

**Research Article**
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# Digital Learning Strategy during COVID – Survey among 4<sup>th</sup> year Dental Students in Casablanca

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### ABSTRACT

**Introduction:** The use of new technologies in the academic learning has largely taken place during the COVID 19 health crisis, opening up new perspectives for learning in 100% online or in hybrid mode. This change in teaching mode led us to ask ourselves about the impact of these learning methods and what recommendations could we propose to improve our current teaching strategies? This work allowed us to evaluate the degree of satisfaction with the different teaching strategies adopted by conservative odontology department during the pandemic period.

**Material and Methods:** A descriptive cross-sectional study was carried out over a period of 2 months from December 2022 to January 2023 among 4th year students of the dental faculty of Casablanca. Data collection with a four-page questionnaire, written in French, self-administered to 4th year students.

**Results:** A response rate of 80.6% was recorded, 66% did not attend the lectures, 52% were quite satisfied with the lectures. On a scale of 1 to 10, 59% of students had a level of satisfaction between [5-7] for face-to-face teaching. 56% were quite satisfied with the Moodle tool, 46% were quite satisfied with the Webinars, 52% were quite satisfied with the Virtual Classes, 46% consulted the platform after the course, 27% of students were able to express themselves during the course, 28% of students said that the professors were available after the course, with an overall degree of satisfaction with distance mode located between [5-7] by 54%. 74% of students thought that face-to-face teaching can certainly be replaced by distance learning courses reinforced by face-to-face teaching.

**Conclusion:** It is essential to recognize that this generation of students, referred to as “Gen Z” are technology natives, meaning they are familiar with ICT. This could play a role in making it easier to adapt to distance mode learning.

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### Introduction

Distance learning or education has existed since 1939, when a correspondence education service was created to compensate for the disorganization of the education system due to the war.

Currently, the world is becoming increasingly digital; This process has been further strengthened with the containment decisions linked to the coronavirus pandemic.

The coronavirus crisis has made it possible to test 100% distance learning mode. However, teachers have sometimes had difficulty maintaining the attendance and concentration of their students. On both sides of the screen the desire to meet “in real life” was quickly expressed. So, are digital natives so different from their elders?

Thus, teachers find themselves facing a generation of students called “Gen Z”. This generation is very comfortable with technology, and requires the use of more intuitive and interactive tools to enrich lessons. In addition, these students are always the first when it comes to technology-based educational applications and show enthusiasm for the digitalization of education.

Indeed, higher education must adapt to this new paradigm and find the right tools to interest and stimulate learners. For this, a transition from face-to-face teaching to digital teaching centered on learners has led to the emergence of new educational models.

As a result, the use of new technologies in the academic world has taken three forms with regard to the use of digital media in face-to-face courses, learning in hybrid mode, or virtual courses taught entirely online.

The aim of this study was to evaluate the degree of satisfaction with the different teaching strategies adopted by conservative odontology department during the pandemic period.

**Material and Methods**

A descriptive cross-sectional study was carried out over a period of 2 months from December 2022 to January 2023 among 120 students of the 4th year in the dental faculty of Casablanca in Morocco. A four dimensions questionnaire was used for DATA collection, written in French and self-administered. The statistical analysis was carried out by the IBM SPSS 20 STATISTICS software.

**Results**

The first part of the survey focuses on variables linked to learners in our study, a response rate of 80.6% was recorded (100/124); with predominance of females 57%, 91% were between 18 and 24 years old.

Then the level of satisfaction with distance education was evaluated, 96% of students consulted the platform. The used devices were 50% for the laptop and 32% used a smartphone. 46% of the interrogated students consulted the platform after the course.

For the overall degree of satisfaction: On a scale of 1 to 10, 59% of students have a satisfaction degree between [5-7] for presential mode learning.

Concerning distance learning, the university’s digital platform was consulted, with participation of 96% of students.

The most used media were Moodle, webinars and virtual classes, 56% of students were quite satisfied with using Moodle and 46% for webinars (Table I).

Regarding the use of interactive platforms, Google Meet was the most popular, with 45% of students being very satisfied and 45% of students being quite satisfied with Zoom.

On the other hand, Microsoft Teams was less well received, with 22% of students expressing their dissatisfaction. For consulting the platform: almost half of the students (46%) consulted the platform after classes.

