International Journal of Business, Human and Social Sciences
ISSN: 2517-9411
Vol:14, No:10, 2020

An Exploratory Study of the Student's Learning Experience by Applying Different Tools for e-Learning and e-Teaching

Angel Daniel Muñoz Guzmán

***Abstract*—**E-learning is becoming more and more common every day. For online, hybrid or traditional face-to-face programs, there are some e-teaching platforms like Google classroom, Blackboard, Moodle and Canvas, and there are platforms for full e-learning like Coursera, edX or Udemy. These tools are changing the way students acquire knowledge at schools; however, in today's changing world that is not enough. As students' needs and skills change and become more complex, new tools will need to be added to keep them engaged and potentialize their learning. This is especially important in the current global situation that is changing everything: the Covid-19 pandemic. Due to Covid-19, education had to make an unexpected switch from face-to-face courses to digital courses. In this study, the students' learning experience is analyzed by applying different e-tools and following the Tec21 Model and a flexible and digital model, both developed by the Tecnologico de Monterrey University. The evaluation of the students' learning experience has been made by the quantitative PrEmo method of emotions. Findings suggest that the quantity of e-tools used during a course does not affect the students' learning experience as much as how a teacher links every available tool and makes them work as one in order to keep the student engaged and motivated.

***Keywords*—**Student, experience, e-learning, e-teaching, e-tools, technology, education.

I. Introduction

THERE has been a significant increase in online courses, especially in those called Massive Open Online Courses (MOOCs) due to different reasons like cost, access, technology and others; usually, the content is given by pre-recorded video lectures along with lecture notes and eBooks and the evaluation includes assignments, quizzes, homework, midterms and final exams [1]. The demand for MOOCs and all kinds of online courses has increased significantly and, as a result, the number of institutions offering such courses has increased to an unprecedented level [2].

The rise of online distance education has increased opportunities for all students. Also, it is more attractive to non-traditional students who have different lifestyles and commitments such as caring for children or full-time employment, where such types of situations could make it difficult for them to attend traditional face-to-face classes [3]. Despite the increase in the availability of these courses, between 40% and 80% of students fail to complete or drop out of the online courses [4].

Angel Daniel Munoz Guzman is with the Instituto Tecnológico y de Estudios Superiores de Monterrey, Mexico (e-mail: daniel.munoz@tec.mx).

Some universities have found differences in the outcomes between face-to-face and online courses [5] and it has been observed that students have had lower rates and grades in online courses [6], [7]. Studies of two community college systems suggest that these gaps remain even after controlling for student and course characteristics [8]. Other studies show that dropout rates were found to be six to seven times higher in online programs [9]. One way to address this issue and decrease student's dropout is by analyzing retention models like Tinto's Student Integration model. This model theorizes that the greater the level of academic and social integration, the greater the likelihood of students persisting until they finish the course [10]; however, most student retention models have been designed for the face-to-face classroom learning environment, making it difficult to apply them to the online learning environment.

There are three main possible factors that affect the students' learning: student self-discipline, quality of faculty and student interaction, and institutional support to students [11].

Student self-discipline is one of the main components of learner-centered models [12]. According to some studies, the role of motivation is the most important factor in student success [13], [14].

A lot of methodologies and tools have been developed and applied in order to keep the student motivated to learn, while the student's experience plays an important role in their motivation [15]; experience is the foundation and source of learning, as well as being powerful force to learn [16].

In recent years, the study of emotions in learning has had special attention and some models involve a direct relationship between learning processes and emotions [17]. To achieve this positive experience in learning, the University of Tecnologico de Monterrey launched the Tec21 Educational Model. This model is based on four pillars: challenge-based learning, flexibility in the way of learning, encouragement of a memorable university experience, and inspiring teachers. Salah-Eddine Kandri, IFC's Global Sector Lead of Education said, "Tec de Monterrey's ambitious initiative to overhaul its educational model provides an excellent example of how a top university can reinvent itself to remain relevant in a changing world and deliver on its mission for students in the 21st century. With its new multidisciplinary educational model, where students take an active role in tackling real-world problems, Tec de Monterrey is igniting excitement and passion in the hearts of students, and this is generating high

levels of student demand. The case study is an inspiring analysis filled with practical advice for higher education institutions around the world" [18], [19].

