

# Real-Time Remote Courses - A Case Study on Student Satisfaction and Implementation

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**Abstract**—Real-time remote courses offer the students the valuable resource of cultural diversity and the access to professors who are leaders in their field of knowledge. It also encourages the practice of several skills with technology as a learning tool. We have studied how courses taught by internationally experienced leaders, relying on communication technologies, impact the students and can be a valuable complement to traditional classes offering them a global perspective in its formation. This paper focuses on the validation of the experience looking at student satisfaction for a teaching methodology in a real-time remote model. It also takes into account the recommendations from their professors. This information can provide valuable data to consider in order to further promote this scheme of classes and successfully continue teaching through real-time remote classes.

**Index Terms**—educational innovation, higher education, remote teaching, student satisfaction

## I. INTRODUCTION

At present we can live the new technologies around us almost anywhere we are. We are immersed in the era of technologies and telecommunications. In Mexico, Seventy-four million Internet users have already been reached, as recently reported by the National Institute of Statistics and Geography (INEGI). The Internet reaches 18.3 million households in this country, which represent 53% of the total. In addition, 93% of users connect to the network through a smartphone, 33% through the personal computer and 18% through electronic tablets. [1]

The course scheme analyzed in this study uses a real-time remote teaching scheme, with the support of communication technologies. Taking this kind of courses encourages the practice of different skills and commits students to be responsible and autonomous of their own learning. In addition, it allows cultural diversity through outstanding foreign professors, who most of the time would not be available locally for a face-to-face class. It also offers the opportunity to take advantage of

technology as a learning tool that leads the student to experiment with new ways of learning [2].

Other important benefits of real-time remote courses have been described by different authors and experts. King *et al* [3] mention that reductions in funding have led to a situation in which access to specialized learning resources is becoming increasingly difficult; remote education offers an experience for those cases where financial support may be non-existent or limited. Wei *et al* [4] explain that one of the advantages are that the students gain independence as they can learn on their own time with the flexibility of selecting the learning content according to their interests. Dr. Naoko Takeda, professor with more than 7 years of experience teaching distance classes in real time from Japan, interviewed especially for this study, mentions two main benefits: "1. The flexibility of being able to give the sessions from any part of the world and that students can take the class also from anywhere in the world. 2. The use of technology, with this method of education keeps abreast of technological advances in communication and distance education". [5] Dr. Juan Burke, professor with 3 semesters of experience teaching real-time remote courses from United States, interviewed especially for this study, mentions the next benefit: "being able to provide students with specialized knowledge in history and architectural theory can help them gain knowledge that they cannot get from a local campus teacher, given that specializations in history and theory have become rarer." [6]

In studies conducted to find out the opinions of teachers about online learning environments, favorable opinions have been obtained mainly because teachers want to be updated on the newest teaching tools [7]. More and more teachers are joining this effort, seeking to align with the new educational models.

Some challenges in remote teaching have also been described by different authors. In their study, King *et al* [3] showed that all teachers found the digital teaching more challenging than their traditional presence teaching; but in the other hand, they also reported that the professors were willing to undertake similar teaching again. Matsumara *et al.* [8] consider that the support that

teachers require to engage in professional learning in order to improve instruction “in ways that can significantly impact students” can be time consuming and effortful. Another challenge that must be taken into account is the bureaucratic issues of the Universities and the acquisition and installation of systems. [9]

Regardless of the challenges that remote teaching can present, this is an important alternative for higher education. The combination of traditional learning and distance learning permits the classroom to acquire a great potential by integrating the strengths of both types of teaching”. [10]

This research is a sequel of a previous work, where satisfaction was determined to be an important factor for a successful remote teaching [10]. As stated in that study, satisfaction consist of four elements: the perceived usefulness, the service quality, the system quality, and the information quality [11]. Another factor that determines satisfaction is the flexibility of the course format. The remote teaching is intrinsically open, and offers a high degree of flexibility and accessibility to persons who desire education in any time and place [12]. Finally, the perceived utility or usefulness is also a strong factor of desire and learning evidences [13].

