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Constructive analysis on teaching architecture through face to face and online learning

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Abstract. A couple of decades now, online learning has gained some popularity among scholars to work across borders and use time efficiently. However, the advent of world pandemic that resulted in a big health crisis has spurred more interest to keep going with the online classes close the gap between students and their teachers. We present here a professional experience that we had in our architecture department during the Covid-19 period. This worth sharing experience has to explain the pedagogical content set in the training unit and will likewise emphasize the importance of "subject project workshop" used in the discipline of architecture. Our contribution in the light of this paper is to come up with suggestions likely to enhance the practice of teaching using modern resources.

Keywords. Architecture, teaching, distance learning or eLearning, project workshop, classroom, face-to-face

1.Introduction:

Architecture stems from man's desire for shelter against the weather conditions and dangers (Di Cristina, 2002; Bouadjadja, 2004), it is the art of building, a knowledge that requires know-how. It will be difficult to isolate architecture to be a stand-alone science (Padovan, 2002; Madrazo, 1994), it is a discipline in which the practice and theory are inextricably linked; as a result, architecture is seen as both a distinct art and a multifaceted science.

Despite the fact that architecture is taught in a multidisciplinary manner, the project workshop subject was and will continue to be an important part of the curriculum since it allows students to offer a summative presentation of what they have learnt in the field of architecture. (Lambert, G, 2014)

1.2. Architectural Teaching and the Workshop Paradigm:

As early as 19th century, architecture was taught in France and researchers have gone so far as to view the workshop as a paradigm in the teaching of architecture. The architectural workshop was compared to the teaching of sculpture or painting, with the difference that the learner studied at a school of fine arts for artistic subjects, whereas the architectural workshop

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is done outside with a master architect, with the intention of associating know-how to knowledge. (G. Lambert, 2014; Lebahar, 2001).

According to Kaba (2012), knowledge of architecture is insufficient for the creation of knowledge in architecture, so the architect should consider the political, social, economic, environmental, and so on from the beginning of his profession, and his knowledge must be based on the first references of design practice, which are the treaties of architecture (encyclopedic knowledge). (I. Kaba, 2012) She creates a chronology that is highly appropriate for the evolution of training and profession, which she divides into two stages. Which we will discuss both in the next sections.

From antiquity to the Middle Ages: this era is characterized by the transmission of information and skills from the experienced to the novice, which takes place in workshops or on construction sites. Architect training did not exist in the Middle Ages, and most architects were self-taught, according to the literature. The recognized architects used Vitruvian manuscripts as a source of information, or learnt the skills through travel, heritage, and the legacy of each civilisation.

The renaissance till modern era: France has the merit to establish the job of architects as a noble one. European monarchs and sovereigns had a special interest in the works of artful design, hence architects were viewed to be shapers of society. (Kaba, 2012)

The teaching of architecture evolved during the industrial revolution. And there happened the codification of the drawing (Development of technical drawing), and the academy evolved towards the school of bridges and roads for pedagogical concerns, before being dissolved in 1793 due to the multidisciplinary of architecture. If architecture was taught in fine arts schools in France until the reform in 1962 (Diener, 2017; Guillin,2010), when the first architecture schools were established, Gropius founded the Bauhaus in Germany in 1919. (Messaoud, A., 2017), We can claim that the Bauhaus teaching was a significant evolution because we no longer spoke of architects but masters of work who would receive their certificate after completing a diverse curriculum supplied by the time's great masters of architecture. (Kaba, I, 2012)

1.2.2. The teaching of architecture in Algeria: It should be noted that architecture was originally taught in Algeria during the colonial period, with the first architects graduating from Algiers´National School of Fine Arts in Algiers. This school was founded in 1881, and its teaching was divided into two phases: i) before 1940, the teaching had a free program, and the rewards and training were free; the official programs and workshop masters were decided by all; and ii) after 1940, the teaching of this school became annexes of that exempted from the school of fine arts of Paris, and the school of Algiers being the only colony accepted for this role. (Chebahi, M, 2013)

According to Kaba's chronology of architecture educational reforms in Algeria, there were three major reforms: i) The first was in 1971, when we switched from a modular to an annual system of teaching, with all modules compensating except the Workshop, which would retain its modular nature, ii) In 1985, a second reform was launched with the goal of improving the quality of the training product by incorporating an opening on the professional component through internship opportunities. Teaching will be provided in two cycles, each ending with an internship and a certificate of aptitude, the second cycle ending with an internship and a certificate of skill, and finally the final year of the diploma which will be compliant, iii) Reform After the establishment of the national pedagogical committees in 1994, the polytechnic school of architecture and urbanism of Algiers (EPAU) was tasked with a project. This change backed up that of 1985, when a significant hourly credit was given to the teaching of the project

