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Senior high school students' learning styles and experiences in the emergency remote teaching

Catalina Juárez Díez

catalinajuarezdiaz@gmail.com

Emmanuel Hinojosa Hernández

Benemérita Universidad Autónoma de Puebla

emmanuel.hhdez@gmail.com

ORCID: <https://orcid.org/0000-0003-2870-3595>

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Abstract

Nowadays Mexican senior high school institutions are promoting temporally emergency remote teaching. Even though the instructional shift is just temporal, it is advisable to implement technology in education, consider student needs, learning styles, and promote student autonomy in the online learning experiences. Moreover, to include the teacher, the social, and the cognitive presences in the community of inquiry. This qualitative study aimed to analyze senior high school students' online learning experiences in relation to their learning styles. The sampling process was voluntary and consists of 37 participants. The results show predominance of theorist students, followed by the pragmatists, and finally, activists. Favorable learning experiences involved teachers using appropriate strategies and materials to promote learning. Negative online learning experiences were due to students' lack of understanding and interaction, as well as teachers' lack of explanation, reinforcement, and feedback, which reflect the lack of cognitive and teacher presence and omission of elements in online learning experiences that address the particularities of students regarding their learning styles.

Keywords: learning styles; social presence; emergency remote teaching

[es] Estilos y experiencias de aprendizaje en los estudiantes de nivel medio superior en la enseñanza remota de emergencia

Resumen

En la actualidad, las instituciones mexicanas de bachillerato impulsan la enseñanza remota de emergencia. El cambio solo es temporal, pero se recomienda implementar la tecnología, considerar las necesidades y estilos de aprendizaje de los estudiantes y promover su autonomía en las experiencias de aprendizaje en línea. Además, incluir la presencia social, cognitiva y del maestro. Este estudio cualitativo tuvo como objetivo analizar las experiencias de aprendizaje en línea de estudiantes de bachillerato en relación con sus estilos de aprendizaje. El muestreo es voluntario y consta de 37 participantes. Los resultados muestran un predominio de los estudiantes teóricos, seguidos de los pragmáticos y, finalmente, de los activos. En las experiencias de aprendizaje favorables los maestros utilizando estrategias y materiales apropiados para promover el aprendizaje. Las experiencias negativas fueron por la falta de comprensión e interacción de los estudiantes, así como la falta de explicación, refuerzo y retroalimentación de los profesores, lo que refleja la falta de presencia cognitiva y del profesor y la omisión de elementos en las experiencias de aprendizaje en línea que atendieran las particularidades de los estudiantes con respecto de sus estilos de aprendizaje.

Palabras clave: estilos de aprendizaje; presencia social; presencia cognitiva; presencia docente; enseñanza remota de emergencia

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1. Introduction

In Mexico, high school institutions are promoting emergency remote teaching (ERT), even though most Mexican institutions offer a face-to-face instruction on a regular basis. Through this temporal instructional shift, public high schools offer service to 4,242,200 students, while 997,475 students are in private school (SEP, 2019).

The availability of computers in Mexican homes is low. Only 44.9% of the population owns a computer, and so is the internet service which only 52.9% of people with a computer has access to internet which makes it impossible for some students to be part of the online learning environment (INEGI, 2019).

Since March 2020, institutions adopted ERT which is considered as a temporal alternate change of face-to-face instruction to a remote instructional mode which assumed to provide instruction as long as the crisis lasts (Barbour, LaBonte, Hodges, Moore, Lockee, Trust, & Kelly, 2020). As many institutions began providing remote learning, some suggestions have been provided for different educational levels,

which can be applied in different countries. The suggestions indicate the way teachers must organize the teaching-learning process and communication, keep contact with students, make sure every student receives the information, feedback, and avoid adding stress to students (ISBE, 2020).

In this regard, researchers advise implementing technology in education carefully; indicating that all e-learning experiences must consider student needs, learning styles, and promote student autonomy (Arrosagaray, González-Peiteado, Pino-Juste & Rodríguez-López, 2019; Yeop, Wong & Goh, 2016). Also, as Information and Communication Technology (ICT) use is increasing, it is advisable to research the utility and effectiveness of ICT in learning outcomes (Chandra & Briskey, 2012).

The institutions need to prepare teachers with the necessary skills to reach the learning objectives during online teaching. Institutions have to provide workshops to update teachers in online teaching and encourage skillful teachers to create learning material and shared it with less experienced teachers. Moreover, teachers need to give short lessons to engage students in their learning. Teachers must be flexible and understanding with their students' rhythm and style and the real conditions of their students who can have the tools to get involved in online learning or cannot be part of the new proposal. However, they can still work with them in no digital learning (ISBE, 2020).