In its Strategic Plan 2020, our university established the “TEC21 Educational Model” as a strategic initiative that proposes a change in the curricular and formative strategy [14]. Part of the TEC21 strategy [15] is to make the professor a model of inspiration for the student. The experience of distance and interactive learning offer the students a valuable access to these inspiring academic leaders as well as preparing them to face real problems, achieve a global vision, gain motivation, create bonds with other environments, and to appreciate ethical considerations [16].

## II. AIM

The objective of this study is to observe and analyze the student satisfaction experienced while attending a real-time remote course as well as to complement this information with recommendations obtained by the professors who have participated in this model. Data collected included post-course interviews with teachers. The main aim of this work is to complement a series of preliminary works about the improvement in students’ satisfaction and the competences developed in the students who were enrolled in real-time remote courses.

## III. METHOD

At the university (Tecnologico de Monterrey), with the TEC21 Model, one of the competencies that will be promoted is the international / multicultural vision. Part of the complement of the real-time remote model is the adaptation of the classrooms with certain characteristics in order to achieve this model, the resources that are needed in the classroom are: a computer, TV screen or projection of the teacher's screen, access to internet and a remote communication tool.

This paper is part of a project to follow the validation of the novelty of the real-time remote model. For this case, the study evaluated a series of questions that describe the students' experience in the course, in addition to assessing the perception of three fundamental aspects of the distance courses. The key elements to evaluate on their satisfaction were: the students' inclination to enroll again in similar courses, the perceived quality of professor/student contact, the feeling of being inspired by the professor and how likely they would recommend the course to other students [10] and [16]. Data collected also included subsequent interviews with the teachers.

The key elements were asked in four questions to understand the importance of the options of the students who lived the distance course experience, in yes/no format:

- Do you feel that there is adequate quality of contact between professor and student?
- Does the professor inspire you during the delivery of the course?
- Would you choose to take a course in the real-time distance format?
- Would you recommend this type of course to other students?

Three questions measured the perception of factors that describe the remote course impact using Likert-type a scale from one to five, where one is the low and five the high:

- How do you evaluate the flexibility of the course model?
- How do you evaluate the novelty of the course model?
- How do you evaluate the utility of the course model?

This paper took information from five courses taught in in Architecture and Industrial Design bachelor programs. 106 students (women= 53, men= 52) experienced a real-time distance course during the Spring 2019 semester and the Fall 2018 semester.

The survey where applied to students who studied the following courses: 1. Language and Meaning of Objects (Fall 2018) 2. Urban design methodologies (Fall 2018). Urban theories (Spring 2019), History of Architecture and the city II (Spring 2019) and Language and Meaning of Objects (Spring 2019).

## IV. DATA ANALYSIS AND RESULTS

The analysis of the data is divided in two parts or observations in order to measure the experience and satisfaction of the selected students. The first analysis is the revision of the options for the questions regarding the perceived quality of interaction with the professor, as well as the student's willing to choose to take a course in this format again and their willing to recommend this course format. The second analysis is the observation of the options for the questions of the experience in the course regarding three characteristics: the perceived flexibility, novelty and utility of the course.

TABLE I. OPINION OF THE PARTICIPANTS ON THE COURSES

Period	Subject	Quality of Interaction with the professor	Did the professor inspired you?	Would you choose to take a course in this format?	Would you recommend this course format?
January-May 2019	Language and of Objects	Yes: 100%	Yes: 100%	Yes: 100%	Yes: 100%
		No:	No:	No:	No:
January-May 2019	History of Architecture and the city II	Yes: 56.2%	Yes: 75%	Yes: 68.7%	Yes: 68.7%
		No: 43.7%	No: 25%	No: 31.2%	No: 31.2%
January-May 2019	Urban theories	Yes: 100%	Yes: 100%	Yes: 100%	Yes: 100%
		No:	No:	No:	No:
August-December 2018	Urban design methodologies	Yes: 100%	Yes: 87%	Yes: 73%	Yes: 67%
		No:	No: 13%	No: 27%	No: 33%
August-December 2018	Language and of Objects	Yes: 92%	Yes: 80%	Yes: 67%	Yes: 67%
		No: 8%	No: 20%	No: 33%	No: 33%

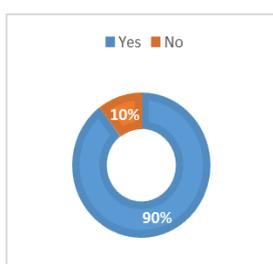


Figure 1. Do you feel that there is an adequate quality of contact between professor and student?