Since we are currently living through the COVID-19 pandemic, Tecnologico de Monterrey has released a flexible and digital model (FDM). FDM applies every element of the Tec21 model but is optimized for digital online courses by adding new skills from teachers, as well as new technologies, features and resources to maximize the learning experience of the students [20].

This study is not about if the e-learning is better or worse than learning in a traditional classroom, it is about what factors are involved in students' learning experience and how the best learning experience could be offered to the students using new methods and techniques; in this case, the application of the FDM in different courses.

II. Materials & Methods

The evaluation of the student's experience was made using the PrEmo method, which is a non-verbal measurement created as a tool that could be used to study the emotions elicited by different products on different people across languages and cultures [21]. This tool converts qualitative data in quantitative data; in PrEmo there are usually 14 images that represent different emotions.

The way it works is that participants evaluate each question, then systematically click on every image, and after viewing it, and assign a value on a three-point rating scale: 'I do feel the emotion expressed by this image'; 'Not sure or to some extent I feel the emotion expressed by this image'; or 'I do not feel the emotion expressed by this image'. By using these options of emotions it is possible for the student to give ratings for more than one emotion felt at a time, and giving the possibility to describe more complex emotional responses [22], [23]. To make the evaluation of the student's experience, five images were used, two images representing positive feelings, two images representing negative feelings and one image representing indifference.

In order to have a more valid and reliable result without any subjective or statistical weighting on ratings of the elements, some questions that cannot be measured by the PrEmo method were singularized using the visual analogue scale (VAS) [24].

100 students from different undergraduate programs were asked to participate in a poll. This poll had questions and situations useful to measure students' emotions with the PrEmo method. The questions were: 'How did you feel when all your classes changed to online mode?'; 'Select which teaching techniques were used by the professor'; 'If I ask you: Do you think the techniques applied in your course (gamification, PBL, Flipped learning among others) helped you to learn better and/or more? How would you react?'; 'What e-tools or apps were used in your classes?'; 'If I ask you: Do you think that the e-tools (kahoot, miro, menti, zoom, Canvas, quizlet, socrative, genialy among others) helped you to learn better and/or more? How would you react?'; 'Now that the semester has ended, which emotion do you identify with?'; 'On a scale from 1 to 6, were your courses more listening or doing?'; 'Which emotions did you feel each time the professor gave you an activity or homework?'; 'In your opinion, what things did you not like in your online courses?'; 'In your opinion, what things did you like in your online courses?'; 'In your opinion, how would you describe the way in which the professor used all the tools, methodologies and techniques during this semester?'.

The selection of the emotions was based on the Kort, Relilly and Picard's Model [25].

III. Results

At the beginning of the study, the students were asked about how they felt after being told that schools were to be closed, and that all students must remain at home and that the remainder of the semester would continue online. Their answers are shown in Fig. 1.

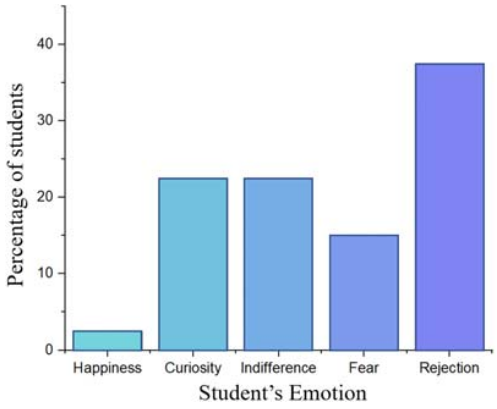

Fig. 1 Students' emotions felt at the moment they changed from traditional courses to online courses.

At the end of the semester, the same students were asked how they felt about the online courses they had taken. Their answers are shown in Fig. 2.