About half of students were quite satisfied with access to digital resources (54%), the internet (36%) and computer equipment (36%) provided by the establishment.

For hybrid learning, 62% of students were quite satisfied and 74% of students thought that presence-mode learning can be replaced by distance learning courses reinforced by supervised teaching in presential mode (Table II).

**Discussion**

According to the results, a female predominance was observed in this study. This feminization of Dental Medicine students has also been observed in other surveys which have been carried out in the United States, the United Kingdom, Ireland, Denmark, and France [1] This predominance can be explained by the fact that dentistry is a profession that allows you to reconcile professional and personal life as a female dentist.

A study carried out in 2022 at the Faculty of Dentistry of Monastir (Tunisia) showed that 82% of students considered that the lecture is a teaching method which allows the provision of knowledge and only 8 students felt the need to complete the course information after the lecture [2].

On the other hand, a study carried out in 2004 in the USA in 64 faculties of Dental Medicine reported that 62.5% of the students questioned did not appreciate this method [1].

This could explain that “traditional” teaching is teacher-centered teaching based on lectures, and in which students play a passive role in the learning process; while the student, faced with technological tools, prefers interactive teaching methods [3].

Students were more interested by supervised learning mode, in a study carried out in Tunisia showed that 95.7% thought that this teaching method allowed them to get involved in their training and to assimilate the lessons taught [2]. This teaching method was appreciated for its interactivity. It is, according to the learners, “a complement to the lecture course which allows you to improve knowledge”; “an interactive teaching method”.

For Practical Pre-clinical applications (PPA) A study carried out in the USA; in 2017; revealed that 54% of students complained about the discrepancy between courses and practical practice while

**Table I: Student Feedback with Presential Learning Mode**

		n (100)	%
Attendance to the lectures	Yes	34	34%
	No	66	66%
Lectures satisfaction	Very satisfied	12	12%
	Somewhat satisfied	52	52%
	Not satisfied	29	29%
	Dissatisfied	7	7%
Supervised teaching satisfaction	Very satisfied	25	25%
	Somewhat satisfied	45	45%
	Not satisfied	29	29%
	Dissatisfied	1	1%
Supervised teaching satisfaction	Very satisfied	26	26%
	Somewhat satisfied	50	50%
	Not satisfied	22	22%
	Dissatisfied	2	2%

**Table II : Global student’s Satisfaction about different learning modes**

	Satisfaction scale	n (100)	%
Presential Mode Satisfaction	1 - 4	16	16%
	5 - 7	59	59%
	8 - 10	25	25%
Distance Mode Satisfaction	1 - 4	9	9%
	5 - 7	54	54%
	8 - 10	36	36%
Hybrid Mode Satisfaction	1 - 4	3	3%
	5 - 7	62	62%
	8 - 10	34	34%

62% of them appreciated the concordance between courses and practical practice especially for conservative odontology, which is concordant with our results [1].

On the other hand, another study carried out at the Faculty of Dentistry in Nancy in 2017, showed that around 10% of students spontaneously mentioned quality teaching and pedagogy. On the other hand, some would like to have more practical work sessions [4].

According to the results of a survey carried out at the Mohammed V University of Rabat (Morocco), 89.70% of the students surveyed took online courses compared to only 10.30% who did not take distance courses during the confinement period [5].

The results obtained could be explained by the disruptions caused by the health crisis, which had a significant impact on education. Faced with this situation, it has become essential for educational establishments to adapt quickly. They had to opt for distance learning to allow students to continue their studies by setting up virtual learning platforms to allow students to access online courses and resources. Thus, teachers had to rethink their teaching methods to suit the current circumstances.

The majority of students declared that they essentially had the technological devices to follow online courses from a laptop (90.2%), a smartphone (78.5%) and a tablet (10.1%).

So, the most used device were Smartphones and laptops; two key factors may be at the origin of this gap: mobility and the multitude of functionalities.

A study carried out at the Faculty of Medicine and Pharmaceutical Sciences of the University of Dschang (Cameroon) used WhatsApp for distance learning. Virtual classes were created through WhatsApp groups, course notes were sent in PDF, Power Point or Word format and lessons were delivered through voice messages. The results showed that 83.4% were dissatisfied with distance learning using this method [6].