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workshop, iv) The new L. M.D. changes will go into effect in 2004, and teaching will be divided into three cycles, the first of which will be sold as a license, the second as a master's degree, and the third as a doctorate. (Kaba, I, 2012)

1.3 Distance learning or E-learning at the university:

The evolution of distance learning has been facilitated by the introduction of Elearning. (Donnelly & McSweeney, 2008; Assareh & Bidokht, 2011; Jethro et al., 2012; Ibrahim et al., 2021), this mode has become very successful (Wagner et al., 2008; González, 2010) and unavoidable in the face of the significant demand for education, it also remedies the lack of educational infrastructure that require much time and money. (Werbach, 2000). Regardless of the differences between face-to-face and distance modes, the pedagogical experiences of teaching are more or less similar, if not identical. This new mode entails the use of computer-assisted communication to promote information accessibility, adaptability to the new mode, and lastly, cognitive involvement of both lecturers and students. (Seok, 2008). In order for students to accept distance learning, universities or schools will need to offer free courses and intensive workshops with predetermined instructional content. (Azimi, 2014; Cheok & Wong, 2015).

Moodle was one of the first university platforms dedicated to this style of teaching, and according to lecturer feedback, it is a technology that perfectly supports classroom teaching (Oproiu,2015). Many lecturers have been able to simulate their students' demands, deposit their courses, and create assessments using Moodle, which has been in use till now. If access to this type of platform was previously only available after a lecturer's training, the availability of video tutorials on the interface has aided in the platform's mastery. (Benta et al., 2015)

1.3.1 Distance learning during the covid-19 period: Distance learning has existed in our institutions for a long time (Ibrahim et al., 2021; Alqahtani, 2021), but it has become more important during the global health crisis, so we can see that distance learning is playing the role of a hyphen in these times, and all reviews of recent publications since the beginning of the pandemic go in one direction, which is to consider this important and unavoidable mode of learning, which has yielded unexpected positive results for a variety of students.. (Vidal, 2020).

In all schools and colleges, transitioning from face-to-face to distance learning was simple in appearance; this simplicity is due to the fact that teachers and students live in a highly connected society (Boudokhane-Lima et al., 2021). We can see a willingness on all sides to advance pedagogically, and to do so with the available ordinary methods, which are sometimes inadequate but mostly sufficient to allow everyone to progress. It should be mentioned that Information and communication technologies have revolutionized background teaching; the class that we are accustomed to visualizing in our minds is now nothing more than a virtual class. (Boudokhane-Lima et al., 2021; Rus et al., 2021)

There are many studies that deal with distance learning and covid-19 nowadays (Affouneh,2020). We mention for this reason a recent study by Granjon, who evaluated the experience of university students through a survey since March 2020, i.e. the beginning of the crisis. (Granjon, 2021). The following are some of the features of this form of learning, according to him: i) positive: saving time on transportation and the ability to study at one's own speed; ii) negative: loss of concentration and motivation, especially when one out of every six students complain about a lack of or inadequate internet connection.

According to the same survey, students' preferences were carried out on distance courses broadcast live and viewed with their preferred viewing device. With the slide show gaining the majority of votes over the white board or classic filmed board as a teaching medium. Students prefer taped sessions in real time for tutorials, and they like to use the screen sharing technology

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the most. The technique used for practical work differs depending on the discipline, however the majority of the students interviewed prefer filmed and replayed sessions. (Granjon, 2021). The final point addressed in the targeted questionnaire was the mode of evaluation. While the majority of learners are opposed to exams in the same conditions as in the classroom, they do not find any inconvenience in the mode of evaluation being in the form of the work done, test, or other as long as it is completed on their own time (i.e. as soon as the learner is ready to take it).

Fascinating study is that of Maatuk et al. (2021). This study is based on two types of questionnaires, one for students and the other for lecturers at the University of Benghazi. The study indicates that distance learning should be based on a number of factors that will allow us to determine if it is successful or not later on. The improvement of working conditions, the technological context, technical and financial support, and so on are some of these components. However, the very low levels of internet in Libya hindered this experience from being completely successful. As a result, the research suggests numerous options, to be chosen: To succeed in this experience, the university must provide a good internet service, computers, and other appropriate technological tools to both students and lecturers. We will also activate a digital library, provide a maintenance service for all components of the university, and provide staff training in order to improve this type of education. (Maatuk et al., 2021).

