



RESEARCH ARTICLE

# Teacher Satisfaction with Active Learning Methods: A Comparison between Emergency Remote Teaching During COVID-19 and Pre-Pandemic Face-to-Face Classes in Latin America

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## ABSTRACT

**Background:** Online education has been implemented in various higher education contexts for several years, enabling increased access to education. The COVID-19 pandemic challenged the education system at multiple levels, and higher education was compelled to implement an "emergency remote teaching" (ERT) format, enabling it to address the health crisis promptly. However, few studies in Latin America have compared the results of courses implemented in both modalities (online and face-to-face).

**Objective:** Analyze the satisfaction of a teacher training course on active learning methods for university instructors in Latin America, implemented online in the context of ERT during 2020-2022, compared to the course implemented face-to-face during 2018 and 2019.

**Methods:** For this, instructors from the Universidad San Carlos de Guatemala (USAC), Universidad San Francisco Xavier de Chuquisaca, Bolivia (USFX), and Universidade Federal do Paraná, Brazil (UFPR) were invited to participate in a course on "Educational Interventions" adapted to the virtual environment. The face-to-face courses were performed in Lima, Peru, and San José, Costa Rica, with instructors from different universities in Latin America. The evaluation utilized a 5-point Likert-based questionnaire that assessed satisfaction in accordance with the Kirkpatrick model.

**Results:** A total of 121 surveys were collected (83 from the online course and 38 from the face-to-face courses). Participants resided in 9 countries (Argentina, Germany, Brazil, Bolivia, Colombia, Chile, Guatemala, Peru, and Mexico) and represented various disciplines, including Biology, Medicine, and Engineering. Online course participants reported a significantly higher age than in-person course participants ( $p = 0.008$ ). All respondents would recommend the course to their colleagues, and the average course rating was 9.28 out of 10. Overall, a good level of satisfaction was reported in both formats. Technological resources were better valued in the online course, whereas tutor support was more valued in the in-person format.

**Conclusion:** The results highlight the potential of online education based on active learning methods, particularly during crises, to enhance access while maintaining educational quality, leveraging the technological resources currently available.

## Introduction

Active learning is a key component of healthcare training, where the student is considered the center of the teaching-learning process and is actively engaged in the content covered, thereby promoting their understanding and fostering meaningful learning<sup>1</sup>. Active teaching methodologies have been reported as an effective strategy to facilitate the transition from theory to practice, providing a clear understanding of the objectives and skills to be achieved. It has been linked to enhanced memorization, increased self-confidence, greater empathy, and increased creativity. They also promote communication skills, critical thinking, and the ability to assess one's own learning, allowing students to become aware of their limitations and needs<sup>2</sup>.

In this context, it is essential to implement a teaching process that not only incorporates effective techniques but also relies on active methodologies organized to achieve the learning objectives. ARIPE model (AVIVA, from the German acronym) is a conceptual model that guides the structure of classes or educational interventions for effective active learning<sup>3</sup> in face-to-face formats. Based on the logic of the meaningful constructivist process and considering the cognitive load of learning<sup>4</sup>, this model follows five stages<sup>3</sup>: 1) Adjust, to prepare the student to be open to new knowledge; 2) Reactivate previous knowledge; 3) Inform, to construct new knowledge; 4) Process, to consolidate knowledge; and 5) Evaluate the achievement of objectives and the process. It has been proven to be an effective learning methodology across various learner groups<sup>5</sup>. The Center for International Health at Ludwig Maximilians University of Munich (CIH<sup>LMU</sup>), an institute dedicated to promoting global health, research, and education within an international network (<https://www.cih.lmu.de>), has, for several years, been implementing a face-to-face course aimed at promoting the design of educational interventions based on the ARIPE model and active teaching methods, under the "train-the-trainer" concept. This course has been applied in diverse educational, research, and community settings<sup>6,7</sup>. *Emergency Remote Teaching*.

The COVID-19 pandemic presented a significant challenge to the educational system and its capacity to provide tools for distance education at various levels. These challenges included inflexible curricular designs, insufficient teacher training in the use of technology, inadequate infrastructure, limitations in software and hardware, and limited access to the internet<sup>8</sup>. Higher education was pushed to implement a format of "emergency remote teaching" (ERT), recognized as virtual education delivered rapidly, with minimal curricular planning, and in crisis situations<sup>9,10</sup>. Low- and Middle-income countries faced the most significant challenges regarding access to online tools, faculty training, and student engagement during the pandemic<sup>11,12</sup>.