From the stated above, some research questions emerged: what are the online learning experiences of public high school students in relation to their learning styles in the emergency remote teaching? What kind of presence do teachers promote in the CoI? The objective of this research was three-fold to characterize participants' learning style predominance, to identify the type of presence in the CoI and to analyze the online learning experiences of high school students in relation to their learning styles.

2. Literature review

2.1 Information and communication technology (ICT) in education

The integration of ICT in the educational setting has risen fast during the past decades, since ICT permits providing education no matter the distance, reducing time and cost (Agrawal, & Mittal, 2018). Also, as different researchers mention (Çapuk, 2015; Çelik, & Gundogdu, 2016) e-learning is productive because ICT makes it possible to create more entertaining lessons, allowing teachers to provide many learning activities and materials that help students understand subject content, get motivated, and develop social and communicative abilities, and ultimately enhance student autonomy. Moreover, the use of ICT in instruction, benefit students regardless of their learning style (Doulik, Skoda, & Simonova, 2017).

As Çapuk (2015) indicates, teachers must have skills and knowledge linked to their field of study, ICT and pedagogy. Some benefits of the proper use of ICT are changes in the way students get informed, learn, and communicate. Other mayor changes are on teachers, students, curriculum, and the whole teaching-learning process, thus, institutions need preparing teachers in the ICT field.

Teachers should employ ICT to create learning experiences and to develop competencies required in the 21st century, however, using ICT as a teaching tool in high school is complicated since it demands teachers to have specific abilities related to teaching and technology (Salehi & Salehi, 2012). High school teachers face problems including ICT because they cannot use technology fully. Teachers lack time to create the learning experiences mediated by technology. They do not want to change, have technical problems with computers, and are not confident ICT users (Nikolopoulou & Gialamas, 2016).

The role of the teachers in the e-learning environment is vital since teachers have to be present to facilitate learning. Otherwise, their absence negatively impacts learning outcomes. When teachers leave their students by themselves with little or no intervention, lack of accompaniment affects students' performance negatively. The integration of ICT is a careful and thoughtful process, so teachers must integrate ICT tools properly; otherwise, the results of ICT inclusion would not satisfy neither teachers nor students. Therefore, teachers have to implement ICT properly and choose new teaching approaches to make e-learning experiences functional and reliable (Hayes, 2016). In sum, teachers have to pay attention to different requirements that e-learning comprises to prepare favorable learning experiences.

2.2. A framework to teach in a community of inquiry

Teachers and students are part of a community of inquiry (CoI), where they interact "to construct meaning and confirm understanding" (Garrison & Vaughan, 2008, p.9). It is important to include three presences in online learning experiences (Rourke, Anderson, Garrison & Archer, 2001): a) The cognitive presence allows students to reflect on the information they receive, interact with teachers and other students to exchange information, visualize the information mentally, corroborate understanding, use the information, and construct knowledge (Garrison & Vaughan, 2008); b) The teacher presence helps the cognitive aspect to emerge, in order to have a productive learning experience, since teachers are responsible for directing the learning experience and design the materials and activities to facilitate and mediate learning, promote discussions and verify understanding (Garrison & Vaughan, 2008); c) the social presence creates a sense of belonging and trust among the participants of the CoI, which increases confidence and collaboration to learn (Garrison, Anderson & Archer, 2001) and at the same time supports the cognitive and the teacher presences.

2.3. ICT and learning experiences considerations

Some researchers state that in the design of the online learning experiences, it is important that teachers consider student needs, learning styles, and student autonomy (Arrosagaray et al., 2019; Yeop et al., 2016). When teachers regard student needs and their learning styles, the instructional design engages students to learn (Yeop et al., 2016).

Another benefit of considering the learning styles in the e-learning contexts is that the learning experiences become productive, satisfying, time saver, and beneficial to the academic development (Özyurt & Özyurt, 2015). Teachers can set appropriate conditions to facilitate learning using ICT to mediate learning, considering student necessities, concerns, skills, and learning styles (Agrawal & Mittal, 2018). Teachers must adapt the e-learning to students' learning styles because it promotes good students' performance (Abdullah, Daffa, Bashmail, Alzahrani & Sadik, 2015). Researchers recommend paying attention to student needs and learning styles to provide fruitful e-learning experiences. They allude to different aspects, but they recurrently mention the learning styles and the student needs as vital aspects to be considered in the e-learning experiences.

