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Benefits, Disadvantages, and Constrains of Applying Blended and Virtual Design (Case Study: Studios at Nahda University).

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Benefits, Disadvantages and Constrains of Applying Blended and Virtual Design (Case Study: Studios at Nahda University)

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Abstract—**E-learning in our countries faces many challenges and constrains that may prevent it from reaching its goals. This study aims to explore the virtual design studio VDS and blended design studio outcomes on education in terms of benefits, disadvantages, and constrains to come out with lessons to be a key-stone in developing the learning process. This research presents the results of a study that lasted for two consecutive semesters, in which the teaching of architectural design studio moved from traditional methods to virtual then to the blended system at Nahda University in Beni Suef related to the current situation necessitates in the universities to use technological applications as an alternative to the conventional learning system (face to face) due to the spread of the Coronavirus (covid-19). The descriptive and analytical approaches were used through literature review, participant observations, interviews, and questionnaires. The findings from this study motivate adjustments to existing curricula that can provide new visions into traditional pedagogical models related to design studio. Results show that the blended system helped to solve many problems and reduces the constrains of the virtual design studio and keep the benefits of the conventional learning system.**

I. INTRODUCTION

THE educational process is an integrated system in which the material and moral elements overlap to provide an appropriate educational environment which is a prerequisite for improving the quality of education. The educational environment is not only limited to the curriculum, but also includes the instructor, the student, equipment and requirements, and the successful educational process is not complete without evaluation and the continuous upgrading of its various components [1].

Technologies are an important tool for visualization and implementation by making a tangible contribution. Over years many digital interfaces, that use virtual reality techniques, have been developed to digitally visualize an architectural project in an interactive way, the same way the developments in information and communication technology (ICT) are also reshaping teaching and design practices in the architectural design studio [2]. The observer of the educational systems conditions recognizes that learning has never been immune to the societal conditions surrounding it, as it is always affected by everything that goes on, events and changes. Due to the spread of the Coronavirus (covid-19), it is necessary to take advantage of technological and electronic development to achieve learning outcomes, so architectural design studios have turned towards e-learning as a temporary alternative to

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the regular education system then the blended learning was used.

Architecture departments in Egypt are committed to teach design through traditional education, student and teacher gathering in one physical environment, in the studio, and after the increases of the Corona virus spread, the architectural design studios have turned into fully virtual studios.

E-learning in our countries faces many challenges and constrains that may prevent it from reaching its goals, and the most prominent of which are [3]:

1) First: Material constrains and challenges, including electricity and communications, the students' need for equipment required for e-learning such as computers, the lack of a high-capacity network to ensure the speedy download of educational curricula and programs and sudden malfunction in the internal and external networks or computer devices.

2) Second: Financial constraints and challenges, including: The application of e-learning requires students to have experience using computers and the Internet, and the limited coverage of the Internet and its slowness and high price.

3) Third: Psychological and human constrains and challenges, such as lack and weakness of experience, as well as psychological outcome of working in front of computers, such as introversion and boredom [3]. The virtual learning environment of architectural education is the only tool for communication between the student and the instructor in light of the spread of Corona virus.

The learning environment in general affects student's creativity [4]. Physical environment and psychological dimensions are important to various needs of the learners as supportive tools of 'being there' or socially involved or acquire an emotional significance. When students showing disappointment with specific condition of environment, physically or psychologically, they are unable to reach the expected level of creativity [5].

The descriptive and analytical approach is implemented in this research to demonstrate benefits, disadvantages and constrains during the teaching process to improve the teaching process. The researcher used the interviews and questionnaire tools to investigate the real situation related to the case study of Nahda University

II. ELLECTION OF THE RESEARCH PROBLEM

The sense of the research problem stemmed from several matters, namely with the necessity to use e-learning to fully or partly teach the architectural design studio due to the spread of Covid-19 and with the newness of the experiment, which was applied surprisingly, it was necessary to explore its outcomes

on education in terms of benefits, disadvantages and constrains to come out with lessons to be a key-stone in developing the learning process. This research presents the results of a study that lasted for two consecutive semesters, in which the teaching of architectural design studio moved from traditional methods to virtual then to the blended system at Nahda University in Beni Suef. Previous studies confirmed on the existence of a number of challenges and constrains that prevent achieving the desired results of the virtual design studio, knowing that the current situation necessitates many universities to use technological applications as an alternative to the conventional learning system (face to face). The current research problem is determined by answering the following questions:

1) What are the benefits, disadvantages and constrains of using virtual design studios within the e-learning program.

2) Had the blended design studio helped to solve or reduce the disadvantages and limited the effects of constrains of using virtual design studios.