Globally, online education and its methodological tools have been implemented for several years in various contexts of higher education<sup>13</sup>. The most commonly used formats are blended learning, which combines both online and face-to-face activities; fully online learning with tutor

support; self-directed online learning by the student; and Massive Open Online Courses (MOOCs)<sup>14</sup>. These formats have facilitated access to education for a larger number of students in different contexts<sup>15</sup>. However, the integration of these various modalities of knowledge transfer, application, and skill development remains a subject of ongoing research within different theoretical frameworks. This scrutiny is essential for fostering continuous improvement in the teaching-learning ecosystem, particularly in anticipation of new challenges emerging in the educational landscape<sup>16</sup>.

It has been highlighted that for effective online education at the higher education level, it is essential to consider the characteristics of adult education, particularly the importance of feedback and meaningful learning based on experience and practice<sup>17</sup>. Additionally, alignment between objectives, methodology, and assessment is crucial<sup>18,19</sup>. Furthermore, the support provided by various approaches, including interactive classes, student-centered learning, teamwork, debate, project development, and interprofessional learning<sup>20,21</sup>, as well as the increasing availability of technological tools (ICTs) for educators, demonstrates positive pedagogical effects<sup>22</sup>. Techniques such as storytelling, gamification, case-based learning (CBL), flipped classroom, and collaborative learning have been reported as effective<sup>23</sup>.

The existing literature on the effectiveness of online educational interventions in higher education has generally reported positive outcomes across various learning contexts<sup>24</sup>. However, the literature has also described certain obstacles to active learning methodologies, which need to be considered also in the online context, including the lack of preparation of the actors involved, both students and facilitators, linked to the lack of structural support, organization, and coordination of activities, which contributes to dissatisfaction<sup>2</sup>.

In response to the needs of partner institutions in the CIH<sup>LMU</sup> networking arising from the COVID-19 crisis and the suspension of face-to-face classes, the course on educational interventions was adapted to a virtual format through an online teaching course designed to provide educators with basic tools to adjust their classes to the online environment during the pandemic emergency. The adaptation considered the urgent needs of educators and their limited prior training in the use of information and communication technologies prior to the closure<sup>25</sup>. Therefore, the purpose of this study was to explore participant satisfaction in both courses, comparing the results between the face-to-face modality and the online format during the COVID-19 pandemic. The results will help improve future faculty training initiatives, especially in contexts where a rapid transition between different teaching modalities is required.

## Methodology

### CONTENT FACE TO FACE COURSE

The Educational Intervention course was offered in person from 2014 to 2019 to various groups of instructors and/or faculty members from partner institutions of CIH<sup>LMU</sup>. It was available in Spanish and English and lasted

one week, requiring complete immersion from the participants. These interventions included a series of participatory learning tools designed based on the ARIPE model, with the final product being a lesson plan that applied the methods in a local context (Table 1).

#### CONTENT ONLINE COURSE

The online course was developed within the CIH<sup>LMU</sup> network between 2020 and 2021 and continued as part of the network's ongoing training offerings under the name "Train-trainers with E-learning Applications, Fostering Creativity and One Health Approach" (TEACH Course). Its purpose was to support educators and trainers from different disciplines in adapting the content of their face-to-face classes to an interactive virtual format. The course design was based on the structure of

the ARIPE training model, utilizing teaching skills adapted to case-based learning (CBL). Asynchronous content delivered through the Learning Management System (LMS) Moodle platform and synchronous meetings were held in a collaborative interdisciplinary environment via Zoom® making international participation possible. The total duration of the course was 6 weeks, during which participants received support from a team of tutors experienced in methodology. The seven modules guide educators step by step in transforming their classes into an interactive virtual format (Table 2).

In both courses, the main contents were maintained, however, in the online course, specific contents were included to address online education (e.g., cybersecurity, or online interactive methods).