We believe that this unpopular but unavoidable way of teaching was more effective than classroom teaching because it allows cultural reform in the educational system. In order to improve teaching in general, this method should be adopted into specialties where it has not previously been implemented. (Amir et al., 2020)

1.3.2 Distance learning in architecture: Owing to health crisis, teaching halted for a while after we had resumed, and the first semester of resumption was entirely at a distance; the year after, we adopted the hybrid method, in which distance teaching was done in week intervals.

This new mode was imposed for the university community until this year. We discovered benefits and drawbacks that could reorient pedagogy and architecture teaching. This is due to the unique characteristics of architecture teaching, the subject of project workshop, a lack of training, and other financial and technological factors.

This crisis has shown that in the field of architecture courses that are not related to design can be completed at a face-to-face. In the case of the project, the lecturers will need to study and master software that will allow the student to articulate their idea over the screen. This method will broaden the scope of architecture education to include national and international viewpoints, allowing students to exhibit their work to international juries and therefore improve their communication abilities. (Ibrahim et al., 2021).

We will give a critical reading of our experience with this approach to teaching in this paper. The goal is to share this experience and compare it to what it was like before Covid-19.

2.1 Materials and method:

2.1.Case study :

*2.1.1.Distance teaching of the course: 24 students :*The course we show here is a Master 02 course titled "Environmental Performance And Technological Innovations In The Building," a course aimed at coloration architecture, environment, and technology, with a coefficient as 03, and delivered in the form of a course followed by guided practice. We scheduled the course on Google-Meet for the entire semester at the same time and on the same days of the week. The

students were automatically notified about the course on their google-meet-synchronized calendars the day before and the day of the course, within a few hours.

The identical training was delivered in person to a group of people who shared the same scientific interest.

2.1.2 Teaching the seminar at a distance: 68 students: In this paper, we present our experience teaching the seminar on "architectural news," which, according to the training offer (Table 01), should be provided in the form of guest-presentation-debates, is a 03-hour course with a semester coefficient as 03, and is provided in the form of distance conferences due to the pandemic. As a result, it's a matter of inviting one or two practitioners or theorists to present their work, discuss their findings, or discuss their professional or academic career paths.

Students are automatically notified of the course as well as the lecture on their agenda, which is connected with Google calendar, the day before and the day of the course. We also include a poster of the speaker, a link to their website, and a few materials to help them understand the content of the course.

We'll compare this seminar, which has the appearance of a conference cycle, to previous face to face conferences.

2.1.3 Distance learning project workshop: 18 L1 students, 11 M2 students: We took students from the Bachelor 1 and Master 2 levels who performed the workshop in class the first semester, but because of the Covid 19, we used distance teaching the second semester.

As previously said, the the conducting of the project workshop is the foundation of architecture teaching. This subject unites all of the theoretical knowledge and know-how that will help the student to succeed in their academic or professional path. The workshop is held once a week for nine hours. It is done in the form of activity drilling by taking each student separately over the period of the course (12hours), with the remainder allocated to the drawing exercises, projection of ocumentary film, or round table of reading card.

Because first-year students do not yet possess all of the knowledge required to create an architectural project on their own, the workshop will focus on technical drawing, particularly the fundamental aspects needed to begin a design. For master 2 students, it is work that has been done on two parallel and complementary research, namely their final study project and thesis. Once the sketch has been validated, the work is done in a software interface, which facilitates project correction. The student has the option of sending his work via e-mail to the lecturer, or he can share it himself, and the lecturer receives and comments the work.

2.2.Methodology:

A comparative descriptive technique was chosen to monitor our experience of the mode of teaching. We will first describe the different subjects, their style of teaching, and their forms of evaluation in pre-pandemic time, and then explain how we taught them during the pandemic. A comparison of the two modes will be included with this description.

We also provide a statistical analysis that was conducted on a sample of students previously presented. With the ratings based on the submitted forms at the end of the academic year. A return on the recorded videos and the students' evaluations was performed to round out the findings regarding the pedagogical evaluation.

It should be mentioned that we are only interested in video-based distance learning. Traditional E-learning that enables the deposit of courses on Moodle will not be considered in this study. However, during the pre-Covid time, face-to-face teaching was supplemented by the

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Moodle platform. During the Covid and post-Covid periods, the Google-meet platform was the most widely used tool in our evaluation, in addition to the Moodle platform.