The importance of the current research lies in seeking to diagnose the actuality of e-learning at Nahda University, relying on the opinions of instructors and students in the first stage then students in the second stage, to choose the best method to use in design studios to achieve the optimal outcome for the educational process.

III. RESEARCH METHODOLOGY

This study has been applied to the Architectural department at Al-Nahda University in Beni Suef, where three different systems were studied, which are the traditional design studio, the virtual design studio, and the blended design studio. This research provides an evaluation and review of the virtual architectural design studio and compares it to the traditional and the blended. This paper presents the benefits, disadvantages and constrains within a practical application for students over a period of ten months.

In order to achieve the objectives of the research, the researcher used the descriptive and analytical approach in research implementations. Because it depends on the description of the reality or phenomenon as it exists, its analysis and the statement of the relationship between its components and the opinions that are raised about it. This study starts with a problem definition then a desk study to explore benefits, disadvantages and constrains of teaching virtual architecture design studio from previous studies. Results revealed specific description to the real situation which taken into consideration to develop approach with viable solutions and guidelines, see Fig. 1
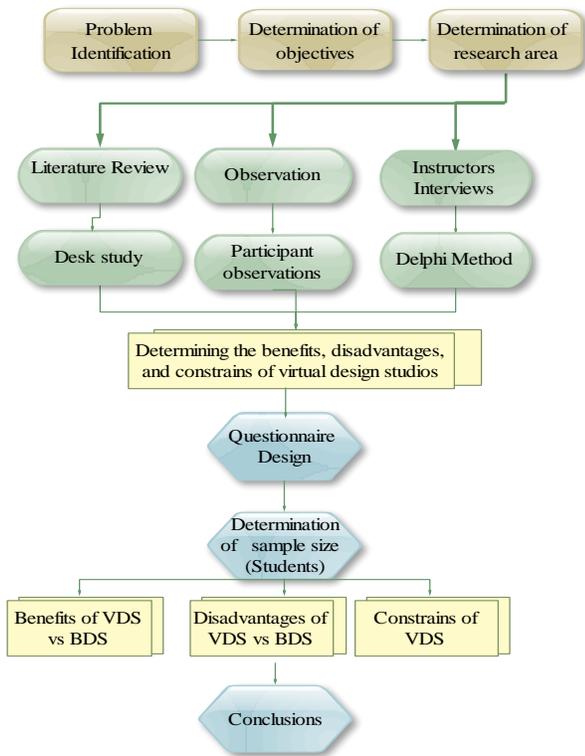
Fig. 1. Study methodology and structure

The next steps clarifies the phases of this study as shown in Fig. 1:

1) The first phase of this study consists of reviewing the benefits, disadvantages, and constrains of virtual design studios from previous studies.

2) Then, using observational methodology, not controlled observations and naturalistic observations, but participant observations this is due to the fact that the researcher is one of the architecture department instructors who are participating in teaching virtual design studio.

3) Interviews with instructors: using the Delphi method [6] to enumerate the reasons through interviews. Instructors practicing the virtual design studio answered a set of questions that include the most occurring benefits, disadvantages, and constrains of virtual design studios that they found or encountered during the teaching process. After instructors answering the first round, they repeat answering to the second round after reviewing other instructor's answers from the previous round and the reasons on which their judgments were based. Consequently, professors were encouraged to review their previous answers in the light of responses from other members and in light of previous studies. Then answers were classified according to the repetitions' times to reach a summary of the answers which were placed in a questionnaire that answered by students. They were twenty-three instructors (professors and research and teaching assistants)

4) The results were summarized and put into a questionnaire and the students were asked to respond to it. The questionnaire consists of three main sections: the first section is about the benefits, the second one is about the

disadvantages, and the last part is about constrains that encountered during their participation in the virtual architectural design studio during the spring semester of the academic year 19-20.

5) The same questionnaire was applied to the students themselves after their participation in the Blended architectural design studio that combined conventional and virtual education (the first week students met the instructor in the studio inside the faculty (face to face) and the second week they receive online modifications and so on during the first semester 20-21.

6) The results of the two-applied questionnaires were compared to reaching the results. Comparative analysis was conducted between the two experiments to find out which one worked best, and whose disadvantages and constrains are less

IV.   LITERATURE REVIEW

Blended, Hybrid, and Mixed-Mode Learning are defined as a pedagogical approaches that includes a combination of computer-mediated with face-to-face instruction [7].

Blended learning BL means the integration of face-to-face and online instruction [8]. It is effective to use blended learning experience to teach Architecture design by practical face-to-face tutorials that allowed students to work on their projects, present their work, and engage in the dialogical learning process that comes after flipped classroom model where video lectures, software tutorials, and additional readings were delivered online through a Learning Management System [9].