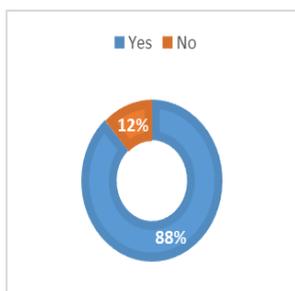


Figure 2. Does the professor inspire you during the delivery of the course?

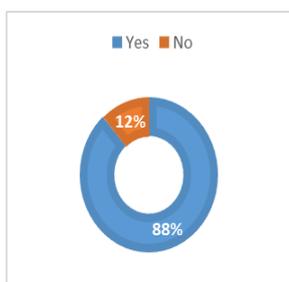


Figure 3. Would you choose to take a course in the real-time distance format?

The obtained results can be observed in the different visual elements of this paper. First, a table shows the opinion of the participants to observe the frequency of the affirmative or negative response. In Table I, it is observable how the quality of contact between teacher-student and the inspiration evoked by the teacher are positive, however, there seems to be a small discrepancy in taking a similar course and the recommendation of the

course to other students. Of the total of participating students, 89.65% perceived an adequate quality of contact between professor and student. 88.40% of them affirmed that the professor was inspiring during the delivery of the course. 81.75% would choose to take a course in this format again and 80.55% would recommend this course format to other students. (Fig. 1 to Fig. 4)

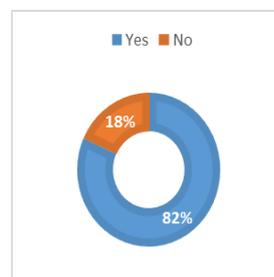


Figure 4. Would you recommend this type of course to other students?

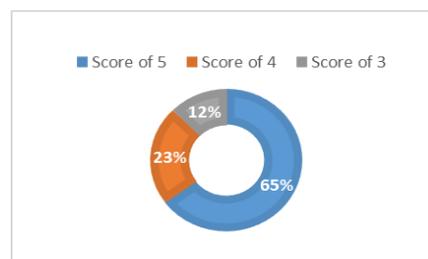


Figure 5. How do you evaluate the flexibility of the model?

The second analysis is the observation of the experience in the course regarding three characteristics: the perceived flexibility, novelty and utility of the course (see Table II). In the Fig. 5 to Fig. 7, it is observable how the perceived flexibility of the model is positive, however, there seems to be a small discrepancy in the perceived novelty and the perceived utility. Of the total of participating students, 63.98% selected a score of 5 (the highest score) for flexibility and 22.32% a score of 4 on this regard. 65.4% chose a score of 5 (the highest score) for novelty and 18.02% a score of 4 on this characteristic. 65.7% selected a score of 5 (the highest score) for utility and 15% selected a score of 4 on it. (Fig. 5 to Fig. 7).

The results reveal some opportunity areas for a redesign and validation with a much larger sample of

students. This study also agrees with much of the literature reviewed and how the quality of the content, the social factors and the flexibility of the format determines the flexibility and utility implied in the methodology of teaching focused on the remote teaching. In general, this study reveals how the experience and the perception of relevant elements in the real-time remote teaching proposed by the researchers has a validation in its format.

For the purpose of this particular study, the professors who participated in this remote teaching model, were

interviewed. The main question was: What recommendations would you make to a teacher who is going to teach a distance class for the first time? A summary of the responses would be: to keep the students interested and active through promoting the active participation, the use of questions during the class, the application of quizzes, and different types of interaction using online forums, chats and blogs [5], [6], [17].