3.Results and discussion:

3.1 General layout of the training offer:

The contents of the training offers intended for the cycles of study architecture are presented here. The first reading allows us to notice that in terms of weekly hourly volume, the subject project workshop represents the largest number of hours, as well as the largest coefficient; this coefficient doubles during the second semester of the master 2 because it will become the end-of-study project.

We can also notice the existence of subjects that cannot be classified in any category, which are: the seminar (which will be given in the form of course-debates); the internship (which lasts 15 days and will be carried out at a master craftsman's).

Table 01: Summary of the summative reading of the training offers

			Number	Hours S1	Coefficients	Number	Hours S2	Coefficients
Licence's Degree	Licence 1	Course	06	9	11	04	6	09
		Tutorial classes	04	7,5	9	04	7,5	09
		Practical work	-	-	-	01	3	2
		Project workshop	01	9	6	01	9	6
	Licence 2	Course	05	7,5	11	06	9	12
		Tutorial classes	04	6	9	03	4,5	8
		Travaux pratiques	01	3	2	01	3	2
		Project workshop	01	9	6	01	9	6
	Licence 3	Course	06	9	12	05	7,5	11
		Tutorial classes	04	7,5	10	04	7,5	10
		Practical work	-	-	-	01	1,5	01
		Project workshop	01	9	6	01	9	6
Master's Degree	Master 1	Course	08	12	14	06	9	12
		Tutorial classes	03	4,5	06	03	4,5	06
		Seminar	-	-	-	01	3	02
		Project workshop	01	9	6	01	9	6
	Master 2	Course	02	3	4	End of studies project	9	12
		Travaux dirigés	02	3	4			
		Seminar	01	3	3	End of study thesis	3	08
		Project workshop	01	9	6			
		practical training	15J	90h	7			

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3.2. The comparative description: the comparison between the two teaching methods:

3.2.1.The course: The attendance percentage for face-to-face course teaching is varied. The course, according to the training offer, should be delivered in the form of a debate; but students do not interact with the content; they are simply receptive.

The attendance percentage for the distance learning course is fairly impressive and consistent; the reasons for absences are related to connection issues or a lack of time due to the programming of the workshop project.

The comparisons between the two modes (Figure 01) show that, in the end, the distance course contributes to good assimilation; students appear to be more at ease, and ask questions, either in writing or orally. The course is left in programmed display mode until the next course session, allowing absentees to visualize it at any time.

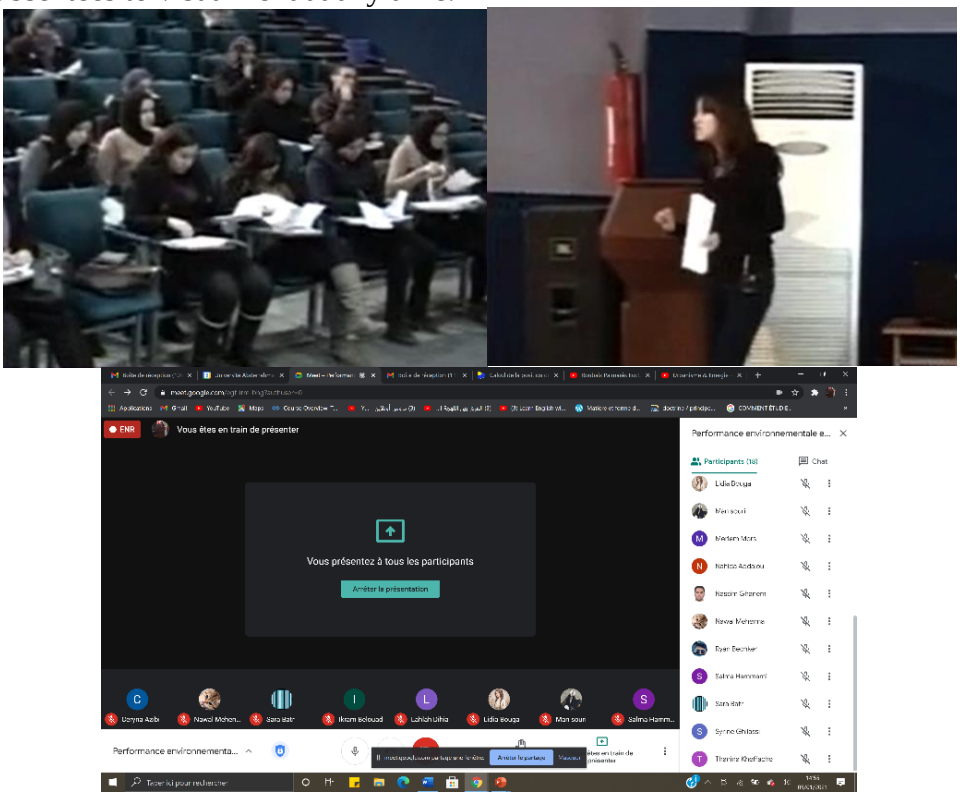

Figure 01: Classroom course and google-meet distance course window.

