوير الشكل الكامل للتعليم التقليدي و ظهور مسطلح التعليم الهجين و هو مفهوم ليس بالجديد فهو يهدف إلي مزج طرق التعليم و استراتيجياته مع الوسائل التكنولوجية المتنوعة لإنتاج نظام تعليم هجين **Hybrid learning** تهدف الدراسة لإظهار أهم الإحتياجات التدريسية لمقررات التصميم لما تمثله من محتويات علمية ذات طبيعة تدريسية خاصة تتطلب التواصل المباشر مع الطالب و كيفية تدريسها ضوء التطورات المستقبلية بإستخدام المنصات الإلكترونية لسد الثغرة بين الواقع الملموس لنظم التدريس التقليدية و المأمول نحو تبني اتجاهات تدريسية غير نمطية و توظيف إمكانات المنصات الإلكترونية لتدعم المتطلبات التدريسية للمقررات العملية و تذويد القائمين علي التدريس بالاساليب الحديثة و المتلائمة مع متطلبات المنهج و كيفية تفعيل تلك الاساليب في حال مواجهة الازمات مثل ازمة covid-19 القائمة بالاضافة إلي تعزيز فكرة ان عملية التدريس هي منظومة تعاون مشترك بين القائمين علي التدريس و الطلاب و بين الطلاب بعضهم البعض في صورة عمل جماعي تفاعلي.

تهدف الورقة البحثية الي دراسة تغيير مفاهيم تدريس المقررات المعمارية و تغيير اساليب التعامل مع الطلاب باستخدام منصات التعليم الافتراضي التفاعلية و بناء فصول أفتراضية Collaborate Spaces و دراسة تعاظم تأثير تكنولوجيا المعلومات و ظهور العديد من المبادرات التي تسعي إلي تطبيق مفهوم النعليم عن بعد و تدريس مقررات الهندسة المعمارية ألكترونيا باستخدام منصات التعليم الإلكترونية كبديل للاستوديوهات التعليمية و تحليل التجربة و قد تبنت الورقة البحثية دراسة تطبيقية علي منصة Microsoft لطلاب الفرقة الأولي بجامعة حورس.

الكلمات المفتاحية:
المنصات ، التدريب الإلكتروني ، مساحات التعاون ، التعليم المختلط ، عملية التصميم

Research Methodology:

- The research adopts the experimental approach, which investigates the effect of e-learning, as a future variable, on the architectural product as one of the teaching courses, either theoretical or practical. The single group is designed with two design tests; a pre-test and a post-test.

Research limits:

- The research is limited to studying the effect of e-learning on the first year students in the Department of Architecture - Horus University and the extent to which they meet their training needs, design an electronic scientific product according to their needs and measure its effectiveness on the practical and theoretical courses.

Introduction:

Effective management of biological disasters as Coronavirus pandemic imposes major research challenges on the educational crisis management systems for the university student in practical faculties; especially, the faculty of Engineering as its special nature departments require a daily and direct interaction with the students through courses and lectures within the galleries and studios for theoretical and practical courses that improve the student's ability to design and innovate. Among the most important facts that prepare the students to start a design process and

have a career are the practical courses inside the educational studios where the basic design concepts are presented.

The research paper aims to study changing the concepts of teaching architectural courses and the methods of dealing with the students using interactive virtual learning platforms, build virtual classrooms (Collaborate Spaces), and study the growing impact of information technology and the emergence of many initiatives that seek to apply the concept of e-learning as well as teaching architectural engineering courses via the electronic learning platforms as an alternative to educational studios and experience analysis. The research paper adopts an applied study on Microsoft platform for the first year students at Architecture Department -Horus University.

- The research is studying the effect of e-learning on the first year students in the Architecture Department - Horus University and the extent to which they meet their training needs, design an electronic scientific product according to their needs and measure its effectiveness on the practical and theoretical courses.

Hybrid education and teaching architectural design through:

• Mixing different types of Internet based technology to achieve educational goals, such as direct virtual classes and teaching based on cooperative education using (video - audio - texts)

• Mixing technology of teaching with virtual work tools to create designs that affect the harmony between teaching and learning.

E-learning, in all its forms and types, supports the viewpoint of student-centered education as they are the focus of the educational process. There are several tools available to the students such as virtual classes, e-mails, multimedia ... and others as in **Figure 1.** However, traditional education supports the instructor-student based education using only the traditional learning tools.