Virtual places, which include virtual worlds, can be defined as computer-mediated dynamic world models that create a sense of place. The advantage is the abundance of tools available for supporting the design process and communicating with others The disadvantage of VDS are the lack of coherence and collaborative 3D modelling tools. The comprehensive support for all aspects of computer-supported collaborative design is not as well developed in virtual worlds, but the development of a community of collaborators has the potential to facilitate communication and collaboration [10].

Some studies reviewed the disadvantages in the virtual architectural design studios, they found that the lack of face-to-face interaction is a clear flaw, as well as technological problems such as data transmission, the connections, and information media that each participant may cause difficulties in developing project performance, in addition to limiting security and privacy in the evaluation process of students architectural production [11]. Constrains in using e-learning in are related to lack of experience and weak capabilities of devices and Internet use [12].

Architecture departments develops pedagogical models and new learning methods such as Blended Learning and Distance Learning.   To offer appropriate architectural education to learners; adaption contemporary educational models is a necessity such leveraging the impact of digital knowledge [13].   There was an experience during 1993 in a program called "Virtual Design Studio VDS" that aimed to

examine how design collaboration are affected by technology and how to design across the barriers. Thy used many tools such as internet and CAD. They had problems in co-ordination, weak software skills (made students sketching on paper), students found this system disappointing them, failed to make all synchronous activities of design and slow files transfer by internet. The advantages were providing new ways to work, and introducing better collaborative attitude. They recommend the ability to edit graphics and exchange videos and audio recordings to ensure success of VDS [13, 14]

Collaborative work at a distance between students proved to be a great motivation. Which means that VDS add educational value to the traditional design studio. Some advantages of VDS are students' benefit from variety of participants and not only their studio instructor [15]. Different tools of communication and interaction took advantage by using combination of conventional studio and VDS. A hybrid approach can solve many limitations related to design studios [16]. Design practice in general affected by the academic physical environment which encourage collaborative work with students as Information and Communications Technologies [15]. During design process, it's essential to offer co-operation or co-ordination which is different from collaboration; to reach the aims which can be achieved by VDS [17].

Technological advances had an impact on the field of architectural education, computer technologies were started to be used in architecture as a tools to design and present projects or as a tool of teaching and delivering information and designs [18]. College of Arts and Creative Enterprises at Zayed University mention that it is still possible to find and experience alternatives and methods to teach interior design without physical contact. They clarify that they achieve the course learning outcomes. [19]. Technologies start to reshape teaching and design practices in the architectural design studio [20]. VDS can support interaction and complex social learning, leading to successful student outcomes and motivates students intrinsically [21]. In light of previous studies, a set of results was reached that can be summarized as shown in Table 1.

V. NAHDA UNIVERSITY EXPERIENCE

Nahda University was chosen because the researcher is one of the faculty members at the university and has witnessed the experience of traditional, virtual, and blended learning within the university, and the university is to some extent considered equipped in terms of means of communication and electronic education that has been used for years and represents a model that can followed. It had less difficulty switching to an e-learning system during the Corona period.

Upon the spread of Covid-19, the design studios at Nahda University were transformed in March 2020 (spring semester) into a virtual studios, according to the procedures followed to prevent contact and interaction to reduce the spread of Corona virus.

TABLE 1
PREVIOUS STUDIES RESULTS SUMMARIZATION RESEARCHER

	Benefits	Disadvantages	Constrains
Conventional design studio	• Face to face Communication [11,15] • Face-to-face adjustments as directed by the instructor [11,15] • Ensure that the work product is of the student • Work in all traditional and digital means [10,15] • Make the massing models that help to present the idea	Some students are distinguished in terms of time of communication and the amount of modifications [11,15]. • A specific time and fixed timing, regardless of the student's psychological state and physical comfort [11,15].	Covid-19
Virtual Design Studio	• It encourages independence and self-reliance [21] • Various methods and different means of modifying projects and communicating [17]. • Flexibility of studios place and time, selection of the appropriate to achieve better performance [21] • Achieving an interactive virtual environment between students themselves and between students and instructors [13,14,15] • Reliance heavily on problem-solving strategy in design and critical thinking [15] • Recording modifications and making them easy to refer to at any time [9]. • Communication is available all the time [13,21]	• It consumes more time to adjust students' work • Lack of participation among students in educational activities and social communication [11] • face to face communication is missing [11] • Not ensuring that the student is the one who makes the modifications [11]	• The need for equipment such as devices, communication networks, and the Internet [11]. • Technical and practical determinants [11]. • The incompatibility of the versions of the programs used by the students, as well as the type of programs [11,10]. • Language of devices and applications (English language) • How to use applications to communicate and modify [13,14] • Reliance on software to demonstrate the block of the project [18].