3.2.2. The seminar on the architectural current events: For the seminar teaching, which was solely based on two parts: first, the guest's intervention, and then the argument. When we compared this seminar course to seminars that the department used to host (Figure 02), we discovered that the attendance numbers were nearly identical. We saw that students leave and return for distance learning on occasion, which we believe is due to disruptions in the internet network, which can be unstable at times.

In our remote learning experience, we discovered that the majority of the absent students do not have access to the internet.

Seminars held face-to-face can only be consulted if the university's web TV records them.For seminars held at a distance (Google-meet), the lecturer provides a rebroadcast; it is here to identify absent students and schedule them for the rebroadcast, or to make the content recorded by Google Meet accessible over a period of time, or to simply broadcast the seminar through the university's web TV.

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We also noticed that students are much more at ease in the remote debate than in the face-to-face debate; even those who struggle to express themselves could write down their questions in the chat section, which the teachers read and directly ask the speakers; the virtual debate was more productive than the face-to-face debate.

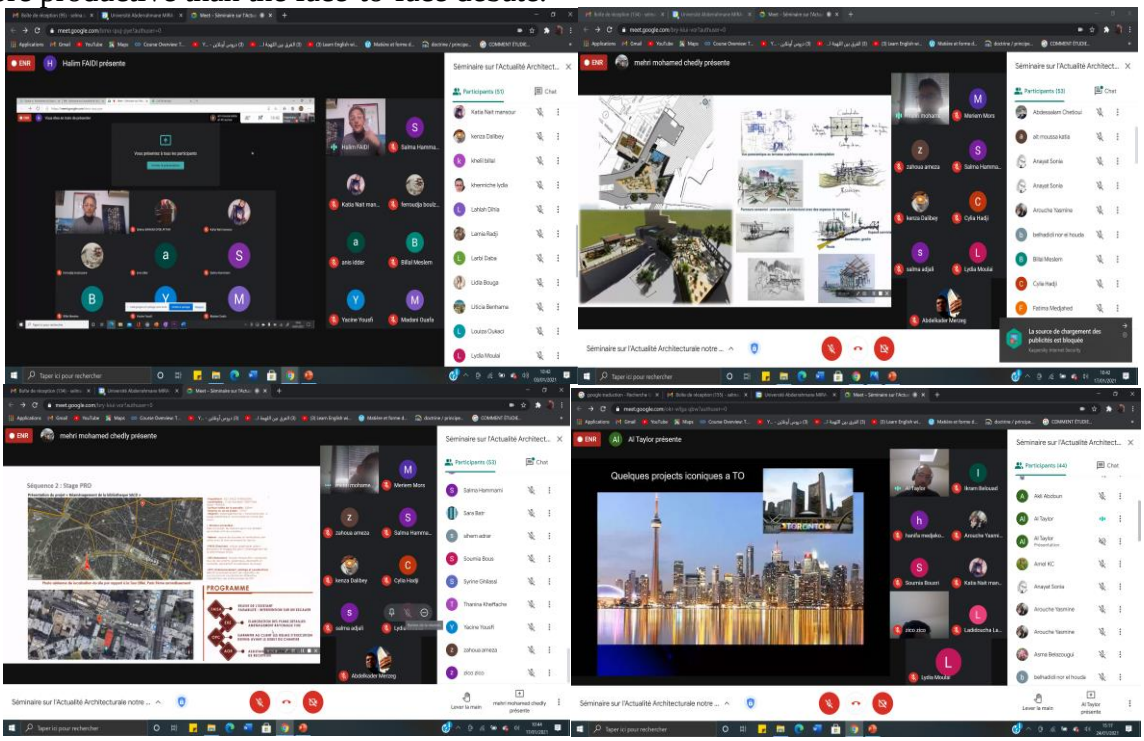

Figure 02: Screenshot of some sessions of the seminar on architectural Topicality with different speakers.