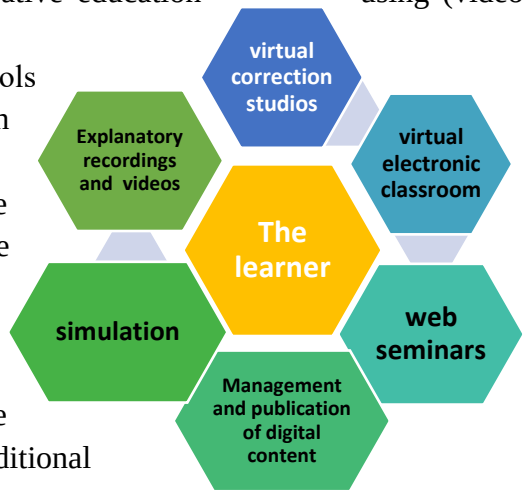


Figure (1) virtual education and the learner

Despite the difference in meaning and objective between the two terms; e-teaching and e-learning, there is usually an overlap between them; as they are treated as one term. The term e-learning represents the idea that the learner uses electronic media, which means that he/she educates him/herself. However, the difference between teaching and learning is that the latter is a personal effort and a self-activity emanating from the learner him/herself, while education is an effort with the help of another person.

E-learning is a limited educational activity related to the topics of lessons and teaching methods, while e-teaching is an integrated system that includes educational and administrative aspects and includes both concepts of teaching and learning.

Stages of development of education		
First stage	before 1983	The stage of traditional education and direct communication between the teacher and the student according to specific teaching & learning methods
Second stage	1984-1993	The time of multimedia in which windows and CD operating systems have been used as major tools for education development
Third stage	1993-2000	The emergence of the World Wide Web of Information “the Internet”
Fourth stage	2001 up to date	The evolution of the global information network and the design of educational platforms

Table (1) stages of development of education

E-learning features	
Flexibility and convenience	• Easy and fast access anytime and anyplace • The ability to easily access course contents with the possibility of challenging them • Ease of handing out assignments and doing exams and exercises using the educational platforms • Easy to follow students regardless of their numbers • All students have access to scientific content at the same time, unlike paper sources
Time	• Saving and organizing time and make good use of it • Student are allowed to follow the lectures at any time
Money	• Reducing the cost of travel, transportation and living • Reducing the cost of producing and distributing scientific material (textbooks)

Table (2) advantages of e-learning

At the beginning of the covid-19 crisis, e-learning managed to offer a solution for the difficult problem of teaching practical courses, especially in the Faculty of Engineering and Fine Arts, which include departments of an engineering nature that require direct interaction with the students. Design courses, in special, depend on the direct communication between the lecturer and the student, which was replaced by electronic communication using electronic platforms as an alternative to the traditional manual system, which controlled the users’ resourcefulness.

The multiplicity of electronic platforms with its various capabilities is another problem that has emerged recently. Electronic platforms provide alternatives that may be commensurate with teaching theoretical courses. However, the challenge lies in the direct communication required in teaching practical courses. The research paper studies the impact of e-learning on the first year students in the Department of Architecture, Horus University using Microsoft platform and the extent to which they meet their training and educational ends taking into account the main challenge of being the first class in this specialization due to the modernity of the

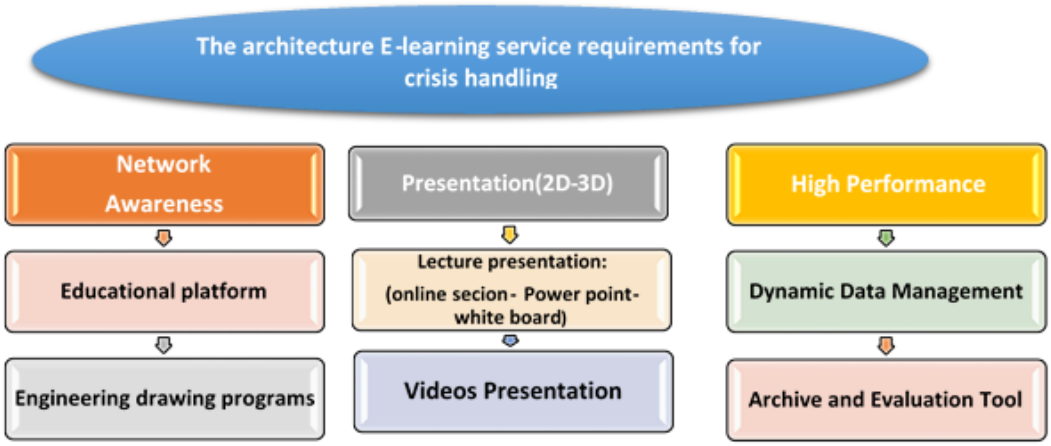
university, which requires measuring the extent of the effectiveness of the platform with its various capabilities to teach practical and theoretical curricula to the students and the staff members.

The Microsoft platform included several applications that were employed as follows:

▪ A collection of popular deployment Microsoft platforms.	
Software platform	**Purpose**
▪ Microsoft One note	Homework, lecture, liberally collect and Assignments
▪ Microsoft team	- Online meeting (staffs and students) and online lectures and classes for students. - Projects Assignments
▪ Microsoft Stream	Recording video for online lectures
▪ Microsoft Form	Quizzes

Table (3) A collection of popular deployment platforms

The research paper reviews the experience of applying e-learning to students of the first year on four courses, including three practical courses, which represented a difficulty in the beginning of the period of distant communication, as it represents the first steps for students with various design courses, number of students: 91.