2.4. Learning styles

Learning styles are "the composite of characteristic cognitive, affective, and physiological factors that serve as indicators of how a learner perceives interacts with and respond to the learning environment" (Kefee & Languis, as cited in Kefee & Ferrell, 1990, p.59). We consider the proposal of Honey and Mumford suitable for this study. They classify the learning styles in activists, reflectors, theorists, and pragmatists. The *activists* are open-minded, enjoy working collaboratively and do one task after another. Therefore, their engagement in the activities lasts just short periods, so they need a wide variety of tasks. The *reflectors* gather information and analyze it deeply before making use of it. They interact until they handle the information well. They do not like to jeopardize and avoid ridicule. The *theorists* invest more time doing the activities because they like to analyze, synthesize, and conceptualize it. They dodge ambiguity and subjectivity. The *pragmatists* take part in appealing projects which are feasible and realistic (Alonso, Gallego & Honey, 1997).

2.5. Learning styles studies in senior high school

Some investigations have explored learning styles with the Honey and Mumford's learning styles proposal and the Honey- Alonso Learning Styles Questionnaire. Among them, Tordecilla González Nuñez and Dávila (2017), in an institution located in Barranquilla, identified a predominance of the reflector style, followed by the theorist, the pragmatist, and the least predominant style was the activist one. In the

results, they observed that the activists obtained less satisfactory results than the reflectors. Ramírez Gallegos, Lozano Rodríguez and Zárate Ortiz (2017), found a predominance of the pragmatist, activist and theorist style in an institution located in Mexico. They also observed that any participant had predominance in the reflector style, but some participants had predominance in two learning styles. For his part, Quintanal (2017) identified the predominance of the theorist style, a combination of styles and a low tendency of the reflector style in a high school in Spain.

In other educational levels such as secondary school in Colombia, the relation between learning styles and use of TIC was explored. It was found a predominance of the activist style. The students selected friendly user tools, therefore, they preferred Whats app and Facebook to share information and consult doubts with their peers. They usually used work processors to do their tasks, they were good at carrying out the assigned task, some students made the effort to analyze and summarize the information while others tended to use literal information. The way students work their documents and tasks vary regarding the learning style. Activists keep the information not systematically, while pragmatist and reflector organize the files alphabetically to make it faster their further use (Zambrano Acosta, Arango Quiroz, & Lezcano Rueda, 2018).

3. Methodology

3.1. Research approach

The research design selected was qualitative (Hernández Sampieri, Fernández Collado, & Baptista Lucio, 2014).

3.2. Population and sample

The study was conducted in a public high school institution located in the city of Puebla, Mexico. The institution offers face-to-face education on a regular basis. However, due to the pandemic authorities forbade the attendance to institutions, so teachers and students started working online. The sampling process was voluntary (Hernández Sampieri et al., 2014). The number of participants in the qualitative phase was 37 because the saturation principle was reached (Álvarez-Gayou, 2003) Their ages were 15-18 years old. The participants had a high academic achievement score, their average grade was 9.19 (SD=.489).

The principal of the school gave permission to do the study in the institution and an informed consent was sent to the participants' parents and the participants so that they allowed the researchers to use the data provided in the instruments. The researchers informed the participants that their identities would be confidential so that no names would appear in the results. The participants and participants' tutor agreed that the researchers presented their data in this study.

3.3. Instruments

The survey (Barraza, 2006) and the semi-structured interview (Martínez, 2006) were used to gather the information. The instrument to identify the learning styles was the Honey-Alonso Questionnaire of Learning Styles. The instrument has 80 dichotomous items, a scale that helps to identify the predominance of each learning style (Alonso et al., 1997). The instrument was validated in Mexico, its reliability to measure the learning style construct is 80% (Lugo, Hernández y Montijo, 2012). The semi-structured interview was used to gather information on students' learning experiences in the online environment. Both instruments were sent online. The answers were received from June 3 to June 20.

3.4. Data analysis

The data analysis treatment was artisanal (Gibbs, 2007), and the open coding was employed; researchers read the data the necessary times to identify and segment the content units to form the categories

(Hernández Sampieri et al., 2014). In the result analysis, the researchers followed a formal analysis that consists of 3 steps. The first step allowed us to organize the interview information after reviewing the interview guides to identify the topics. Then, the information was put in a chart, which eases the analysis of the data. In that overview, the most frequent words and expressions reported in the interviews were picked out, and later they were organized into codes and categories. Second, looking for validity, the codes and interpretations were sent to a researcher who has experience in this topic and in doing qualitative research. The colleague verified the accuracy of the interpretations and sent feedback on the codes and interpretation. Third, the codes were summarized and compared with the literature (O'Connor & Gibson, 2003).