In design studios, many applications were used to communicate instructors with students such as Microsoft Teams, Zoom, and Whatsapp. Different programs also were used to modify, develop, and present projects such as AutoCAD, Photoshop, 3D Max, Sketch up, Paint and Sketchbook. Design instructors noted that they need twice the time needed in conventional design studio to make adjustments for all students, so they had to divide them into smaller groups (5-7 students) who are supervised by a research and teaching assistant, and all groups are supervised by the

course main instructor.

Projects are displayed on the screen and shared with students, adjustments are made by photo editing programs or drawing programs. Student discussion and changes are recorded, with the ability to save recordings for students to return to it when needed. All projects were submitted in digital techniques using AutoCAD for 2D drawings and 3D rendering programs for perspectives and masses. Finally, after the end of the design studio experience, students were asked about the benefits, disadvantages, and constrains that they encountered using a questionnaire tool. See Fig. 2.
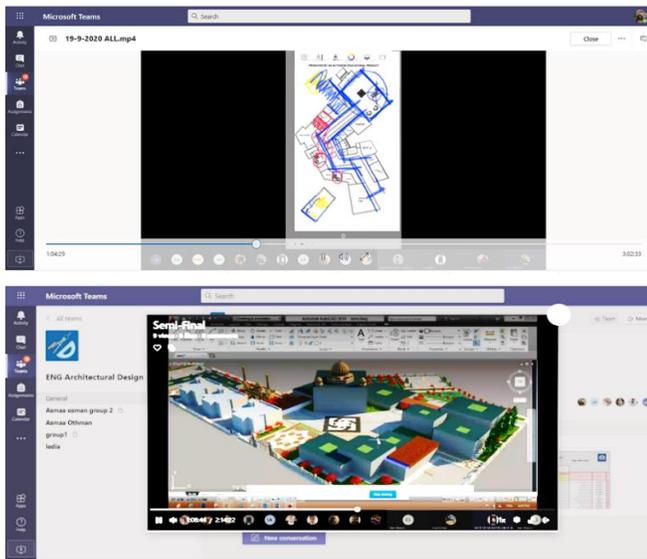

Fig. 2 The Virtual design studio (Spring semester)

After reducing the preventive procedures from Covid-19, a Blended-design studio was adopted, where instructors were met face to face inside the conventional design studio in the first week then adjustments were made during the virtual design studio in the second week. The situation continued to be reciprocal until the end of the semester to try to overcome the disadvantages that students referred to in the first questionnaire, and after the end of fall semester, they were asked about the same disadvantages and constrains that were asked about in the first questionnaire that related to VDS. See Fig. 3
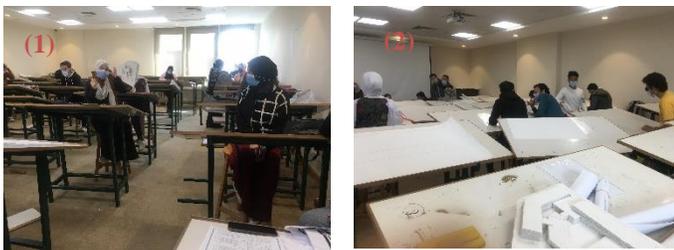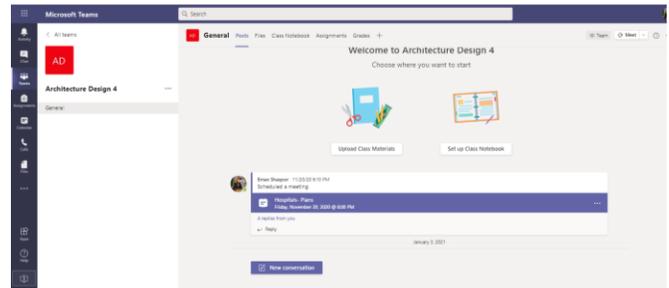

Class meeting
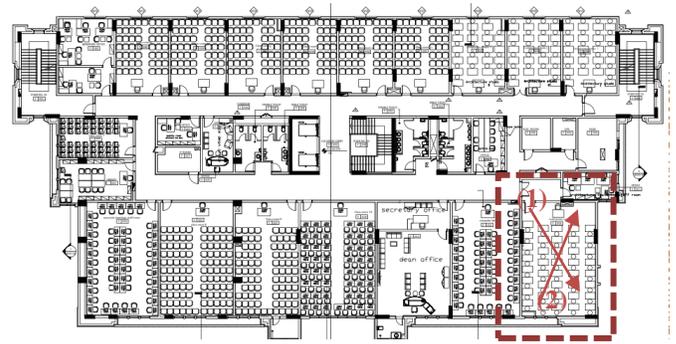
Online meeting

Fig. 3 During the Blended design studio (Up: class meeting, down: online meeting)