The previous figure (2) reviews the main requirements of the educational service for the proposed electronic architectural education for the effective management of education during the covid-19 pandemic. There is a proposal to use the Microsoft platform with its various programs, while studying the possibility of employing it to suit different educational courses to provide a distinguished educational service.

1. What are the requirements of the electronic architectural education service?

1.1 Real Time Requirements:

The requirements available at the time of the crisis management necessitate that the student is to be aware of using the electronic network and navigating between the various programs to search for information related to the curriculum. In addition, the student needs a dynamic reformat in order to adjust the service itself in accordance with the dynamic nature of the

networks. Specialization subjects have been distributed according to the credited hours for each of them through the Microsoft team calendar. Organizational schedules that help the student to organize time and ensure achieving the best possible performance have been set.

The date and time of the virtual lectures and classes were organized by placing electronic schedules linked to the university students' emails so that they can work to organize their time. In addition, an alert message is sent on the personal e-mail before the date of the lectures or the submission of projects.

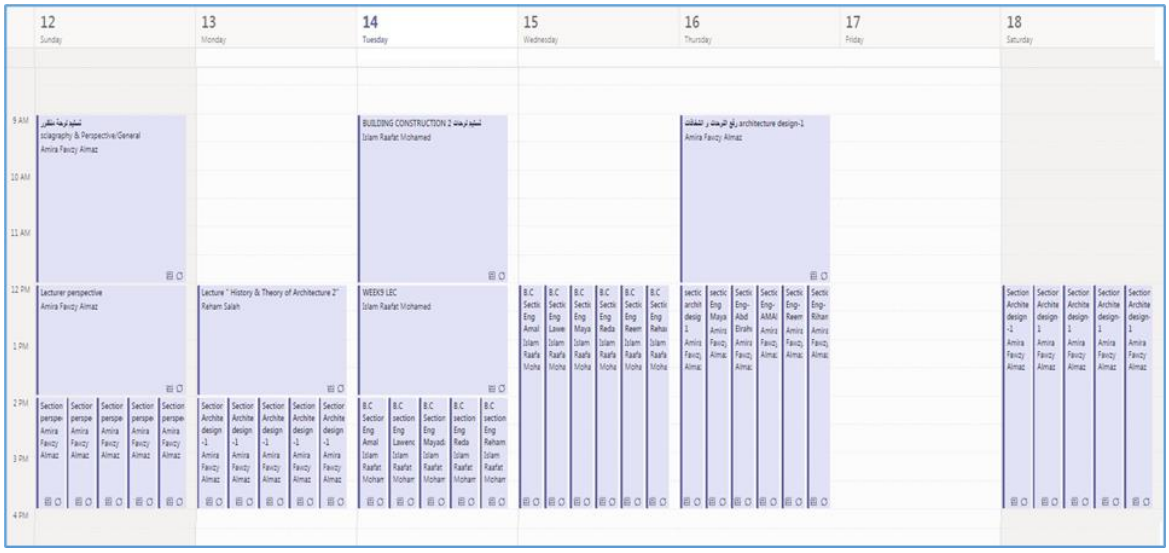


Figure (3) the weekly schedule of lectures and virtual classes

1.2 Presentation Requirements:

The educational process management systems by Microsoft platform include three-dimensional display and show methods according to the nature of education and the architectural engineering teaching curricula, which depend on visualization and ways of direct communication between the student and the staff member as a quick way to deliver and illustrate information through the presentation and explanation of some ideas depending on the nature of the course (theoretical - practical), each of them has a different presentation method to display the content. Education is a systematic targeted process that has a specific objective to transfer knowledge to specific people in order to develop their capabilities through the relationship between the teacher and the learner. There are two methods of transferring knowledge, namely presentation and exploration. Presentation depends on the teacher's effort to provide information to the learner through various teaching methods, delivering, measuring, and audio and video presentation. However, exploration depends on the learner's (student's) effort in concluding, discussing, and resolving the design problem using some learning data.

Similarly, in the field of architectural design education, each group of professors has a different approach to education and a different thought, provided that these approaches do not contradict with the capabilities and qualities of both the student and the staff member.

In regard to the theoretical courses, presentation methods can be used to give virtual lectures using some programs (PDF-Power point-white board) that can be used easily through Microsoft platforms, such as Microsoft team, which provide the opportunity to view the lecture by one of the aforementioned methods. Furthermore, they provide the opportunity to interact with the

student in writing or drawing sketches on the white board, and allow direct audio-video communication in addition to linking all Microsoft programs to each other, such as linking Microsoft team to OneNote. Additionally, explanatory videos can be displayed to facilitate the rapid delivery of the information.

In regard to practical courses, presentations can be done by using engineering programs that can convey the design idea and make editing and corrections to the ideas in relation to the proposed design project for the students, which is available through the (2D-3D) presentation programs and direct interaction with the student to support him/her so that he/she can continue to communicate, because he/she believes to receives direct information.