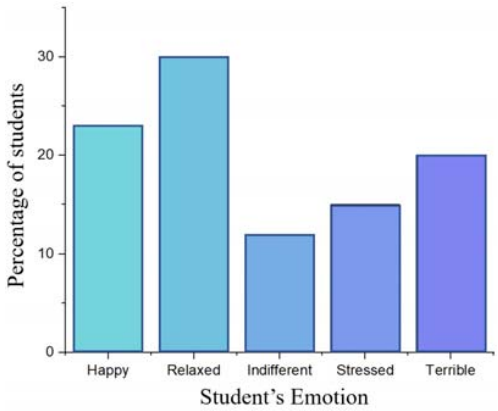

Fig. 2 Student's emotions felt at the moment they finished their online courses.

It can be seen that the positive reactions increased at the end of the semester. To analyze the factors that could be related to

this result and their experience, all students were asked about the e-tools or apps and what kind of teaching techniques the teacher applied in their courses.

During the interview, the students had to select what teaching techniques were applied to their course; their answers are shown in Fig. 3.

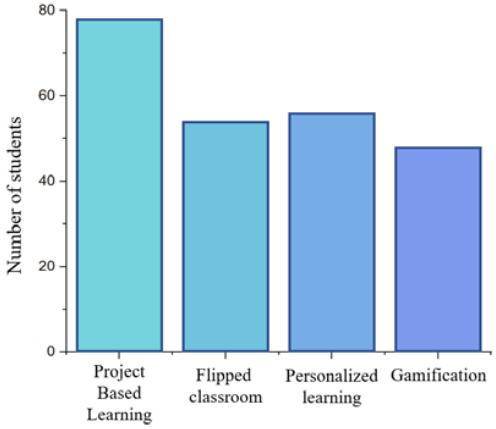

Fig. 3 Number of students that selected one or more teaching technique applied in their courses

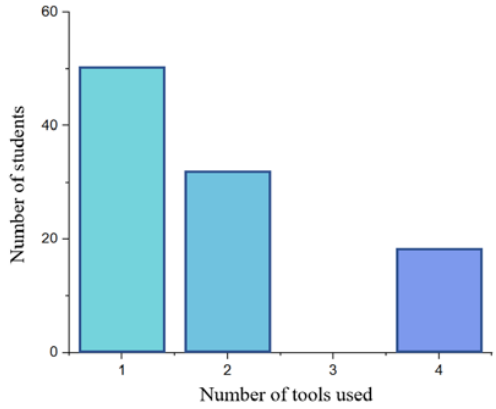

Fig. 4 Number of students that selected 1, 2, 3 or 4 as the number of teaching tools used by the professor in their courses

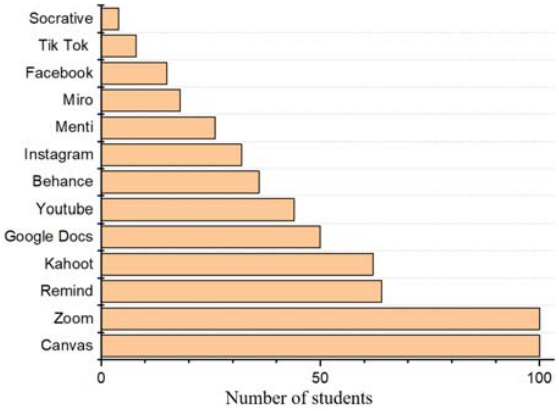

Fig. 5 Number of students that used different e-tools or apps during their courses

Most of the professors used project-based learning in their courses, but some of them used more than one technique.

Fig. 4 shows how many tools were used in a single course based on the students' interview responses. Furthermore, students used e-learning tools as part of their online learning. The tools the students used are shown in Fig. 5.

The students were asked if these e-tools helped them to learn more or easily; the results are shown in Fig. 6.