**Table 1.** Description of the didactic methodology for face-to-face courses

Nº	Module name	Learning Objective <i>At the end of the unit, participants will be able to...</i>	Contents
1	<b>Introduction, cross-cultural communication, and feedback considerations.</b>	Understand the concepts of culture and interculturality, as well as their significance in the teaching and learning process.  Describe the basic concepts of communication.  Identify some basic suggestions for giving and receiving feedback.	Basic concepts related to culture and intercultural communication.  How to give and receive constructive feedback.
2	<b>Problem definition.</b>	Identify through the "Problem Tree" tool a plausible problem to be addressed with an educational intervention.	Construction of a "Problem Tree" based on a detected local problem.
3	<b>Framework conditions for teaching and learning.</b>	Identify the basic components of the teaching and learning process.  Recognize the framework conditions necessary to implement effective learning.	Characteristics of the teaching-learning process in adults.  Components to consider in the context of a classroom.
4	<b>Definition of the Learning Objectives (LO).</b>	Identify basic characteristics of a learning objective according to Bloom's model.  Writing learning objectives for a specific class.	Construction of learning objectives, according to Bloom's model <sup>26</sup> for a specific class.
5	<b>Scientific literature search (Background).</b>	Identify the importance of "Evidence-Based Practice" in their classroom design.  Conduct an effective scientific literature search.	Review of scientific literature search tools, most used databases and Boolean operators.
6	<b>ARIPE model and interactive tools.</b>	Identify social forms of learning.  Familiarize yourself with the fundamental components of the ARIPE model.  Select the appropriate methods and tools for each phase of the ARIPE model.	Toolbox with methods to support participatory classes.
7	<b>Assessment.</b>	Recognize the elements necessary to conduct an effective and efficient evaluation.  Develop an evaluation format that allows you to measure the results of your class (before and after the class).  Present a lesson plan based on the methodology.	Assessment format that considers learning objectives, aligning with the teaching-learning process.

**Table 2.** Description of the didactic methodology for online courses

Nº	Module name	Learning Objective <i>At the end of the unit, participants will be able to...</i>	Contents
1	<b>Introduction</b>	Identify a class to be converted to an online format.  Recognize the challenges of online teaching in the local context.	General characteristics of online education formats.
2	<b>Considerations for online teaching-learning.</b>	Identify the basic components of the teaching and learning process.  Recognize the framework conditions necessary to implement online learning.	Characteristics of the teaching-learning process in adults <sup>17</sup> .  Components to consider in the online context.
3	<b>Interculturality in the Local and International Virtual Environment.</b>	Understand the concepts of culture and interculturality, as well as their significance in the teaching and learning process.  Establish coexistence agreements for online classes.	Basic concepts related to culture and intercultural communication.  How to establish coexistence agreements in virtual (synchronous) communication.
4	<b>Definition of the Learning Objectives (LO).</b>	Identify basic characteristics of a learning objective according to Bloom's model.  Write learning objectives for an online class.	Construction of learning objectives for online teaching, following Bloom's model <sup>26</sup> .
5	<b>Scientific literature search (Background).</b>	Identify the importance of "Evidence-Based Practice" in the design of their online class.  Conduct an effective scientific literature search.	Review of scientific literature search tools, most used databases, and Boolean operators.
6	<b>Interactive Online Teaching Methods and Technological Tools.</b>	Identify social forms of learning and modes of synchronous and asynchronous learning.  Select the appropriate methods and technological tools for each phase of the ARIPE model.	Toolbox with online methods to support participatory and interactive online classes.
7	<b>Assessment.</b>	Recognize the elements necessary to perform an effective and efficient evaluation.  Develop an evaluation format that allows you to measure the results of your interactive class (before and after the class), considering an online format.	Assessment format that considers learning objectives, aligning with the teaching-learning process.

## Participants /users

For the Online Courses, educators from various disciplines were invited to participate from 2020 to 2022 (two courses in Spanish in 2020 and 2022, and two courses in Portuguese in 2021 and 2022). They were faculty from our partner universities, San Carlos University of Guatemala (USAC), San Francisco Xavier University of Chuquisaca, Bolivia (USFX), and Federal University of Paraná (UFPR). The selection and enrollment criteria for participants were adapted to local needs. The course was developed under the "train the trainers" approach, and the users were primarily educators and trainers at a higher education level. The purpose was to provide them with interactive methodological tools to support their daily classes.