4. Results and discussion

4.1. Positive online learning experiences

Regarding teachers' performance and commitment to work online, 22 students found positive and 15 negative online learning experiences. Students considered that teachers' performance caused positive and negative feelings. Fifteen students felt bad working online and 22 students felt the opposite. In findings were identified positive and negative learning experiences. The positive ones occurred because of synchronic online sessions, learning resources, student qualities, and abilities. The positive learning experiences occurred because of synchronic online sessions, learning resources, student qualities, and abilities.

4.1.1. Synchronous online sessions

Some participants considered that their teachers were using appropriate teaching strategies, platforms, and learning materials to promote learning. Students had video conferences in some classes through Zoom. Some students stated:

"We have Online classes through Zoom, and I consider that I am learning". (P29R)

"I learn with classes through Zoom; it is as if I were in normal classes". (P33T)

Four students accepted that platform broadly because they consider they could learn, clear out doubts, and interact with their teachers as if they were in the face-to-face classroom. This finding coincides with the results obtained in Candarli and Yuksel (2012), who found out that video conferences help reach the learning objectives and establish a productive learning experience. Synchronous video conferences offer some advantages, such as allowing teachers to interact in a face-to-face way, which let them to assist students and keep them updated with the course's information and material. Also, teachers can know students' performance, reducing cheating and impersonation (Wagner, Enders & Pirie, 2016).

4.1.2. Learning resources

Seven participants consider it convenient to have received material such as videos, PDFs, and instructions. Researchers have reported the benefits of videos in the teaching and learning process; videos increase interest, motivation, and participation. Videos help students organize and create a mental representation of the reviewed material on the videos, thanks to visual and verbal input (Seçer, Şahin & Alci, 2015). The participants commented:

"Videos helped me learn because they explain the subject, and the teachers tell us how to solve the exercises teachers give us". (P15R)

"Teachers send us instructions and material where we can consult the knowledge, they require and PDF material". (P31T)

4.1.3 Personal qualities and abilities

Another aspect that helped students to have favorable online learning experiences was to have a positive self-image, they describe themselves with positive qualities that lead them to learn. According to Nair (2016), students, who have a positive self-image, have a positive perception of themselves, worth and depict their strengths outwards apart from being able to identify their shortcomings. Self-image makes students feel competent and self-sufficient, confident, collaborative, emotion handler, and problem solvers. Students are aware of their strengths and identify their flaws too, taking their weaknesses positively (Nair, 2016).

Twenty-two participants also expressed to have developed some abilities and good habits as students. They portrayed some qualities such as responsibility, autonomy, engagement, disciplined and motivation. Students mentioned that the qualities they have as students helped them to accomplish what their teachers required in the confinement period. Some participants said:

"I am a good student, responsible, respectful, and kind, and I can find a solution to it despite adversity". (P5P)

"I am a responsible student who likes to learn things; however, sometimes I block myself and feel like I can't do it, but I tried to do them. Another characteristic of mine as a student is that I am very motivating, willing to do things, and competent in some ways". (P6R)

"I am committed and responsible. These qualities make me stand out". (P8T)

"I am responsible, disciplined, willing to learn something new every day". (P9T)

Teachers and students contributed to generate positive learning experiences. On teachers' side were the learning strategies and synchronous online session. On the other hand, students' qualities allow them to face the problems they encountered and went for their objective goals.

4.2. Negative online learning experiences

The negative learning experiences resulted from the lack of one of the three presences. The three of them are vital to obtaining favorable learning results.

4.2.1. Social presence

Some students had negative online learning experiences due to a lack of understanding, interaction, explanation, reinforcement, and feedback. Twenty students mentioned that they received material with confusing instructions and no explanations of the new content. This suggests that the teacher, cognitive, and social aspects were not present or partially present in the learning process in online learning experiences. These presences affect learning outcomes (Rourke et al., 2001).

Some students' experiences indicate the lack of cognitive presence, through which students' understanding is verified, and discussions and communication are set (Garrison & Vaughan, 2008). Also, the social presence was not present in the online learning experiences. The social presence helps create a friendly and productive community of learning since learners and teachers can interact and engage and collaborate each other (Garrison et al., 2001). Some participants said that they received a significant number of tasks without explanations, and in some cases, the instructions were not clear. When students read the learning material, they did not understand it. Therefore, they looked for teachers' support, but teachers did not explain them. The participants mentioned:

"It becomes difficult to retain everything the documents contain. I do not have the same class time as I have in normal classes without counting that in classes, you can talk about what you have learned, and now that is a little more complicated". (P29R)

"It is complicated not to find an answer to my doubts; then, it is difficult to find videos where they explain the subject well". (P30T)

"The truth is I don't like it. I feel like they leave more homework right now than when we

went to class. Moreover, when I did not understand, I sent teachers messages, but they just told me to see a video, and they did not clarify my doubts". (P31T)

4.2.2 Teacher presence

Students also felt that teachers left them working alone online, which caused negative online learning experiences. That finding is similar to Herrera's (2012) who found that students could not make the learning objectives without teachers' assistance. Students were unable to take full control of their learning process. Muñoz and González (2010) found that distance learning can promote learning if teachers guide, feedback, correct students and attend their students. However, the participants mentioned that their teachers did the opposite, making them to have negative online learning experiences.