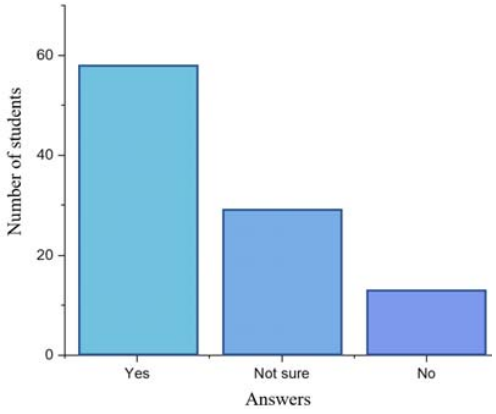

Fig. 6 Answers of students about the utility of e-tools for their learning

At the end of the interview, all students wrote about the best and worst situations they experienced during the semester. The most common reason for disliking the online courses was sighted as being extremely tired of being seated in front of the computer all day. Fig. 7 shows the top three reasons why students did not like the online semester.

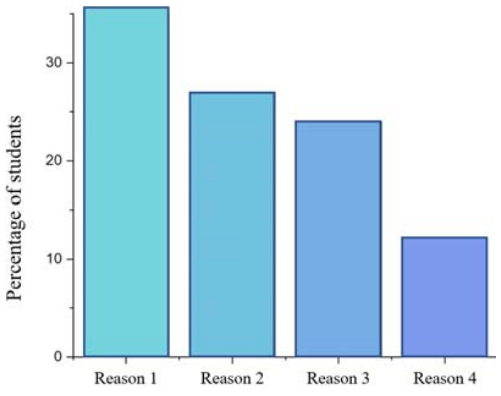

Fig. 7 Reason 1: It was extremely exhausting to be seated in front of the computer all day. Reason 2: It seemed that all teachers thought that if we had to be at home, we had less things to do and they doubled the quantity of homework. Reason 3: It was hard to maintain focus after the first hour. Reason 4: Other reasons

After completion of their courses for the semester, students were asked what they liked about the online mode. The results are shown in Fig. 8.

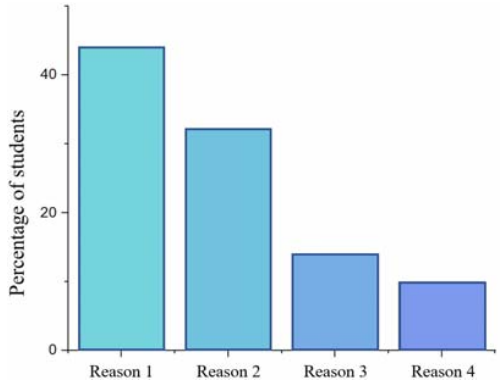

Fig. 8 Reason 1: "The way the teacher taught". Reason 2: "More time to do other things". Reason 3: "Recorded lessons and digital resources". Reason 4: Other reasons

IV. Discussion

When comparing how the students felt at the beginning of the online courses with how they felt at the end of the semester, it is clear that the opinion of most students changed in a positive way, as can be seen in Fig. 9.

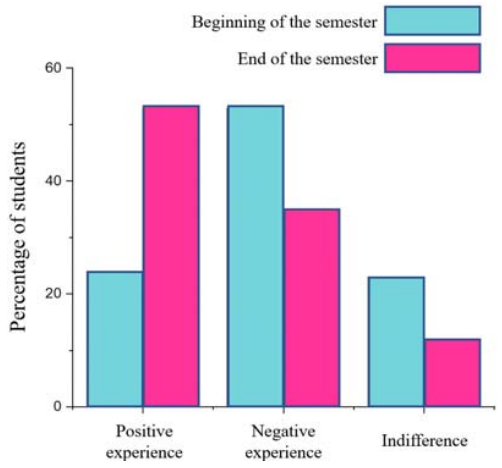

Fig. 9 Comparison between the students' emotions when they started the online courses vs. their emotions at the end of the semester

Negative emotions like fear, rejection or anxiety were expected to be dominant. In fact, as Raafat published in a study, these feelings are a critical variable in relation to student perceptions of online courses, and therefore, it continues to be a significant issue in online courses in higher education [26].