The face-to-face courses primarily included participants from the fields of occupational health and primary health care; we used data collected during sessions held in Lima, Peru (2018) and San José, Costa Rica (2019).

## Evaluation Instrument

For evaluation, we used a satisfaction questionnaire regarding the content, methodology, and potential

applicability in local teaching contexts. This questionnaire was administered at the end of each course, in physical format for face-to-face classes and as an online survey within the Learning Management System (LMS) used for the virtual courses. The "perception" criterion, as described by Kirkpatrick<sup>26</sup>, focuses on the level of satisfaction and reaction of participants regarding the content, instructor, and learning environment.

The instrument contained a total of 33 questions. Satisfaction (12) was explored using a 5-point Likert scale (1= Not at all satisfied to 5= Completely satisfied), which we dichotomized into two groups (1: not at all satisfied, somewhat satisfied, and satisfied; 2: quite satisfied and completely satisfied). Additionally, questions related to the overall course rating (1= poor rating to 10= very high rating) and recommendation of the course to colleagues (yes/no) were included (see survey annex).

## Data Analysis

The surveys were digitized and exported in Excel format for subsequent analysis using IBM SPSS Statistics V.29. Absolute and relative frequencies were reported, with



the Chi-square test used to compare percentages between the face-to-face and online education groups. For the overall course rating question, the mean and Standard Deviation were reported, and a T-test was calculated to compare the two groups. In all cases, a 95% significance level was considered, with an alpha error of 0.05.

## Ethical Considerations

The study was conducted in a completely anonymous and voluntary manner. Therefore, the ethical board of the Medical Faculty of Ludwig-Maximilians-Universität (Munich, Germany) waived the need for evaluation by the ethical Committee.

## Results

A total of 118 participants completed the evaluation surveys, of which 84 corresponded to evaluations of the online courses and 34 to the face-to-face courses (Response face-to face courses 100%; Online 50%). Participants resided in 9 different countries (Argentina, Germany, Brazil, Bolivia, Colombia, Chile, Guatemala, Peru, Mexico) and came from various disciplines (Biology, Medicine, Engineering). Participants in online courses were statistically significantly older than those in face-to-face courses ( $p = 0.008$ ). The gender distribution was equal between the two groups (Table 3).

**Table 3.** Characterization by sex and age of the teachers who took the course (classroom and online).

		Face-to-face course N=34		Online course N=84		p-Value
		n	%	n	%	
Gender	Male	19	55.9	38	45.2	0.30
	Female	15	44.1	46	54.8	
Age	21-30 years	4	11.8	9	10.7	0.008
	31-40 years	21	61.8	26	31.0	
	41-60 years	9	26.5	42	50.0	
	61 y + years	0	0.0	7	8.3	

Regarding the course evaluation, all respondents would recommend the course to their colleagues. The average rating was 9.28 (on a scale of 1-10). Overall satisfaction was reported in both delivery formats, with certain aspects, such as the use of technological resources, rated

higher in the online course. In the face-to-face format, participants reported greater satisfaction with the availability of tutors and the structure of the content. Generally, no statistically significant differences were demonstrated (Table 4).

**Table 4.** Course evaluation survey results for the classroom and online courses (N= 118).

	Rather/fully satisfied		P-Value*
	Face-to-face course n (%)	Online course n (%)	
Selection of contents	35 (100.0)	78 (95.1)	0.18
Content structure	34 (97.1)	81 (94.1)	0.50
Time demand	28 (80.0)	68 (79.1)	0.91
Teaching and learning methods	35 (100.0)	81 (94.2)	0.15
Tasks assigned	30 (85.7)	72 (84.7)	0.89
Assistance by tutors	35 (100.0)	72 (86.7)	0.02
Professional competence of teachers and tutors	35 (100.0)	79 (92.9)	0.11
Task feedback	33 (94.3)	71 (84.5)	0.14
Use of technological resources (videos, audios, images)	31 (88.6)	80 (94.1)	0.29
Complementary material to deepen contents	31 (88.6)	79 (91.9)	0.57
Technical conditions	28 (80.0)	79 (92.9)	0.04
Time management	31 (88.6)	74 (86.0)	0.71
Recommend the course to a colleague (yes)	34 (100.0)	85 (100.0)	1.00
Overall rating (from 1 (low) to 10 (high) of the course (Mean, Standard Deviation)	9.42 (0.7)	9.24 (0.9)	0.27**

## Discussion

This study evaluated two teaching formats — online and face-to-face — for active teaching methodologies to professionals from different disciplines in Latin America. High levels of satisfaction were reported, with no significant differences found in the evaluation of the two course modalities. The high level of satisfaction with the online course, the favorable rating, and the intention of participants to recommend it to their colleagues suggest that, despite the challenges posed by the pandemic, it is

possible to address the issue of Emergency Remote Teaching (ERT) by providing interactive and applicable methodologies for higher education educators at the local level, taking into account the international and interdisciplinary context in which the courses were conducted.