VI. RESEARCH PROCEDURES

A. Research Community and sample

The community consisted of all instructors (23 instructors) who participated in the teaching of the virtual architectural design course to find out the benefits, disadvantages and constrains of VDS. A questionnaire was distributed to all students of the Architectural Department who are studying the Architectural Design Studios course at Nahda University in Upper Egypt, the total number of students is 63 students and only 59 students answered the questionnaire, as shown in Fig.4

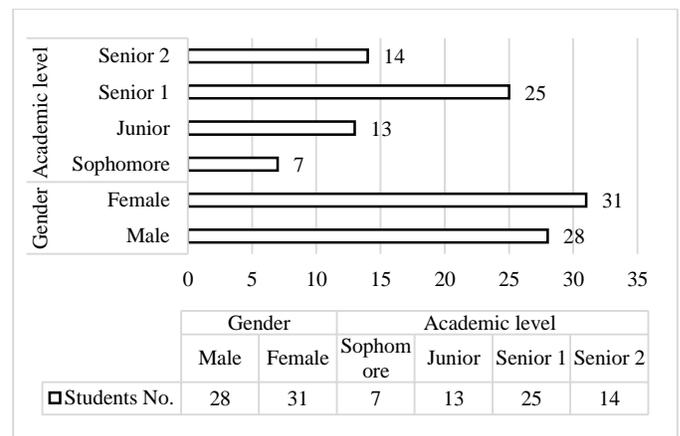|	Gender		Academic level			
	Male	Female	Sophomore	Junior	Senior 1	Senior 2
☐Students No.	28	31	7	13	25	14

Fig. 4 The distribution of the research sample according to the research variables.

The sample (63 students) was chosen by an Intentional method from the research community, where the research tool (the questionnaire) was distributed among 63 of the architecture-engineering department's students who Joined a virtual design studio, and 59 questionnaires were retrieved.

Thus, the retrieval rate is 94%, which is an acceptable percentage to complete the research.

B. Study tools Validity and Stability

The tools of this study was interviews with design studio instructors and questioner

1) The interviews: The researcher used the interviews tool in this study. The validity of the research tool was verified by presenting it to a group of specialized arbitrators, who gave some observations and opinions, and indicated the validity and suitability of the questions for this purpose. The stability was measured by the researcher testing the tool prepared on two members of the sample, to see its suitability to reveal required, determining the time, and the ability of the instructor to understand the questions involved, and after a week the two members were re-interviewed by the researcher, using the same questions to find out the stability of the answers, as the two analyzes were identical with a percentage of up to 90%. The researcher made the necessary arrangements for conducting interviews with instructors in an individual manner

2) The research tool (questionnaire): The researcher used the questionnaire tool which consisted of (23) phrases divided into three axes (benefits of using e-learning, disadvantages of using learning and constrains that limit the use of e-learning). The answer to the paragraphs ranges from the answer (completely disagree) then the answer (don't agree) to the answer (neutral) to the answer (agree) and (very agree) on the five-point scale of (1-5), the stability coefficients of the questionnaire sections are shown as follows in Table 2:

TABLE 2
STABILITY COEFFICIENTS OF THE QUESTIONNAIRE

Field	Paragraphs' number	Stability coefficient alpha Cronbach
Benefits of using VDS	9	0.80
Disadvantages of using VDS	8	0.85
Obstacles of using VDS	5	0.71*

It is also evident from the previous table that the values of the stability coefficients range between (0.71-0.85), which indicates that the current research tool is able to reproduce from 71% to 85% of the current results if it is re-measured, researched and used again under the same conditions. These values were considered appropriate and acceptable for the purposes of research and the objectives for which these areas and terms were set

C. Statistical Processing

The necessary data statistical processing was done by extracting numbers, percentages, arithmetic means and standard deviations. The research hypotheses were examined at the level ($\alpha = 0.05$), by means of a t-test for independent samples and a single-variance analysis test using a computer using the SPSS statistical packages program.

Relative Importance Index estimated for interviews results, RII, given below is used to rank variables within groups:

$$RII = \frac{The \text{ the summation of the } total\ point\ score}{5 \times N} \quad (1)$$

The value of RII ranges from 0 to 1, that is 0≤RII≤1. RII is used because it fits the purpose of comparing different variables [22].