3.2.3. The project workshop :

- *For first year students: Freehand drawing*

The workshop being taught face to face to the freshmen students, there´s physical interaction going on between the teacher and her students, hence the correction process is likely to be carried out in the form of drawing.

The student has plenty of opportunity to talk about his idea, and the mistakes are corrected by intervening immediately on the student's presentation (Figure 03). It's possible that the other students are paying attention to their classmate's correction while they wait their turn to be evaluated. While working face to face, we can run tests to find out whether our students are improving; and therefore, we will have a sense of whether the student is generating some newer content on their own.

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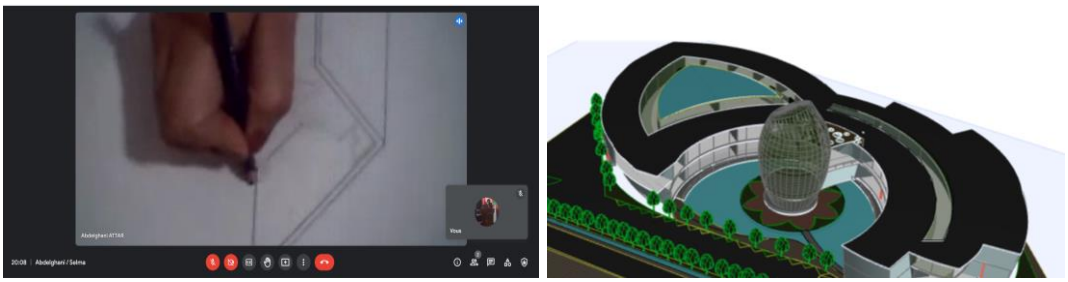

Figure 03: The teaching of the face-to-face workshop and the teaching of the distance workshop.

It was difficult for us to work on the workshop from afar since the students did not have the necessary information to integrate the remarks being freshmen. Unless we work on the knowledge by programming extra hours, we provide the following scenarios:

- **Scenario 01:** via e-mail

The student scans or photographs his work, and we modify it through an e-mail response in which we attach the photos and make color modifications.

Criticism: 80% of students have questions regarding the email itself. It turns out that their inquiries stem from the very email not being easily digestible.

- **Scenario 02**: the use of the double camera and email correction

This method is more effective than the first, but it takes much longer time. It involves printing the student's work and using Google-meet (Figure 03) on two cameras during the meeting, one for the lecturer and the other for the drawing. The student is allowed to take notes or intervene to explain, and in the meantime, the lecturer makes changes on the second camera.

- **Scenario 03**: the use of the camera with a single correction

In this method, the lecturer uses a digital tool to make modifications to a design, then sends it to the student, who shares it with the class, and the lecturer explains the process of modification and correction.

- *For the M2 The use of digital tools:*

The Master 2 project adjustments are easier, and the sketch validation proceeds through the scenario 2 already described. As the sketch is often done by the first pencil stroke. After the sketch has been validated, we can proceed to corrections in software. All that is required is that each computer has the same version installed, and that we open the file and make the necessary modifications or remarks to the students, who will take note, we apply some modifications directly and recorrect them during the same workshop session.

3.3. Synthesis:

We compared the attendance rates of the students in the topics already observed, based on the previous comparison.

3.3.1. Attendance rates: We note that the subject “project workshop” has the highest attendance rates, followed by the “seminar”, and finally “the course”; nevertheless, attendance rates for the workshop in the first year are relatively low (Figure 04).

The causes are related to the internet difficulty and a lack of necessary equipment that allows students to make adequate corrections. While the majority of master2 connect from their desktops, the bachelor connects from their smartphone.