The process of teaching design courses depends on teaching the way of thinking, which is based on discussion, dialogue and debate. It relies on teaching of an organized approach based on the design process sequence according to specific steps, focusing on developing skills, in addition to teaching the student innovation and creativity. Researchers have tried to implement these steps using technology and engineering programs as a virtual alternative supporting means to direct communication between the work direct triangle of the student, the lecturer and the design sheets and sketches.

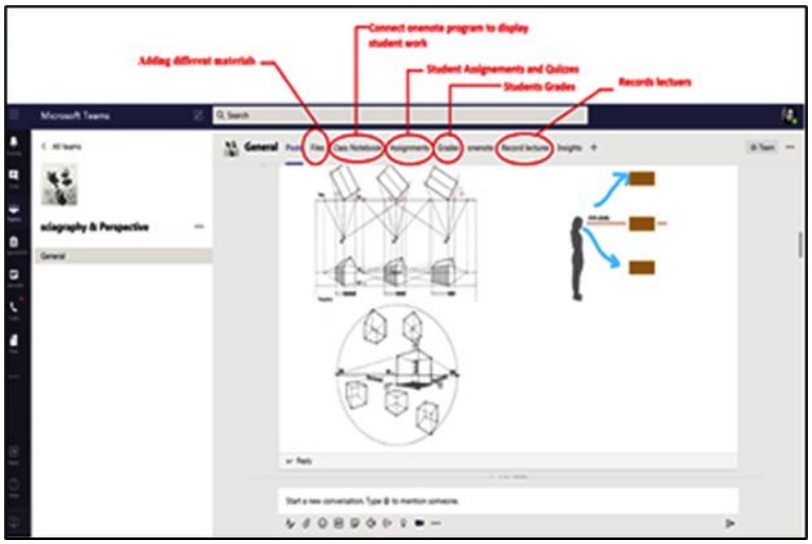


Figure (4) the general interface of Microsoft teams

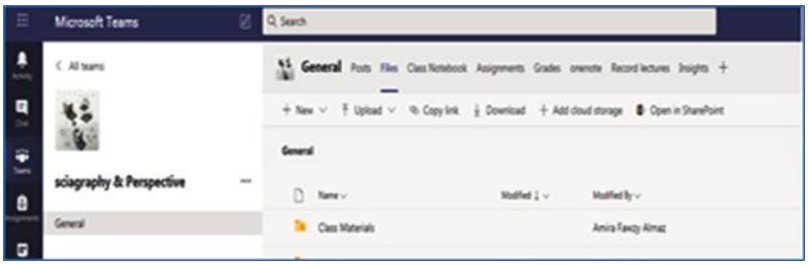


Figure (5) downloading the scientific content files easily and in an organized manner that enables the student to follow-up or download them easily

1.3 Added Value Service Requirements:

The Microsoft office 365 electronic platforms have managed to achieve effective performance through the availability of many applications that allow the students to display information without any difficulty in any of the applications that help the students to select appropriate

information for each of them to receive or display. These applications help to ensure the best possible quality during crises time. Furthermore, they help to manage the data fed either by the staff members or the student him/herself, as there is a link between these applications. On the one hand, the students use OneNote for submitting the required assignments for each course; however, Microsoft team which is used to upload the scientific content of the course can be linked directly to OneNote. On the other hand, the electronic platforms for engineering education are considered as an archive of information and student forms, as well as a means and tool for assessing the level of students by doing exams for architectural courses as a whole in addition to linking the form program with the assignments section.

3-1 All students' accounts were loaded onto Microsoft OneNote to check on daily homework submission, especially in practical courses such as design, perspective, and architectural construction.

Figure 6 shows the ability to perform a design or perspective project editing using OneNote

Students accounts Divided into several duties sections:
- Assignement
- Quizzes
-Homeworks
And ech.....