Another study conducted at the Federal University of Brazil (2019) revealed that 100% of students (7) used WhatsApp as a virtual learning platform to combat infections in dentistry, the use of this tool showed several advantages. Quickly obtaining information about the discipline (clarification of doubts) was the most cited usefulness compared to the use of WhatsApp (64.3%).

In Morocco, a study carried out at the Sidi Mohamed Ben Abdellah University (Fez) 2022 in which WhatsApp support (51.9%) constitutes the communication tool most requested by students and their teachers, the reason was explained by the period of confinement coincided with the preparation of dissertations and end-of-study projects for which WhatsApp was widely used due to its flexibility and interactivity [8].

In conclusion, the WhatsApp tool has proven effective as a means of communication during the health crisis, allowing teachers and students to stay in touch and exchange important information. However, it was not designed as a complete teaching platform and is therefore not ideal for presenting lessons in a comprehensive and structured manner.

Another study carried out at the Sidi Mohamed Ben Abdellah University of Fez among faculties and higher schools (2020) focused on the two populations of students, private and public,

revealed that the choices of the two sectors are not the same. Around 49% of students enrolled in public university establishments surveyed seem to have used this Moodle platform compared to only 6% of students in the private university [8].

The Catholic University of Louvain (Belgium) has set up an iCampus online teaching/learning platform. Overall, the functionalities which mobilize the “information” dimension and the learning resources were the most appreciated, followed by the discussion forums (70%), the group work space (64%), and finally the interactive exercises (58%) [9].

To conclude, Moodle remains a professional educational platform that limits work space by reducing distractions for maximum concentration on educational content.

According to our results, students ranked Google Meet first (49%) followed by ZOOM (32%), while Microsoft Teams came last with a percentage of 21%.

A study carried out at Mohammed V University in Rabat, obtained the same results, shows that almost half of the students, or 47.20%, used Google Meet to access interactive training, 28.50% used Zoom and 16.90% for Microsoft Teams [10].

On the other hand, A study carried out at the Faculty of Education Sciences of Rabat in (2021): Zoom comes first (46%) followed by Microsoft Teams (34.5%), and Google Meet (19.5%) [5].

Indeed, the Google Meet and ZOOM platforms were the most used tools during the Covid-19 period due to the ease of their interactivity and the good quality of videoconferencing.

A study carried out in three Tunisian university found that the number of connections evolved during the months of revisions. Indeed, the number of connections reached its peak during the month of December with 918 accesses, falling to 62 during the first week of January. This development is probably explained by the fact that December includes two major events: the end of classes and the start of revision for semester exams, a period during which students are on the lookout for as much information as possible on the courses [11].

This could be explained by the fact that the moment of consultation of the platform is linked to the student according to their preferences and constraints. It can also be influenced by factors such as homework deadlines, exam dates, and teacher notifications.

According to the survey by Louvain University, 41% of teachers highlight maintaining communication outside of class activities, while 12% of students check this use among their 4 main uses. For a professor, sending a few messages in the forum while responding at length to students' questions constitutes a significant amount of work and helps maintain interactions outside of class sessions [9].

Another study carried out among students at the University of Montreal observed that students are very sensitive to the way in which the teacher uses technologies to the extent that they believe that the educational value of ICT is essential to their integration. Better communication and the possibility of receiving certain information outside the temporal organization of the course prove to be very appreciated by students [12].

According to Rotas and Cahapay, login hurdles can be overcome by recording lectures and providing them to students through

social media, etc. An innovative and effective solution would be to develop e-learning software that works without connection hassles even with low bandwidth [13].

Lack of technical assistance was a problem for 55% of students in our study, according to the Moroccan Review of Evaluation and Research in Education (Morocco) (2021), this difficulty represents one of the main reasons (up to 76.3%) which hinder students from learning through technology in the future [14]. Which agrees with our results. Indeed, to overcome this obstacle, it is necessary to:

- Establish a competent and accessible technical support team
- Provide adequate training.
- Make students aware of available resources and ways to resolve common technical issues.

Regarding the overall degree of satisfaction, a study carried out at the Sidi Mohamed Ben Abdellah University of Fez showed that the percentage of satisfied and very satisfied students does not exceed 22%, while those opting for non-satisfaction was 42%. (8) Which does not agree with our study.