On the other hand, the teaching presence was manifest when teachers directed; designed the materials and activities, facilitated, and mediated the learning experiences. Teachers must promote discussions and verify that understanding those actions makes productive learning experiences (Garrison & Vaughan, 2008). Somehow that presence was partially seen in the learning experiences because teachers selected and sent activities to students. However, according to some students their teachers did not verify meaning and neither mediated learning. Teachers and students did not interact in the CoI. Those actions occur in the cognitive and social presence. The participants said:

"Sometimes, the work teachers send was very messy, or there are certain parts that I don't understand. I need some teachers to explain a little more about the subject so I can understand better". (P4P)

"The teacher only sends the information, but he does not explain well how he wants the job." (P18A)

"Teachers share material and assign work that we have to do in the week. I do not like it at all since I don't learn that way". (P33T)

"Teachers send monotonous, irrelevant homework. It should be more careful in certain subjects, keeping in mind that teachers have to teach and not just keep students busy". (P35T)

4.2.3 Cognitive presence

Most students considered the way teacher performed was not appropriate because they just sent materials and assigned homework, but did not provide any feedback or explanations, and their learning outcomes were negatively affected. Feedback is important because students get conscious through the information teachers provided on their performance and understanding (Hattie, & Timperley, 2007, p. 81) In order to provide productive learning experiences, the three presences must be present. They complement each other and ensure communication and collaboration among the members, exchange, and discussion of the information and personal views and understanding of topics or information. The cognitive presence increases the quality of the learning experiences and learning outcomes because understanding is verified (Garrison et al., 2001).

4.3 Online learning experiences and learning styles

Students learn in different ways; their learning styles can influence the way they learn. Learning experiences must consider the strength and weaknesses students may have while analyzing and treating new information. Researchers suggest considering the way students learn in online learning experiences (Arrosagaray et al., 2019; Yeop et al., 2016).

It might be convenient to care about learning styles because they significantly improve student's performance and learning achievement (Abdullah et al., 2015). According to participants, teachers similarly treat every student, suggesting that the learning style was not considered. Participants mentioned

that their teachers concentrated on sending materials, activities, and assignments and receiving students' tasks.

That way of working minors the students' chance to maximize students' strengths inherent to their preferred way of learning. For example, activists learn better when they get involved in various short-time taking and appealing activities where they can participate actively, compete, and direct debates (Alonso et al., 1997). However, they mentioned to be doing the same type of activities along the online course:

“Teachers only send information, but they do not explain well how they want the work”.
(P18A)

“I don't understand the information and guidelines in history apart from the fact that I don't like it; they are just readings”. (P22A)

“Teachers assign a lot of tasks or rather too much complex work... I have spent hours trying to understand the information and the exercises”. (P34A)

Regarding reflectors, they work better when they read and interchange ideas, observe others, review visual materials, investigate, and review what they have learned (Alonso et al., 1997). Participants mentioned having used visual material. The students commented that they have positive online learning experiences:

“The online classes and the slides that my physics teacher sent us helped me to learn”.
(P6R)

“The videos where the topics are explained and the teachers, who illustrate how to solve something, have helped me”. (P15R)

On the contrary, reflectors faced problems to learn because they could not understand the information; it was difficult to assimilate the information. Understanding is significant for them to use the information (Alonso et al., 1997). The participants mentioned:

“Teachers do not explain to me and only ask for tasks, and I have to solve exercises and I am not clear about their concepts to do the activity”. (P15R)

As far as theorists concern, learning is promoted when reading or listening to concise information, analyze, and generalize it. Theorist students find it appropriate to learn when they can question, have time to explore information, link ideas, participate in the learning experiences ask and answer questions, and read or express ideas (Alonso et al., 1997). The participants expressed:

“I learn in history and biology because teachers send us exercises and readings”. (P2T)

“I could learn, thanks to the amount of support of educational materials that teachers sent about the subject. When I had doubts, I checked the materials, and the questions were solved”. (P5T)

On the contrary, they found it difficult to learn when they worked in uncontextualized activities and when there is uncertainty and ambiguity (Alonso et al., 1997). The participants said:

“I need more explanations of the topics we see in each subject”. (P2T)

“I need much practice, but teachers just made us research and write. I do not see the point of the tasks”. (P32T)