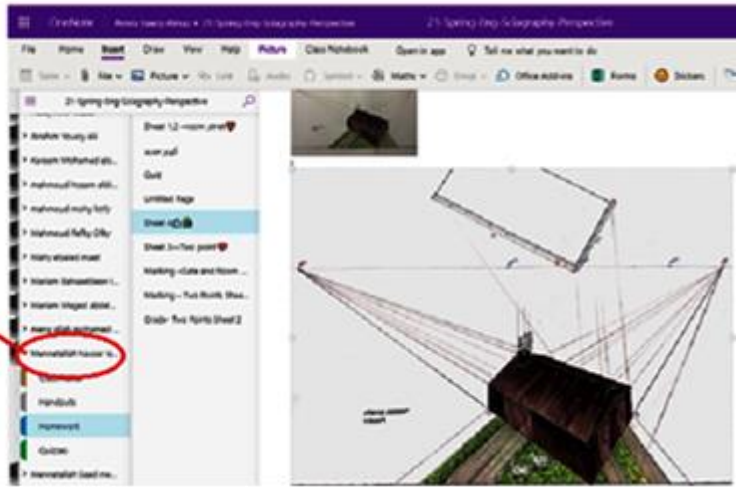
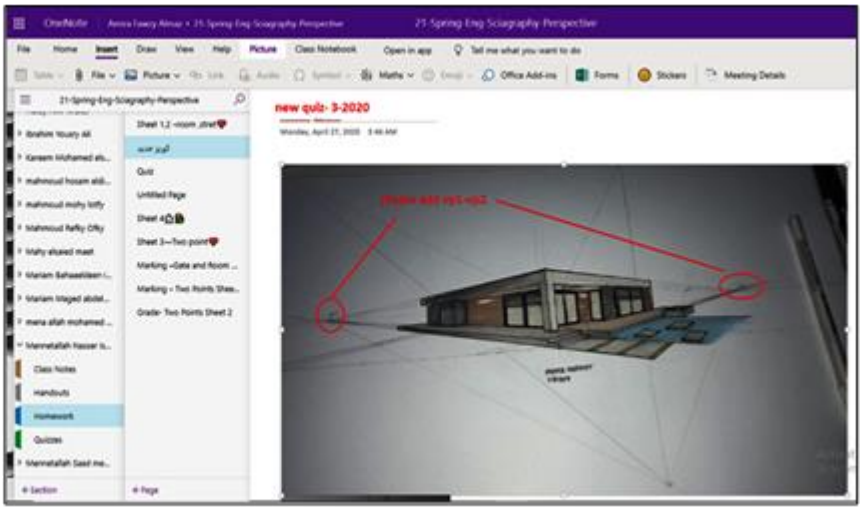


Figure (7) The various techniques in the program helped in dealing with most of the applied subjects (practical) such as Building constraction-2 at all stages of the project, whether the sketches are approved or edited.



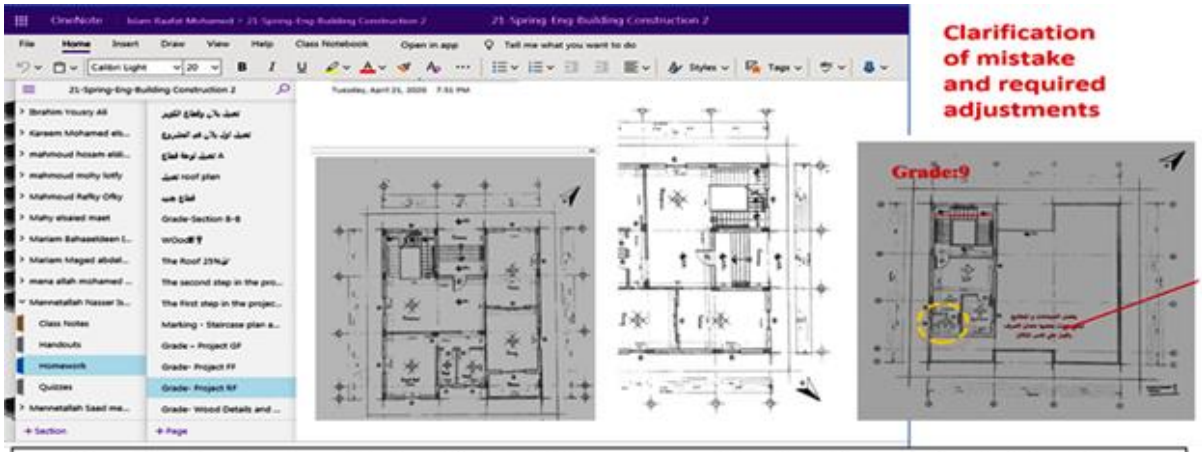


Figure (8) OneNote provides the ability to follow up on weekly submissions and make the editing required by the lecturer

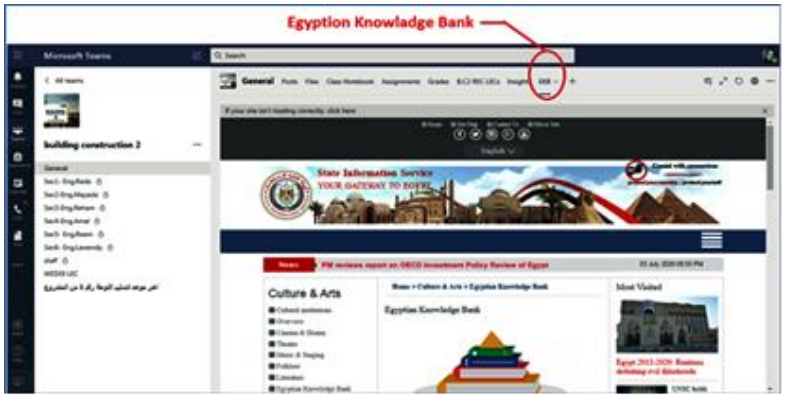


Figure (9) linking Microsoft team of the first year students' courses to the Egyptian Knowledge Bank (EKB) to facilitate the search process and collect information related to scientific contents