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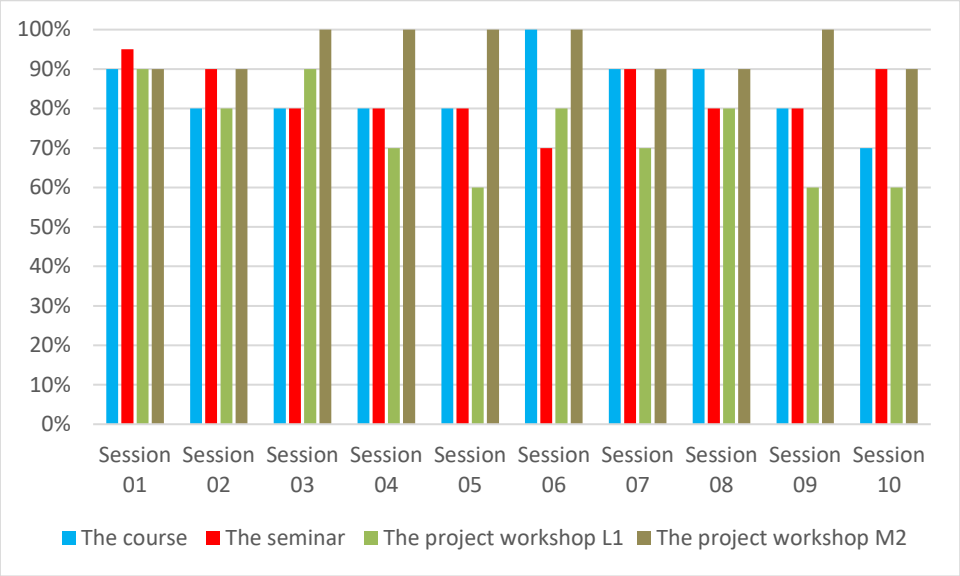

Figure 04 :comparison of attendance rates in different subjects during distance learning**.**

3.3.2. Participation rates, assimilation and quality of the final result: According to our research (Figure 05), the master 2 level subject seminar on architectural topicality has the highest participation rates. Students line up before the session even begins, they ask questions, and even in the mini-exam sheets. We notice that the students personalize their renderings, and the final product is truly excellent.

Then there's the Master 2 project workshop, which has a high success rate because the digital tool makes corrections easier, allowing students to progress more swiftly.

Third, students occasionally complain about connection problems, which we have been able to resolve through replay; nevertheless, students do not always have time to attend the replay because they often have a task to accomplish in another subject.

Finally, the lowest rates are those of the first-year project workshop. Where the lecturer frequently organizes more individual sessions for students who have connection problems. Nevertheless, the core problem seems to be inherent to the lack of assimilation; hence many students seem to overlook all the frequently asked questions (FAQS)adressed in the privious session.

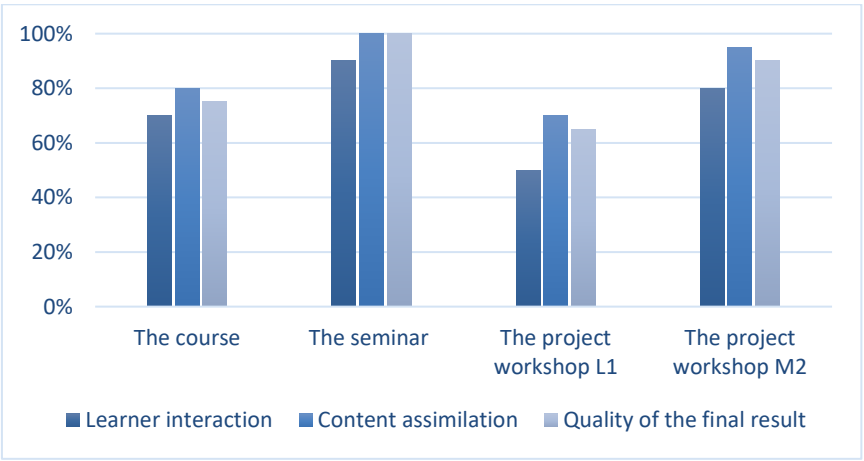

Figure 05 : Comparison between participation, assimilation and the quality of the learner's final result.

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3.3.3. The impact of distance learning on the pedagogical evolution of the courses: We have been able to make a statistical reading (Figure 06) thanks to the follow-up sheets and the reports of the work done by the students.