VII. RESULTS AND DISCUSSION

A set of results were reached that can be summarized as follows. Student answered on the most common programs used in the tasks assigned to them in the virtual design studios within the e-learning program? The numbers and percentages of the respondents' answers were calculated towards the programs used in the virtual design studios within the e-learning program, the following Fig. 5 illustrates that:
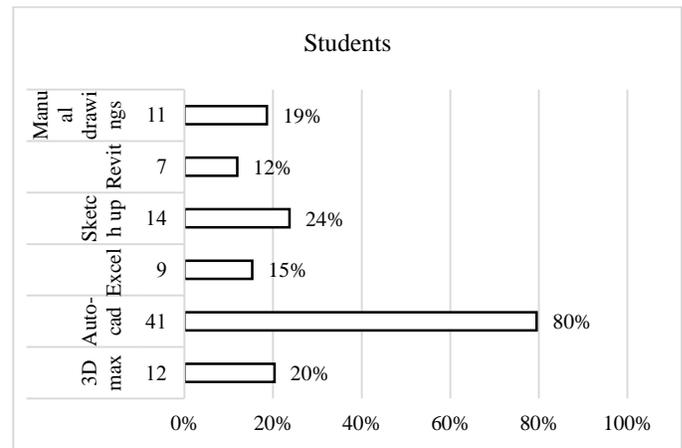

Fig. 5. Programs used by students during VDS

Students were asked about the most effective courses for them were learnt within the e-learning program? To answer this question, the numbers and percentages of the respondents' answers were calculated towards the most effective courses as shown in Fig.6.
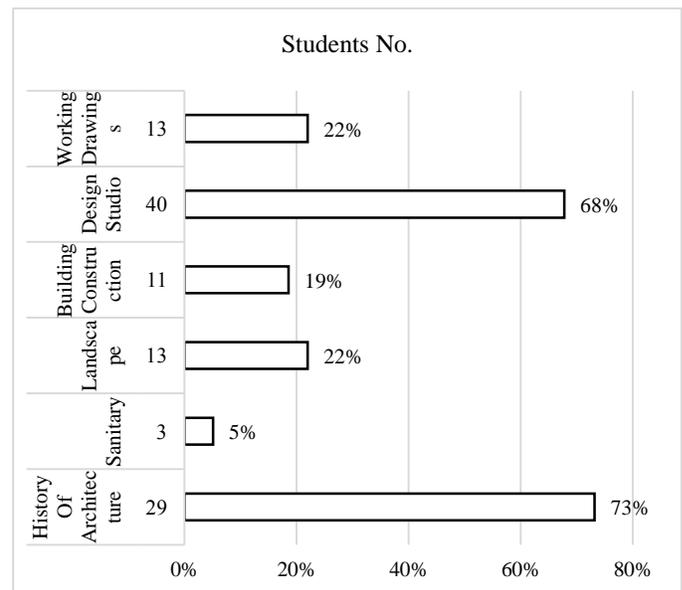

Fig. 6. The effectiveness of learning courses within the e-learning program from student's point of view

The results of the questionnaire analysis also indicated that students are satisfied with learning the architectural design course electronically with a large rate of 67.8%, which is a high percentage and is considered to be in the second place after theoretical courses such as history and theories of architecture.

Students were asked about the type of assignments and activities that they benefited from and enjoyed learning them virtually during VDS. The results of questionnaire analysis concluded that a large percentage of students enjoyed learning design and projects, and they feel satisfied with it as shown in the following Fig. 7.
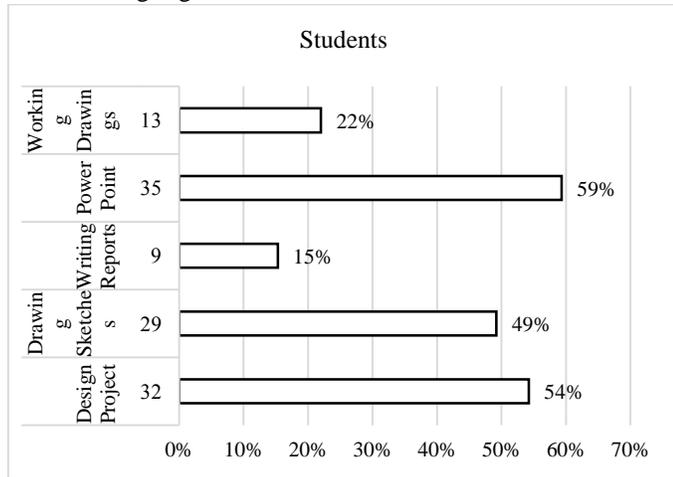

Fig. 7. The effectiveness of the used exercises in virtual design studios

Students evaluated the benefits that came out from the interviews with the VDS instructors and previous studies. The results of the analysis respondent's answers shown in the following Table 3, which were ordered according to the importance index factor.