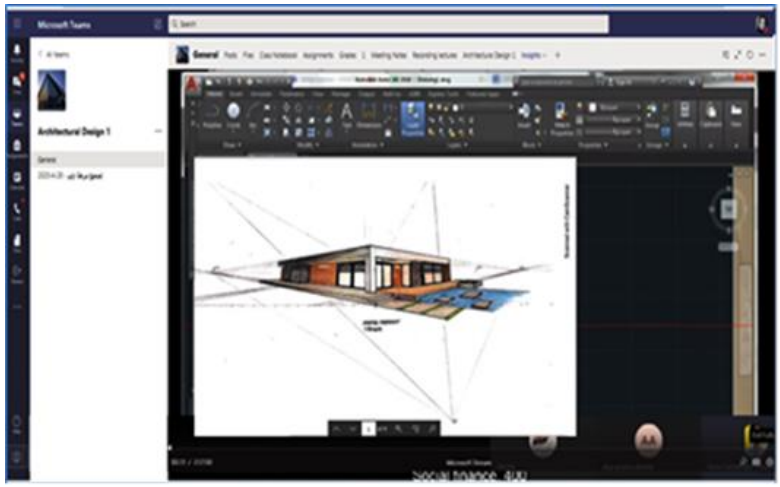


Figure (10) Using the Auto Cad program through Microsoft team program in the virtual follow-up classes

In light of the current conditions of the Coronavirus pandemic, software programs have managed to provide educational platforms to bridge the gap between the students and the staff

members to create a new environment of research that relies on books, educational curricula and multimedia to provide a continuous record of lifelong learning, which was provided by the Microsoft platform during the global downtime for all libraries as a result of the Coronavirus pandemic. It has been possible to link Microsoft team for all the first year students' courses with the Egyptian Knowledge Bank (EKB) to facilitate the process of research and collect information on scientific contents.

This gave students the opportunity, during the distant follow-up period, to obtain the required information and references in all subjects. Teaching design courses represented a major challenge for the e-teaching process during the covid-19 pandemic due to its special requirements such as the direct communication between the students and the lecturer and the continuous hands-on follow-up in editing the project's sketches on a daily and continuous basis, which represented a real challenge during the lockdown period and required an extensive schedule of follow-up and explanation. The stages of teaching the subject are summarized as follows:

1. Problem identification:

- Following-up the design course requires one-to-one communication with students, which requires dividing them into virtual classes.
- The necessity of continuous daily follow-up to the students; especially, the first year students who study design for the first time.
- Attempting to link the follow-up programs with the engineering programs used in the follow-up.

2. Solutions:

- The students were divided into 15 students in each virtual class, followed-up by a staff member and an assistant.
- Setting the subject schedule to four days per week, in contrast to the follow-up schedules within the university, which were limited to only two days per week as shown in the previous schedules.
- Using sketch up, Photoshop and Auto Cad software for follow-up and edit designs.

The design process represents an effort aimed at finding solutions to major problems in an attempt to implement them. Design is an organized process that relies on analysis, evaluation, and making choices. The stage of thinking, selecting solutions and finding results is a part of the design process. To do a creative and innovative work, four stages must be applied:

1) The stage of thinking and preparation
2) The storage stage, realizing the design problem, and finding solutions
3) The stage of generating design ideas and solutions
4) The verification and proof stage, which depends on the application of the design results and the emergence of the final idea

These stages need an organized system and good thinking. The possibility of direct communication between the teacher and the student has helped in trying to achieve these stages during the initial follow-ups of the design course.

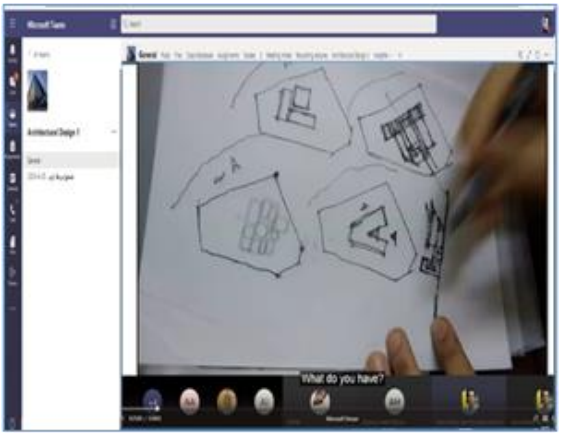


Figure (11) Manual follow-up with the student using video techniques through the Microsoft team program to compensate for the shortcomings resulting from the lack of direct communication and to clarify the required editing and manual explanations, especially during the initial period of follow-up design after the direct teaching cessation