“Teachers share the work that we have to do during the week, but I don't like it at all since I don't learn in that way”. (P33T)

Pragmatist students learn when they solve problems, follow instructions, see examples, shortcut, listen to anecdotes, and focus on practice (Alonso et al., 1997). On the contrary, students from the study found it challenging to learn when they had to work without clear instructions to carry out their tasks. The participants commented:

"The teachers did not explain or come to explain what is in the PDF. They do not give clear indications so that I have many doubts when I am doing the activity". (P37P)

"Teachers do not explain the work well and do not pay attention to us". (P13T/P)

"Personally, I learn in the majority of the tasks where I do not research or make maps, etc. and I learn if activities are for practice or rehearsal of vocabulary". (P3T/P)

From the above, we can say that teachers promoted ways to work with students that resulted in negative learning experiences because conditions that hamper learning depending students learning style predominance were activated.

5. Conclusions

Based on the present results, we can conclude that there is a theorist learning style predominance among students, followed by the reflector, the pragmatist, and the activist and combination of styles. This result is similar to Quintanal (2017). In this study there is no predominance of the theorist style just as in the study (Ramírez Gallegos et al., 2017).

Moreover, activists (14%), reflectors (22%), and theorists (46%) had more positive feelings towards eLearning than pragmatist (18%) students did. According to (Zambrano Acosta et al., 2018), the way students work their documents and tasks vary regarding the learning style. Therefore, it might be convenient for teachers to broaden the types of activities and materials without holding back the potential which characterizes them in their preferred way to learn. Teachers must consider that pragmatist students need to take the theory to real life use, activist learn better with a wide variety of activities. The reflectors need the teacher and social presence since they learn from what they listen in those presences.

Therefore, teachers must have in mind that when they consider students learning styles, students might get involved in online learning activities and make the most of them to learn, just as some researchers coincide that when taking into account students' learning styles, the learning outcomes improve (Abdullah, 2015; Agrawal & Mittal, 2018; Arrosagaray et al., 2019; Özyurt & Özyurt, 2015; Yeop et al., 2016).

Students had positive emotions working online because their teachers explained and interacted with them. However, some students (40.05%) had negative emotions working online since their teacher's performance was limited to provide material and assign homework. Based on participants claims, it seems that students with negative feelings to work online consider still necessary the guidance and accompaniment of their teachers to learn so that the teacher and cognitive presences are important for students to understand the information they are working with. So, teachers have to consider those presences in the learning experiences where feedback and interaction take place. The presences are still a vital practice to make students aware of their progress and things to improve.

In the same way, there were positive and negative online learning experiences. Regarding the negative ones, students (80%) felt uncomfortable working online because they considered that teachers were not involved in the learning process. In this case, students felt comfortable in sessions when they could interact with teachers and cleared out doubts. Therefore, online teachers cannot leave aside the social and cognitive presence while working online. Teachers may consider what turns remote online learning experiences into meaningful and productive ones.

Overall, students and teachers worked in an unfavorable condition because working on online was not their usual way of teaching and learning. Secondly, the tools and technological platforms did not satisfy all students' needs leading students to reject remote teaching. In the learning experiences, their learning styles were not considered.

Understandably, teachers were not ready to work on remote emergency teaching if we consider that most Mexican teachers are devoted to face-to-face teaching. However, these months has come to remind us that teachers must be in constant preparation and that the ICT field is each day, part of the educational system, so the ICT preparation cannot be delayed. It is an urgent skill that teachers must develop even when teaching become to the face-to-face mode. Some questions for future research might be to what extent this new way of working can influence teacher-student interaction when they come back to face-to-face education. To what extend will teachers modify their teaching styles in face-to-face modality to satisfy students' learning style profiles after being involved in online teaching? Finally, how easy, or difficult could it be to adapt teaching styles to face-to-face teaching-learning once again?

Some limitation in this study were that a few studies were available to compare the results of this study and that the results only reflect the population under research. From the present results, we consider that more studies must be done to explore online teaching and learning regarding students' learning styles, using the Honey- Alonso learning style model, to corroborate these findings and to analyze online teaching experiences during and after coming back to face-to-face settings.