It is evident from the previous table that one of the most important features the students agreed on for the virtual architectural design studio is commitment to the specified time to deliver the project and participation in discussions with colleagues that helped to be aware of the strengths and weaknesses of the project, while the lowest phrases were to spend more time developing design ideas and the requirements of the project, followed by the phrase, enabling the student to work at the appropriate time for him, unlike direct education, which not all student were compatible with the studio atmosphere and classes to work in. The researcher attributes this result to the characteristics of e-learning that students take more responsibility in their learning, active participants and not only are recipients of information. This gives them a solid foundation of knowledge and skills. When examining these characteristics after the experience of the blended design studio, we found that these features are still present at a high level, but some characteristics have increased, such as discussion with colleagues, and this is due to face-to-face communication which is not available in VDS.

Students also evaluated the disadvantages related to the experience of the virtual design studio and blended design Studio, the following Table 4 shows the results which were

ordered according to the importance index factor from student's point of view.

TABLE 3
BENEFITS OF USING VIRTUAL DESIGN STUDIOS EVALUATION

Rank	Benefits of using virtual design studios	Virtual Design Studio		Blended Design Studio	
		Mean value	RII	Mean value	RII
1	Commitment to the time specified to deliver the project	4.55	91%	4.3	86%
2	Participate in discussions with colleagues, help to know the strengths and weaknesses of the project	4.47	89%	4.60	92%
3	Displaying and sharing more than one project simultaneously on the computer screen, discussing and evaluating them	4.33	87%	4.4	88%
4	The office hours are free and not limited to a specific time or period	4.23	85%	3.7	74%
5	Supporting the educational platforms used in the educational process by containing many tools and capabilities that help to complete the educational process	4.15	83%	4.05	81%
6	Inquire about any points that were not fully understood during the virtual studio time	4.10	82%	4.15	83%
7	Developing students' skills in using technological techniques in designing projects	4.08	82%	4.10	82%
8	Enabling students to work at the appropriate time for him, unlike direct education, which not all students were compatible with the studio atmosphere and the classes to work in.	4.02	80%	3.91	78%
9	Spend more time developing design ideas and project requirements	3.98	80%	3.7	74%
The total degree		4.21	84%	4.10	82%

TABLE 4
DISADVANTAGES OF USING VIRTUAL DESIGN STUDIOS EVALUATION

Rank	Disadvantages of using virtual design studios	Virtual Design Studio		Blended Design Studio	
		Mean value	RII	Mean value	RII
1	Lack of face-to-face interaction especially in freehand drawing	4.10	82%	2.43	49%
2	Not preparing students to use programs that help them to display and make designs	3.73	75%	2.05	41%
3	Not understanding some written modifications sent in the form of notes	3.65	73%	2.72	54%
4	E-learning takes longer time than traditional learning in virtual studios	3.65	73%	3.82	76%
5	The inability of the platforms used to achieve communication in terms of project presentation, file download and clarity of presentation	3.33	67%	3.33	67%

6	Difficulty in responding quickly to professor's questions and inquiries in virtual studios	3.33	67%	3.39	68%
7	Failure to understand and comprehend the instructor's directives in discussing projects and design work	3.10	62%	2.9	58%
8	Technical problems such as image delay and graphic adjustment of sound	3.04	61%	3.15	63%
9	Lack of quality PowerPoint slideshow presentation on educational platforms	3.00	60%	3.20	64%
	The total degree	3.48	69%	3.00	60%

It is evident from the previous table that the total score of the respondents' attitudes towards the disadvantages of virtual design studios within the e-learning program in light of the spread of the Covid-19 was moderate and the negatives were arranged according to the arithmetic mean and RII, and at the forefront came the lack of face-to-face interaction, especially when using manual drawings technique, followed by the phrase (not preparing students to use programs that help them in presenting and creating designs), the total percentage of it has decreased significantly in the blended design studio. While the lowest of these expressions were (the lack of quality of PowerPoint slides presentation on educational platforms). The researcher attributes this result to the nature of design course as applied one and what it requires from direct interaction between student and instructor, as well as to educational platforms adopted by instructors, the capabilities, and tools which support learning in design studios in particular, and the results are close in the two experiments.

Regarding the constrains to using the virtual design studios within the e-learning program in light of the spread Covid-19, the arithmetic means of the questionnaire expressions related to this question were calculated and arranged in descending order according to the scores of the arithmetic mean and according to the RII. Because it is all related to VDS as shown in Table 5.