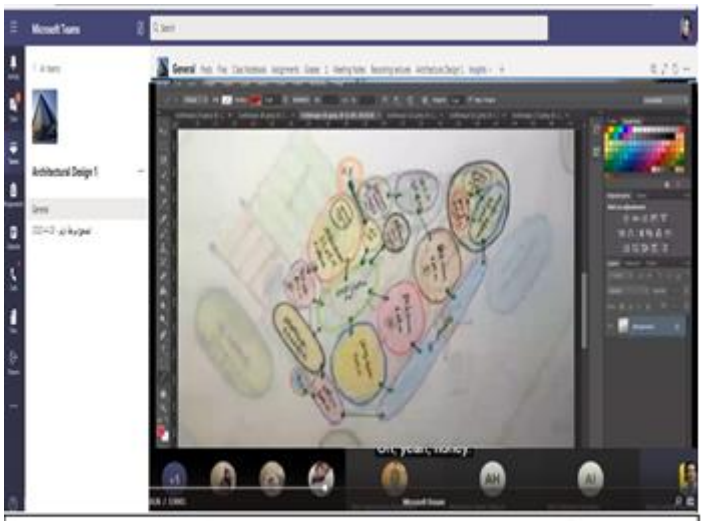


Figure (12): Using the Photoshop program in following up the design course through the Microsoft team program

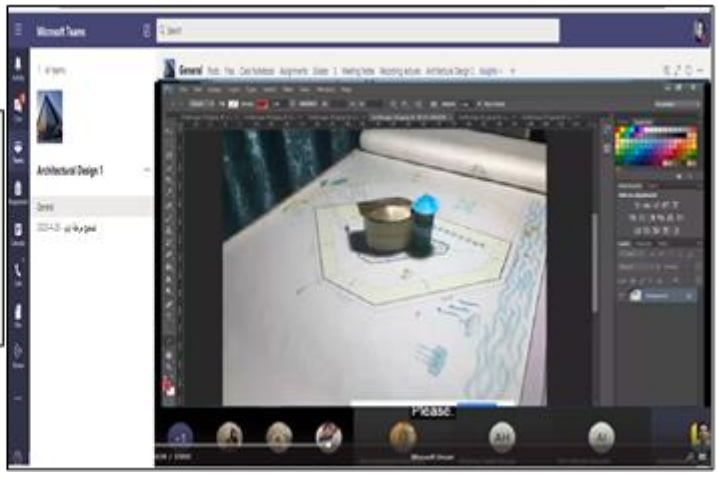
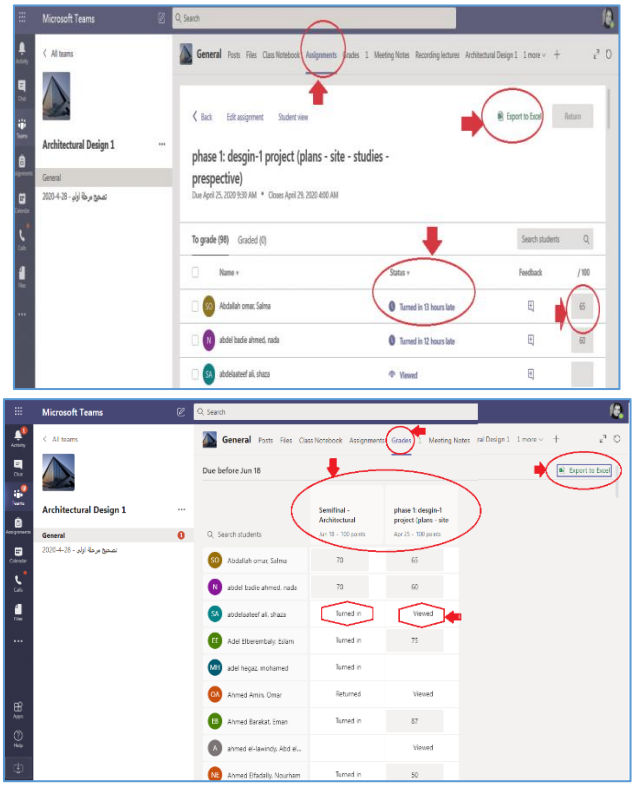


Figure (13): Using the Photoshop program in following up the design course through the Microsoft team program, to facilitate converting the initial idea of the project

Electronic evaluation: The process of employing information networks, educational software and multi-source educational material using evaluation methods to reach to a solid judgment based on quantitative and qualitative data in relation to the academic achievement.

The presence of project submission technology within the Microsoft team in the form of an assignment helped facilitate the follow-up processes, periodic submission, and weekly follow-up degrees for students with the ability to return grades and editing to the students, which facilitated the process of communication between the lecturer and the student in an organized manner in addition to linking this tab to the grade tab which directly lists students 'grades and uploads them to an Excel file in an organized manner. The submission and follow-up process on the Microsoft team assignment program is characterized by the ability to specify the submission date, limit student submission times and identify the late students.



Figures (14-15)
The program guarantees an organized follow-up of the educational process, submission of assignments, follow-up, listing grades, and the ability to return grades for students with the possibility of direct listing in an Excel file titled Assignment Name.

The e-learning period in light of the covid-19 pandemic was marked by a boom in the updates of the educational electronic platforms, especially the Microsoft platform, where an analytical tab is added to measure the extent of student interaction and response (Insights tab). The goals of e-learning must be viewed through three integrated aspects of the student, the teacher and the educational institution, as none of them can be separated from the other. E-learning aims to increase the student's ability to self-education.