Encouraging results have been observed when comparing the effectiveness of training and the achievement of learning objectives with similar content in both online and

face-to-face delivery modalities<sup>27</sup>, which supports the findings of our study. In a recent systematic review, similar learning outcomes regarding the acquisition of clinical practical skills were observed between courses implemented in an online format and those taught in face-to-face classes<sup>28</sup>. However, online education appears to face significant challenges in the realm of practical learning in certain specific disciplines that require manual skills or dexterity, such as those in the medical sciences or engineering<sup>29,30</sup>. From the students' perspective, other studies reported as the main challenges for online education those related to time management, lack of support for online activities, and limited human interaction; while for educators, the lack of infrastructure and technical support, lack of formal training in the use of technological tools (ICT), and difficulties in assessing students are identified as significant obstacles<sup>31</sup>. In this sense, it is crucial to implement practical methodologies that promote active learning, with a constructivist approach connecting with real-life experiences, as the ARIPE model suggests<sup>3</sup>. In our study, it seems that the selected model and active methods, the ICT options presented, and the mixed approach (utilizing both asynchronous content and synchronous meetings) were perceived as helpful in implementing the course, thereby were overcome some of the challenges as mentioned earlier.

Currently, online education is very common<sup>32</sup>, facilitating access to education and showing flexibility to accommodate work and personal responsibilities. In this sense, and in agreement with previous experiences with higher education faculty, it is necessary to provide them with tools that can handle both synchronous instruction and asynchronous content, as well as conduct assessments that meet curricular objectives<sup>33</sup>. On the other hand, it is also essential to consider the potential impact on mental health, especially in a health crisis situation<sup>34</sup>.

Despite the widespread use of online education, several key elements must still be considered for the optimal implementation of online courses. It includes the institutional support, access to quality internet services and software, having the appropriate electronic devices, and the existence of a support plan to face the challenges of ERT<sup>25,35</sup>. In addition, it is essential the adaptability and flexibility of educators when transforming their classes<sup>36</sup>.

In our study, most of the participants in the online course were between 41 and 60 years old, who expressed a high interest to learn interactive teaching tools in a virtual format. This interest may be due to the demanding challenges of ERT during the pandemic and the need for educators in this higher age group to incorporate interactive online methodologies<sup>37</sup>. Our study has some limitations. It was not possible to adjust the results for other variables that may have affected perceived satisfaction, such as participants' prior training. Furthermore, we did not conduct a more exhaustive evaluation of the learning of specific content and the complementarity of a qualitative assessment, which should be considered for future studies to explore the effectiveness of both course formats. On the other hand, it is important to recognize that the results obtained from online course participants may not be representative of all participants enrolled in the online course. A high percentage of participants didn't complete the online course, and only 50% finished the final evaluation form. Although the online course completion rate was high compared to other massive open online competition rates (average 13%)<sup>38</sup>, it is possible that those with the highest levels of satisfaction may have been more likely to complete the evaluation, potentially overestimating the satisfaction of this group.

## Conclusion

In conclusion, our study's results did not reveal significant differences in perceived satisfaction between courses delivered in online and face-to-face formats, both of which utilized active learning methods. This finding underscores the feasibility of promoting online education, particularly in crisis contexts, where maintaining high educational quality standards is crucial. Online learning platforms offer the advantage of facilitating access to education in remote areas, thereby promoting universal and equitable access to knowledge, regardless of the student's location. Although discussion about online education is not a new topic, the pandemic has accelerated its adoption and development. It is now imperative that we focus on refining the interactive methodology for both face-to-face and online courses, so that access to knowledge can overcome geographical barriers and significantly contribute to the improvement of quality of life for many people.

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