According to the study carried out at the Mohammed V University of Rabat, the level of appreciation of the online courses as they were given to them, they found that 37.40% of students are not at all satisfied or only slightly satisfied of this learning mode, 28% moderately satisfied compared to almost a third of the sample, 34.60% who are satisfied, or even very satisfied [15].

According to the Moroccan Review of Evaluation and Research in Education (Morocco) (2021), approximately 61.7% of students express that they are not satisfied with this distance learning experience. Those who are partially satisfied represent 32.4% but the notable thing is that those satisfied with this experience do not exceed 5.9% [14].

Indeed, the high satisfaction of our students could be explained by the mutual efforts made by the teaching staff, the students as well as the university administration. According to a study carried out on 129 students, by organizing a face-to-face lecture course and the virtual tutorial, the results published in the International Review of Pedagogy of Higher Education (France) (2016) demonstrated that 62.7% of responses were clearly positive, 7.8% somewhat positive, and 3.9% clearly negative [16]. Which is consistent with our study.

Peraya et al, 2014 highlights the connection between face-to-face activities and remote resources, which makes it possible to free face-to-face activities from the task of transmitting information and to give more space to interactions between learners and the teacher [16].

Distance learning and digital pedagogy are presented in public discourses both as a solution to learning and teaching problems and as a necessity to follow the “digital revolution” [17].

According to our results, students had a positive opinion regarding this mode of teaching, given the many advantages it offers: Saving time and money, flexibility in and learning (no need to travel ).

In general, these results do not agree with a study carried out at the Faculty of Education Sciences of Rabat (2021), which asked almost the same question to its students: Do you think that supervised teaching complement face-to-face courses ? The results revealed that more than 61.5% of students believe that distance education cannot replace face-to-face education [5].

However, results similar to ours have been observed in other studies: 77% of participants think that we can possibly replace traditional teaching with virtual courses according to the University of Medicine in Taipei and 51,4% of students were in favor of replacing face-to-face teaching with distance learning methodologies according to a study carried out among Portuguese university students [18, 19].

#### Teaching techniques

• **Flipped classroom:** Based on research, it is deduced that “Flipped Classroom” is an educational method that allows students to acquire new knowledge through short videos, podcasts, or e-books outside the classroom and share their knowledge and their difficulties through classroom activities with the help of their classmates and teachers [20,21].

• **Serious games:** Graafland et al claimed that serious games could create training environments for multitasking or team-based work health professionals. Serious games could also be useful for reducing errors in clinical practice and for training teams to manage crisis situations [22].

A study carried out at the University of Marseille [23] found that 99% of the 103 participants claimed to have never participated in a SG and 75% of students affirmed that the SG experience changed their way of understanding the subject taught “management of project”. Despite the educational value of SGs in healthcare education, several limitations have been reported in their use: Transfer of skills, development cost, maintenance and updating. (24,25).

• **Learning by clinical reasoning (CR):** Clinical reasoning corresponds to the thought and decision-making process that allows the clinician to take the most appropriate actions in a specific context of resolving a health problem.

The specific ARC sessions, developed by Chamberland, were to explicitly involve students in a clinical approach and encourage active construction and reorganization of clinical knowledge among students on internship [26-28].

• **Problem-Based learning (PBL):** During Problem-solving learning, learners, grouped in teams, work together to solve a problem generally proposed by the teacher, a problem for which they have received no particular information, from way of learning content and know-how, of discovering new concepts in an active way (he teaches himself) by being pushed to do so by the needs of the problem submitted [3,29,30].

• **Gamification:** is a process of integrating some of the more interesting and interactive features of games into the educational process in order to achieve a specific educational objective. The aim is to increase motivation, engagement, interaction oral, skills acquisition and accepting more challenges.

• **Regarding the limits:** the game must meet a specific educational objective which must be clearly identified and certain games can be expensive to implement [24,31,32]

In conclusion, although gamification can bring benefits to teaching and learning, it is essential to consider its limitations. The integration of gamification must be carefully considered and adapted to the specific needs of the teaching and learners involved.

## Conclusion

It is essential to recognize that this generation of students, referred to as “Gen Z” are technology natives, meaning they are familiar with ICT. This could play a role in making it easier to adapt to distance mode learning.

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