TABLE II. OPINION OF THE PARTICIPANTS ON THE FLEXIBILITY, NOVELTY AND UTILITY OF THE STUDIED COURSES

Period	Subject	Flexibility	Novelty	Utility
January-May 2019	Language and Meaning of Objects	Score of 5 = 83.3%	Score of 5 = 67%	Score of 5 = 78%
		Score of 4 = 16.7%	Score of 4 = 28%	Score of 4 = 16.7%
			Score of 3 = 5.5%	Score of 3 = 5.5%
January-May 2019	History of Architecture and the city II	Score of 5 = 50%	Score of 5 = 50%	Score of 5 = 37.5%
		Score of 4 = 25%	Score of 4 = 18.8%	Score of 4 = 31.3%
		Score of 3 = 25%	Score of 3 = 25%	Score of 3 = 25%
			Score of 2 = 6.2%	Score of 2 = 6.2%
January-May 2019	Urban theories	Score of 5 = 80%	Score of 5 = 90%	Score of 5 = 100%
		Score of 4 = 10%	Score of 4 = 10%	
		Score of 3 = 10%		
August-December 2018	Urban design methodologies	Score of 5 = 40%	Score of 5 = 60%	Score of 5 = 66.6%
		Score of 4 = 33.3%	Score of 4 = 13.3%	Score of 4 = 13.3%
		Score of 3 = 20%	Score of 3 = 26.7%	Score of 3 = 13.3%
		Score of 2 = 6.7%		Score of 2 = 6.6%
August-December 2018	Language and Meaning of Objects	Score of 5 = 66.6%	Score of 5 = 60%	Score of 5 = 46.6%
		Score of 4 = 26.6%	Score of 4 = 20%	Score of 4 = 13.3%
		Score of 3 = 6.7%	Score of 3 = 20%	Score of 3 = 26.6%
				Score of 2 = 6.7%
				Score of 1 = 6.7%

In another question, teachers were consulted on how they have modified their teaching methods when teaching classes from a distance. One of them shared with us the structure that she uses for her three hours of real-time remote course, she proposes to divide the class time into two sections: the first 50% is dedicated to the class and discussion, including the theoretical presentation by the teacher, and the other 50% is dedicated to individual or team exercises, related to the material taught in the first part of the class. Before concluding the class, she recommends that the students share their results and discuss the work done. At the end of the session, students are required to upload the results and materials generated in an online platform. On the other hand, before the class, she suggests to require the students to read material or watch videos / documentaries related to the topic that will be taught in class. She states that it is also important to ask the students to upload reflections to the online platform as part of the homework, and to ask them to participate / discuss in class to keep an interactive session. She takes into account the active participation of the students on the course evaluation. Finally, she emphasizes the importance of collaborating with the other teacher (in case of a team teaching), to link topics and exercises to what both teach, following the course timeline. [17]

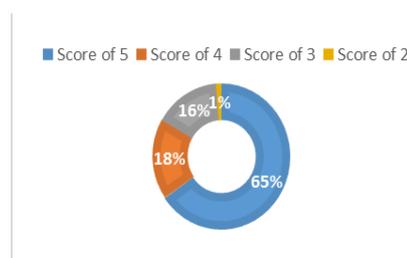


Figure 6. How do you evaluate the novelty of model?

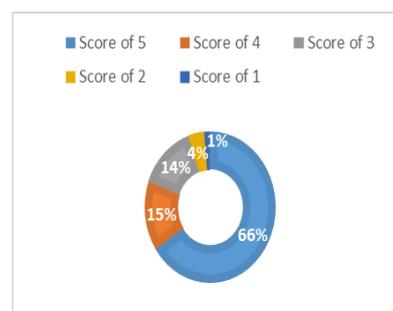


Figure 7. How do you evaluate the utility of model?

## V. CONCLUSIONS

The experience of the students is of great importance in the transformation of education; this is one of the

contributions that the university is making towards educational innovation. This research is a sample of a teaching methodology that combines socio-cultural aspects and a remote teaching model that allows flexibility in the traditional teaching model. This research project continues gathering information as more information is available as other semesters become available. However, the results already presented in this work show that students adapt very well to change and are willing to experience new methodologies if these methodologies allow them to be in contact with experts from other countries. Other aspects that were very welcomed by the students include the flexibility of the model and its utility. As university professors we are implementing suggestions given by students in their end-of-course feedback and constantly improving this model to adapt traditional courses to modern technologies and new generation of students. Future work will involve a search for foreign subject-matter experts with excellent academic credentials and teaching skills who are willing to teach a real-time remote class and thus complement the traditional classroom training.

#### CONFLICT OF INTEREST

The authors declare no conflict of interest.

#### AUTHOR CONTRIBUTIONS

Martha Nunez conducted the research and wrote the paper; Miguel Rodriguez analyzed the data; and approved the final version.

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