7. References

- Abdullah, M., Daffa, W. H., Bashmail, R. M., Alzahrani, M., & Sadik, M. (2015). The impact of learning styles on Learner's performance in E-learning environment. *International Journal of Advanced Computer Science and Applications*, 6(9), 24- 31. <https://bit.ly/3a9qWrU>
- Agrawal, A. K., & Mittal, G. K. (2018). The role of ICT in higher education for the 21st century: ICT as a change agent for education. *Multidisciplinary Higher Education, Research, Dynamics & Concepts: Opportunities & Challenges For Sustainable Development*, 1(1), 76-83. <https://bit.ly/329nTvv>
- Alonso, C. M., Gallego, D. J., & Honey, P. (1997). *Los estilos de aprendizaje: Procedimientos de diagnóstico y mejora* [Learning Styles: Diagnostic and Improvement Procedures] (7^a. Ed.). Bilbao, España: Mensajero.
- Álvarez- Gayou, J.L. (2003). *Cómo hacer investigación cualitativa. Fundamentos y metodología*. México: Páidos.
- Arrosagaray, M., González-Peiteado, M., Pino-Juste, M., & Rodríguez-López, B. (2019). A comparative study of Spanish adult students' attitudes to ICT in classroom, blended and distance language learning modes. *Computers & Education*, 134, 31-40. <https://doi.org/10.1016/j.compedu.2019.01.016>
- Barbour, M. K., LaBonte, R., Hodges, C., Moore, S., Lockee, B., Trust, T., & Kelly, K. (2020). Understanding pandemic pedagogy: Differences between emergency remote, remote, and online teaching. State of the Nation: K-12 e-Learning in Canada. Retrieved from <http://hdl.handle.net/10919/101905>
- Barraza, A. (2006). La encuesta: ¿Método o técnica? *Investigación educativa duranguense* [The survey: method or technique? Duranguense educational research]. 5, 1-17. <https://dialnet.unirioja.es/descarga/articulo/2880937.pdf>
- Candarli, D., & Yuksel, H. G. (2012). Students' perceptions of video-conferencing in the classrooms in higher education. *Procedia-Social and Behavioral Sciences*, 47, 357- 361. <https://doi.org/10.1016/j.sbspro.2012.06.663>
- Çapak, S. (2015). ICT Integration models into middle and high school curriculum in the USA. *Procedia-Social and Behavioral Sciences*, 191, 1218-1224. <https://doi.org/10.1016/j.sbspro.2015.04.409>

- Çelik, B., & Gündoğdu, K. (2016). The effect of using humor and concept cartoons in high school ICT lesson on students' achievement, retention, attitude and anxiety. *Computers & Education*, 103, 144-157. <https://doi.org/10.1016/j.compedu.2016.10.008>
- Chandra, V., & Briskey, J. (2012). ICT driven pedagogies and its impact on learning outcomes in high school mathematics. *International Journal of Pedagogies and Learning*, 7(1), 73-83.
- Doulik, P., Skoda, J., & Simonova, I. (2017). Learning styles in the e-learning environment: the approaches and research on longitudinal changes. *International Journal of Innovation and Learning*, 21(4), 417-434. <https://doi.org/10.1504/IJIL.2017.084359>
- Garrison, D. R., Anderson, T., & Archer, W. (2001). *Critical thinking and computer conferencing: A model and tool to assess cognitive presence*. <http://hdl.handle.net/2149/740>
- Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. United States of America: John Wiley & Sons.
- Hattie, J., & Timperley, H. (2007). The power of feedback. *Review of educational research*, 77(1), 81-112. DOI: [10.3102/003465430298487](https://doi.org/10.3102/003465430298487)
- Hayes, D. N. (2007). ICT and learning: *Lessons from Australian classrooms*. *Computers & Education*, 49(2), 385-395. <https://doi.org/10.1016/j.compedu.2005.09.003>
- Herrera, L. (2012). Self-Access Language Learning: Students' Perceptions of and Experiences Within this New Mode of Learning. *Profile: Issues in Teachers' Professional Development*, 14(1), 113-127. <https://revistas.unal.edu.co/index.php/profile/article/view/29061>
- INEGI. (2019). Estadísticas a propósito del día mundial del internet [Statistics on world internet day]. *INEGI*. <https://bit.ly/3g47osX>
- ISBE. (2020). Recomendaciones de aprendizaje remoto durante la emergencia de Covid-19 [Remote learning recommendations during the Covid-19 emergency]. ISBE. <https://bit.ly/3mF550L>
- Kefee, J. W., & Ferrell, B. G. (1990). Developing a defensible learning style paradigm. *Educational leadership*, 48(2), 57-61. <https://eric.ed.gov/?id=EJ416436>
- Martínez, M. (2006). La investigación cualitativa: síntesis conceptual. *Revista IIPSI*, 9(1), 123-146. <http://revistasinvestigacion.unmsm.edu.pe/index.php/psico/article/viewFile/4033/3213>
- Moto, S., Ratanaolarn, T., Tuntiwongwanich, S., & Pimdee, P. (2018). A Thai junior high school students' 21st century information literacy, media literacy, and ICT literacy skills factor analysis. *International Journal of Emerging Technologies in Learning (IJET)*, 13(09), 87-106. <https://onlinejour.journals.publicknowledgeproject.org/index.php/i-jet/article/view/8355>
- Muñoz, J., & González, A. (2010). Teaching Reading Comprehension in English in a Distance Web-Based Course: New Roles for Teachers. *Profile*, 12(2), 69-85. http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S1657-07902010000200005
- Nair, R. J. (2016). Self-image and self-esteem for a positive outlook. Training Manual on Theeranaipunya - Equipping Fisherwomen Youth for Future. *ICAR-Central Marine Fisheries Research Institute, Kochi*, 75-78. <http://eprints.cmfri.org.in/10815/>
- Nikolopoulou, K., & Gialamas, V. (2016). Barriers to ICT use in high schools: Greek teachers' perceptions. *Journal of Computers in Education*, 3(1), 59-75. <https://doi.org/10.1007/s40692-015-0052-z>
- O'Connor, H., & Gibson, N. (2003). A step-by-step guide to qualitative data analysis. *Pimatisiwin: A Journal of Indigenous and Aboriginal Community Health*, 1(1), 63- 90. <https://bit.ly/3mJ02fJ>
- Özyurt, Ö., & Özyurt, H. (2015). Learning style based individualized adaptive e-learning environments: Content analysis of the articles published from 2005 to 2014. *Computers in Human Behavior*, 52, 349-358. <https://doi.org/10.1016/j.chb.2015.06.020>
- Quintanal, F. (2017). Estudio de caso con estudiantes de física y química de bachillerato: estilos de aprendizaje, ciencia y publicidad. *Revista De Estilos De Aprendizaje*, 10(20). Recuperado a partir de <http://revistaestilosdeaprendizaje.com/article/view/1059>