- When it´s come to M2 students, the pedagogical objective represented 40% in the first stage of the work, and this objective had evolved to reach 96% in the final stage of the work. However, we noticed a reduced rate and a less important evolution in the students of the Bachelor 1 level, where the percentage corresponds to 23% at the beginning of the lessons, and during the final stage only 76% of the pedagogical objective is reached. The explanation we might put forward is that the previous pedagogical achievements of the Master 2 students, where the lecturers do not spend much time explaining elementary things, since the students have mastered them.
  However, for the freshmen students , the acquisition of concepts is only at its beginning and the return to detailed explanations is more than necessary for the development of the students' pedagogical skills.
- Project based learning is the basis for subject workshop teaching. We noticed that Master 2 students are quite responsive to the needs of their workshop subject, especially the first stage. The project success was rated at nearly 50% from the beginning and 85% at the end.
  Regarding bachelor 1 students, the idea at the beginning of the project represents 30% in our corpus and in its final phase it evolves to reach a maximum of 72%. This observation can be explained by the concept of the imagination which is not yet completely developed for novice students of architecture.
- Regarding the graphic design, we will deal with the question of the pencil drawing; according to the corrections carried out at distance, students of master 2 use the manual drawing only for the sketch phase, and for the documents given by email each correction, we notice that the quality of this drawing evolves from 50% until 80%. Regarding bachelor 1 students, the drawings made manually is around 73% towards the end, which is a very low rate, because they do not yet master other drawing tools (digital).
- In the case of the final model, Master 2 students go from a first step of 40% to a final step of 90%, since the models are made using the digital tool. For bachelor 1 students, the models are made manually, the average estimated mastery of this presentation tool is 80%, during the distance learning we explain to the student the steps, but the cutting will be done by him alone. The first tests will require practice with his lecturer.
- Our analysis of the digital drawing indicated that master 2 students were average from the beginning, but the final phase showed their rates skyrocketed up to 96%.This curiously brings us to believe that the digital tool at hand is quite important to monitor learning at distance, in addition to the honing of students skills in drawing.
  We can add that the fact of displaying his project at a distance, the student in distance learning makes the effort to prepare a speech in which he explains his projet, this speech helps them to improve their communicative skills.

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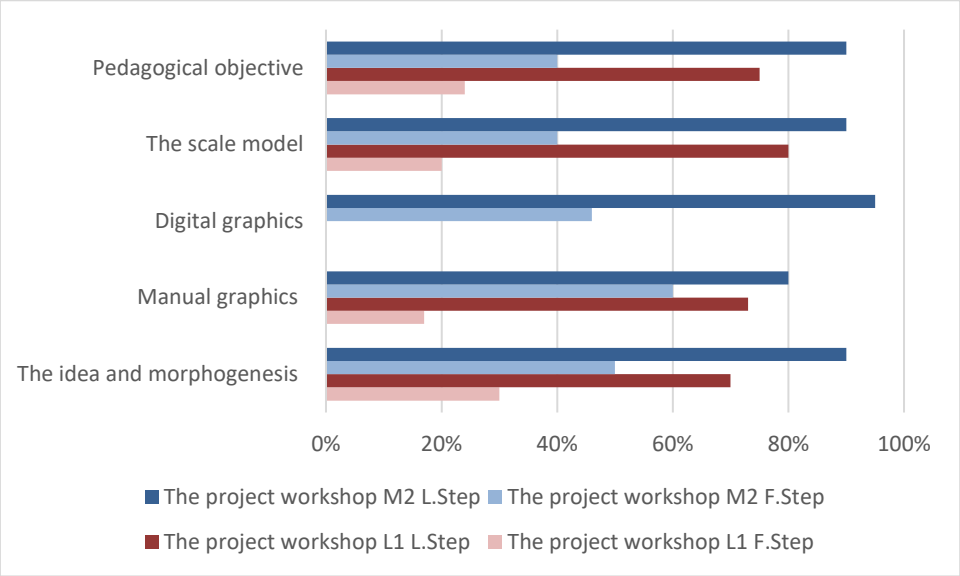

Figure 06: Comparative evaluation of distance learning achievements between freshmen and senior students.

Conslucion:

We have attempted to share our own experience of distance learning in architecture through this paper; however, the sample size of our study does not allow us to generalize the findings of this research. This research should be reworked and backed up by similar experiences of our colleagues in various architecture departments.

According to our research, there are various advantages to distant learning, including:

- Students find online learning courses and seminars more engaging than face-to-face courses because they may react, discuss, and ask more questions, as well as review the course.

However, this mode may have several drawbacks, such as:

- Problems with learning tools; absences are typically due to a connection problem or the student's inability to access the computer tool.

- The cameras are frequently deactivated due to the connection's low speed; at this point, we notice a feeling of heavy moments, or one has the feeling of speaking without an audience.

-There is no proximity between students of different levels; however, we can admit that distance learning in the architecture specialty could free up a bit more time for architecture students; we can schedule courses that are based on distance slide supports, and for the lecturer to have the feeling that there are students present, he only needs the cameras on.

Students are comfortable sharing their creations with their lecturers when teaching the architecture project at the Master 2 level, and digital tools and software make it simple for them.

Distance learning is not impossible for first-year students, but it is tough and involves a lot of effort from both lecturers and students. As a result, we believe that in order for students and lecturers to succeed in distant learning, all technical and financial resources should be made available to them.

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