Figure (16) shows the ability to list grades and return them to students via the return tab and the ability to write the required comments through the feedback tab.

• Insights tab:

Insights tab provided an integrated statistical picture that helped in developing and following up the educational process during the crisis period. One of the advantages of the digital submission of sketches in the projects of the proposed subjects is the ease of following up the students' due submission dates, as the program identifies the percentage of sketches received on the due date and compares that throughout the semester. In spite of the possibility of applying hybrid education in the upcoming classrooms after Covid-19 pandemic and the possibility of choosing design courses for their special nature that was mentioned within the curricula of direct communication and highlighting the need for students to attend, the electronic submission pattern of sketches and projects is recommended to continue for several reasons, the most important of which is that the task is carried out in a very organized manner, the possibility of improving the performance of the educational process according to the accurate statistics, in addition it agrees with the necessary precautions to avoid the transfer of any infection due to the circulation of student sketches' sheets.

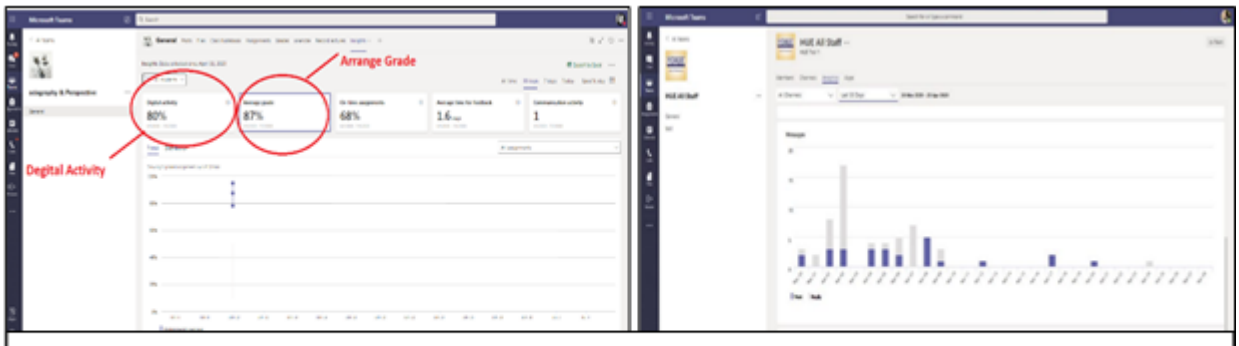


Figure (17) the program performs statistics to calculate the rate of increase of the grades for each project, which facilitates making a comparison to the degree of difficulty of each project and the extent of student response.

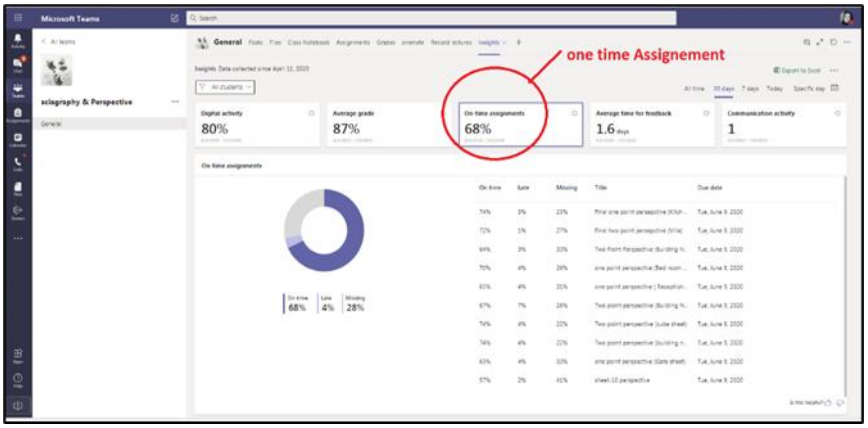


Figure (18) following up students' commitment to the announced submission dates and making comparative statistics that help in studying the development of student performance

Conclusion

Combining an e-learning approach with traditional learning to produce a hybrid teaching is considered to be a major step in the educational process of design courses. Whatever the circumstances are, the potential of educational platforms will help increase students' interest as well as the ability to communicate directly and continuously with their teachers, which is very important in our modern life with its various environmental disasters such as the Covid-19 pandemic. In regard to professors, it is not always easy to work with some new tools and innovations. However, it is believed that the future lies in the integration of information technologies within the educational process. Therefore, it is necessary to use and follow the continuous updates that are made on the educational platforms and study how to adapt them to serve the educational process, especially in the design field, which brings about a positive impact on the community and the educational process of architectural design programs. Nonetheless, Design Studio requires an integrated approach to ensure an ideal learning process for the students of architecture Engineering. All supporting materials in the Architecture course must be properly integrated to ensure useful learning in Design Studio as part of the learning goals of the architectural design studio is to help architectural students develop their skills in critical, creative, and practical thinking.

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