- Ramírez Gallegos, E.N., Lozano Rodríguez, A. y Zárata Ortiz, J.F. (2017). Los estilos de aprendizaje y el rendimiento académico en estudiantes de cuarto semestre de bachillerato [Learning styles and academic performance in students in the fourth semester of high school]. *Revista De Estilos De Aprendizaje*, 10(20), 182-219. <http://revistaestilosdeaprendizaje.com/article/view/1062/1779>
- Rourke, L., Anderson, T., Garrison, D. R., & Archer, W. (2001). Assessing social presence in asynchronous text-based computer conferencing. *The Journal of Distance Education/Revue de l'Éducation à Distance*, 14(2), 50-71. <https://www.learntechlib.org/p/92000/>
- Salehi, H., & Salehi, Z. (2012). Integration of ICT in language teaching: Challenges and barriers. In 3rd International Conference on e-Education, e-Business, e-Management and e-Learning IPEDR (Vol. 27). https://www.academia.edu/28261513/Integration_of_ICT_in_language_teaching_Challenges_and_barriers
- Seçer, Ş. Y., Şahin, M., & Alcı, B. (2015). Investigating the effect of audio-visual materials as warm-up activity in Aviation English courses on students' motivation and participation at high school level. *Procedia-Social and Behavioral Sciences*, 199,120-128. <https://doi.org/10.1016/j.sbspro.2015.07.495>
- SEP (2019). Principales cifras del sistema educativo nacional. México[Main figures of the national education system]: SEP. <https://bit.ly/32gay4t>
- Tordecilla González, J. P., Nuñez, B. A., & Dávila, C. M. G. (2017). Estilos de aprendizaje en estudiantes de educación media y su relación con el desempeño en las pruebas Saber 11. *Revista De Estilos De Aprendizaje*, 10(20). Recuperado a partir de <http://revistaestilosdeaprendizaje.com/article/view/1055>
- Wagner, E., Enders, J., Pirie, M., & Thomas, D. (2016). Supporting academic integrity in a fully-online degree completion program through the use of synchronous video conferences. *Journal of Information Systems Education*, 27(3), 159. <http://jise.org/volume27/n3/JISEv27n3p159.html>
- Yeop, M. A., Wong, K. T., & Goh, P. S. C. (2016). Blended learning: pedagogy, learning styles, and assessment activities in the classroom. *International Journal of Advanced and Applied Sciences*, 33(11), 36-39.
- Zambrano Acosta, J., Arango Quiroz, L., & Lezcano Rueda, M. (2018). Estilos de aprendizaje, estrategias de aprendizaje y su relación con el uso de las TIC en estudiantes de educación secundaria [Learning styles, learning strategies and their relationship with the use of ICT in secondary school students]. *Revista De Estilos De Aprendizaje*, 11(21). <http://revistaestilosdeaprendizaje.com/article/view/1087>

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