While all the students experienced unexpected power outages or lost Wi-Fi signals, this factor was not sighted as a reason for why they did not like the online course experience. This finding supports the results from another research which indicated that the emotional state of a student (whether positive or negative) has no direct impact on the perceived usefulness of an online learning system [26].

At the end of the semester, most of the students overall had a positive learning experience. The use of different teaching techniques and online tools or apps clearly helped them to improve their learning experience. However, this was not the case for everyone, despite the use of these tools, not all students had a positive experience at the end of the semester.

Some 35% students said that overall, they had a bad learning experience. To analyze what factors affected their emotions, these students are named as "NEG" (Negative experience group). From the NEG group, 76% of students say they experienced feelings of rejection and fear at the beginning of the online courses while 24% experienced a feeling of curiosity about the new model. This result suggests that by the end of the semester, 24% of the NEG group of students had changed from feeling a sense of curiosity to feeling stressed. Also, in this group, only 29% thought that the teaching techniques used by the professor actually worked, while 41% of them thought that the apps and e-tools used by the professor worked. As shown in Fig. 7, all NEG students responded that the online courses were exhausting and sometimes boring. These findings suggest that using e-tools and different teaching techniques is not enough to give the student a positive learning experience. When students were asked about how the teacher used the tools available, they responded that the teacher used just a few tools as individual activities or as a way to try to wake them up for long classes. Several studies have concurred on the effect that emotions have on achievement in general [27]. On the other hand, 53% of all students finished the semester with a positive learning experience. When they asked what they liked about the online semester, almost all the students wrote "the way the teacher taught". Mottet et al. offered the emotional response theory (ERT) linking instructor communication behaviors to students' emotions in classrooms [28].

When students were asked about how the teacher used the tools and teaching techniques, the responses suggest that the teacher used a lot of different tools and techniques as part of the class and that these were related with the activities and learning objects; these findings are in line with previous studies of student success in virtual learning [29].

V. Conclusion

The survey applying the PrEmo method along with the open questions showed the e-learning experiences of students in the Tecnologico de Monterrey University and gave a wide perspective of how the students were feeling in specific situations, this helped to identify some variables directly related to their learning experience. Giving a positive learning experience to the students has the potential to increase students' enthusiasm, concentration, attendance, skills development and engagement.

Education is constantly evolving, and therefore, every educator must update their teaching methods, and communication technologies can provide these possibilities. New students have different needs, they do not learn in the same way as in past decades, and e-teaching does not mean just teach using technologies, as [30] said, place technology before pedagogical analysis is a mistake. Taking into account student's emotions and learning experiences promotes a new

way of learning and teaching in the 21st century in order to improve learning outcomes.

This study highlights important factors to help us understand how instructional communication, methodologies, tools and emotions are interrelated and it suggests that the quantity of teaching techniques, apps or e-tools used during a course does not affect the students' learning experience as much as how a teacher links every available tool and makes them work as one in order to keep the student engaged and motivated.

ACKNOWLEDGMENT

The author would like to acknowledge the technical support of Writing Lab, TecLabs, Tecnologico de Monterrey, Mexico, in the production of this work.