TABLE 5
CONSTRAINS OF USING VIRTUAL DESIGN STUDIOS EVALUATION

Rank	Constrains of using virtual design studios	Virtual Design Studio	
		Mean value	RII
1	The problem of slow download of files and projects due to slow and weak network connections	4.52	90%
2	Electricity current off during virtual studios or project discussions	4.38	88%
3	Frequent technical glitches during virtual studios and even project discussion	3.90	78%
4	Instructors' readiness and willingness to present design studios virtually	3.87	77%
5	The need for professors to improve their performance in e-learning	3.53	71%
6	The process of reaching the required item takes a long time	3.38	68%
	The total degree	3.93	79%

The previous table shows that the total degree of respondents' attitudes towards constrains of using the virtual design studios within the e-learning program was high. In the forefront of these constrains is (the problem of slow loading of files and projects due to the slow and weak communication network), while the lowest expression were: (process of accessing the required material takes a long time). This indicates that all constrains are technical at the level of public networks, including electricity and the Internet. The concerned authorities need to improve the communication infrastructure.

VIII. CONCLUSIONS

By presenting the results of the two experiments related to teaching design with the virtual system, as well as the blended system that combines the two systems (virtual and conventional), a set of results were reached:

1) The results show that the blended system helped to solve many problems and reduces the disadvantages of the virtual learning studio as shown in Table 4, such as face-to-face communication and understanding modifications. The mix between VDS and conventional studio proved to have considerable benefits over each pedagogy specially when working together more than working separately as shown in Table 3. Since introducing aspects of a blended design studio can help to overcome abstraction and detachment from reality, which have been found to be a problem in the experience of the virtual design studio.

2) In addition, the blended design studio demonstrated to be more motivated to engagement between students which did not mean that virtual design studio cannot add educational value to the conventional design studio, on the contrary, the results showed that it adds many benefits, such as: students take more responsibility in their learning, active participants and not only are recipients of information as shown in Table 3. This gives them a solid foundation of knowledge and skills.

3) The virtual architectural design studio retained its advantages when it switched from the complete system to the partial reciprocal system with the traditional studio according to the proposed blended education program. This is consistent with the results of many previous studies that dealt with the same problem that recommended the transformation does not entirely take place into the virtual design studios, except after preparing the necessary tools, such as the various programs that are used in the modifications and presentation of projects. And also developing the infrastructure for communication and Internet to limit constrains as shown in Table 5. Thus, the students' need to communicate face to face to achieve participatory education and social relationships which is essential to overcome boredom and introversion.

4) The findings from this study motivate adjustments to existing curricula that can provide new visions into traditional pedagogical models related to design studio.

IX. RECOMMENDATIONS

A set of recommendations were reached in the field of design studio teaching:

1) Designing a blended education program by experts to teach the architecture design studio, then widely apply it to architecture departments related to its benefits as shown in Table 3.

2) Paying attention to the application of architecture pedagogy that depends on communication and computer technology and developing the communication infrastructure to accommodate it and to eliminate constrains related to technical problems.

3) Blended learning shows the ability of solving the disadvantages result from virtual learning as shown in Table 4, so it is recommended to use it in design studio teaching.

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ABBREVIATION AND SYMBOLS

NUB	Nahda University at Benisuif
VDS	Virtual Design Studio
BDS	Blended Design Studio
ICT	Information and Communication Technology
RII	Relative Importance Index

Title Arabic:

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مزايا وعيوب ومعوقات تطبيق ستوديو التصميم المعماري الافتراضي والمدمج (دراسة حالة استوديوهات جامعة النهضة)

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Arabic Abstract:

<div dir="rtl">

التعليم الالكتروني في بلادنا يواجه العديد من التحديات و المحددات مما يمنعه من تحقيق اهدافه ، تهدف هذه الدراسة إلى استكشاف فوائد و عيوب و محددات تطبيق ستوديو التصميم الافتراضي VDS وستوديو التصميم المدمج في التعليم للخروج بالدروس لتكون حجر الأساس في تطوير عملية تدريس التصميم المعماري. يعرض هذا البحث نتائج دراسة استمرت فصلين دراسيين متتاليين ، حيث انتقل تدريس ستوديو التصميم المعماري فيها من الأساليب التقليدية إلى الافتراضية ثم إلى النظام المدمج في جامعة النهضة ببني سويف فيما يتعلق بالوضع الحالي الذي يستلزم من الجامعات استخدام التطبيقات التكنولوجية كبديل لنظام التعلم التقليدي (وجهاً لوجه) بسبب انتشار فيروس كورونا (كوفيد -19)، وتم استخدام المنهج الوصفي والتحليلي من خلال مراجعة الأدبيات والملاحظات والمقابلات والاستبيان. تحفز نتائج هذه الدراسة على إجراء تعديلات على المناهج الحالية التي يمكن أن توفر رؤى جديدة في النماذج التربوية التقليدية المتعلقة في ستوديو التصميم، و أظهرت النتائج أن النظام المدمج حقق نتائج افضل بالنسبة للطلبة بسبب الحفاظ على مميزات النظام التقليدي في التعليم و تقليل محددات النظام الافتراضي.

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