REFERENCES

[1] A. B. Mostafa Abedi, «Rise of Massive Open Online Courses» 4th International Congress on Engineering Education, pp. 1-4, 2012.
[2] T. W. S. Jane M. Sileo, «Academic Dishonesty and Online Classes: A Rural Education Perspective» Rural Special Education Quarterly, pp. 27(2), 55-60, 2008.
[3] C. Aslanian, «You're never too old: Excerpts from adult students today» Community College Journal, pp. 56-58, 2001.
[4] B. Smith, «E-learning technologies: A comparative study of adult learners enrolled on blended and online campuses engaging in a virtual classroom» de ProQuest Dissertations and Theses database, 2010.
[5] T. &. J. S. S. Bailey, « Effectiveness of fully online courses for college students: Response to a Department of Education meta-analysis» New York: Columbia University, Teachers College, Community College Research Center, 2010.
[6] B. Guenter, «Studying distance education at community colleges,» Journal of Applied Research in the Community College, pp. 10(2), 119–126, 2003.
[7] T. E. Chambers, « Internet course student achievement: In Ohio's two-year community and technical colleges, are online courses less effective than traditional courses?» Unpublished doctoral dissertation, 2002.
[8] J. Di Xu, «The effectiveness of distance education across Virginia's Community Colleges: Evidence from introductory college-level math and English» Educational Evaluation and Policy Analysis, pp. 33(3), 360-377, 2011.
[9] M. Patterson B., «Attrition in online and campus degree programs» Journal of Distance Learning Administration, p. 12(2), 2009.
[10] V. Tinto, «Dropout from Higher Education: A Theoretical Synthesis of Recent Research» Review of Educational Research, pp. 45(1), 89-125, 1975.
[11] J. Gaytan, «Factors Affecting Student Retention in Online Courses: Overcoming this Critical Problem» Career and Technical Education Research, pp. 38(2), 147-155, 2013.
[12] C. White, «Learner-centered teacher-student relationships are effective: A metaanalysis» Review of Educational Research, pp. 77(1), 113-143., 2007.
[13] C. Dweck, «Motivational processes affecting learning» American Psychologist, pp. 41, 1040–1048, 1986.
[14] A. Gorbunovs, «Self-discipline as a key indicator to improve learning outcomes in elearning environment» Social and Behavioral Sciences, p. 256 – 262, 2016.
[15] D. Munoz, «Blending Gamification and Project-based Learning with Rapid Prototyping Technologies in Enhancing Students' Learning of Design» Conference: 2019 11th International Conference on Education Technology and Computers, pp. 210-214, 2019.
[16] D. Boud, Using Experience for Learning, UK: McGraw-Hill Education, 1993.
[17] C. C. B. V. Carlos Ramirez, «Non-Invasive Technology on a Classroom Chair for Detection of Emotions Used for the Personalization of Learning Resources,» International Journal of Educational and Pedagogical Sciences, 2010.
[18] N. ECIU, «ECIU,» 14 02 2020. (En línea). Available: https://www.eciu.org/news/world-bank-case-study-on-tecs-educational-model.
[19] ITESM, «Tecnologico de Monterrey» 11 04 2020. (En línea). Available: https://tec.mx/es/modelo-tec21.
[20] MFD, «TEC» 12 04 2020. (En línea). Available: https://tec.mx/es/mdf-plus.
[21] D. Norman, «Measuring Emotion» The Design Journal, p. 6(2), 2003.
[22] P. Desmet, «Designing Emotions» 2002.
[23] EmotionStudio, «PrEmo» 29 3 2020. (En línea). Available: https://www.premotool.com/.
[24] D. Boer, «Is a single-item visual analogue scale as valid, reliable and responsive as multi-item scales in measuring quality of life?» Quality of Life Research, pp. 13(2), 311-320, 2004.
[25] B. R. R. a. P. R. Kort, «An Affective Model of Interplay between Emotions and Learning» IEEE, Conference on Advanced Learning Technologies, pp. 43-46, 2001.
[26] D. K. Raafat George Saadé, «The Emotional State of Technology Acceptance» Issues in Informing Science and Information Technology , 2006.
[27] B. Weiner, «An attributional theory of achievement motivation and emotion» Psychological Review, 1985.
[28] F. B. Mottet, «Theorizing about instructional communication» Handbook of instructional communication: Rhetorical and relational perspectives, 2006.
[29] C. F. Brooks, «Emotion in online college classrooms: examining the influence of perceived teacher communication behaviour on students' emotional experiences,» Technology, Pedagogy and Education, pp. 24(4), 515-527, 2015.
[30] M. Cebrián, Innovar con tecnologías aplicadas a la docencia universitaria, MAdrid: Narcea Ediciones, 2003, pp. 21-36.