Microlearning as an Alternative Teaching Model: Influence of COVID-19 in Latin America and the Caribbean

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The article focuses on the use of Microlearning as an educational response during the COVID-19 pandemic in Latin America and the Caribbean. It highlights how Microlearning, which consists of breaking down educational content into small, easy-to-understand units, has become an important trend. During the confinement, education systems adapted traditional methods to provide educational content in Microlearning format. Social networks played a crucial role in the delivery of microcontent and collaboration among students. Teachers' roles varied, but their ability to manage technology was essential. Digital infrastructure also influenced the success of Microlearning. The most relevant keywords are Microlearning, COVID-19, Distance education and social networks.

Keywords: microlearning, COVID-19, distance learning, social networking, Latin America and the Caribbean

INTRODUCTION

Microlearning shows remarkable development in the world of learning, used by companies in the corporate training sector, and e-learning, such as Google, Unilever, or IBM, apply it successfully to train their teams. It is a relatively emerging global topic involving Microsoft, LinkedIn, Coursera, and Udemy, offering training compressed into small capsules. The increase in their internet search during the COVID-19 lockdown, Figure 1, suggests that the approach may mature.

FIGURE 1
**COMPARISON OF THE SEARCH TREND BETWEEN MICROTEACHING,
MICROLEARNING, AND MICROTRAINING FROM 2016 TO 2020**
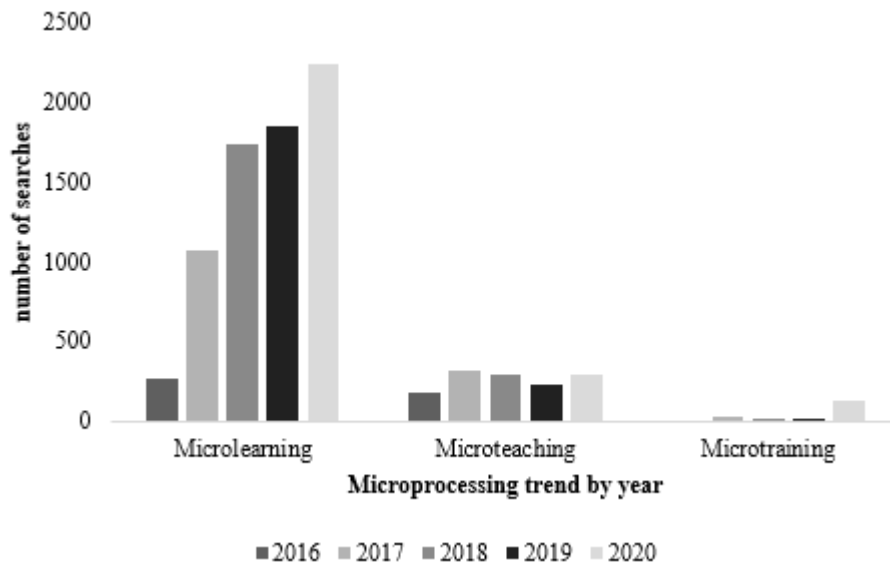
Source: Authors.

The figure obtained through the publicly accessible online tool Google Trends shows the search trend of three terms: microteaching, developed at Stanford University in the 60s (Allen, 1967), microlearning, and microtraining, also originating there. This exercise highlights microlearning, to which Koross (2016) refers to breaking down the content of the teaching process into small units for easy understanding in a simulated situation inside and outside the classroom to reach a high degree of control and produce a sense of security in practice. It is defined as a snack by the brevity of the content concentrated in small fragments (Hug, 2007). Psychology and brain science credit microlearning with fostering hard skills as a tool that accelerates the transition from short-term to long-term memory by reducing the brain's natural tendency to forget, which is an advantage (Maddox, 2018).

Given the impossibility of continuing to deliver formal learning for several hours with large content modules, the microlearning model assumed the cognitive function facilitating the delivery in the form of microcontents in less time for the educational systems of Latin America and the Caribbean (LAC) during the COVID-19 lockdown. The methodologies of the face-to-face and online education systems that had shown progress in this region in their dual or mixed variants were grouped into courses or programs to simulate face-to-face, synchronous and asynchronous time. One of them is blended learning which Moreno and López (2020) affirm is a combination of face-to-face and online education it can only be continued online; Another is the flipped class that consists of transferring the continuity of the work of some processes outside the classroom, using the time inside the classroom to improve other processes, it could only continue outside the classroom and at home.

The microlearning approach combines the remnants of mobile and ubiquitous learning to guide the transition from face-to-face learning to online learning, facilitating fundamental changes in two important areas: the place and way the teaching-learning process unfolds and the other in the role of teachers and learners. Dahlmanns *et al.* (2020) reveal that the trend towards microlearning is influenced by its fast and fragmented delivery properties, making it easier for students with multiple siblings, and parents with multiple children, to ration their internet use to access less extensive content and complete schoolwork promptly. This innovation deserves an approximation to its description, and we propose an approach based on identifying the microlearning model in the portals of the LAC educational systems used during confinement.

METHODOLOGY

It is a qualitative descriptive transactional study because the origin of the data is net-phenomenographic orientation. This approach arises from the need to exploit the diversity and variety of data found on the internet. The other complementary approach is phenomenography focusing mainly on the inquiry into the learning experiences of pupils and teachers in different grades and disciplinary areas of the education system. The research approach seeks to understand the participants' perspective from their passage through the electronic media and resources of the internet in their direct relationship with the phenomenon of learning during confinement considering the structure, Figure 2.

FIGURE 2
STRUCTURE OF DATA COLLECTION
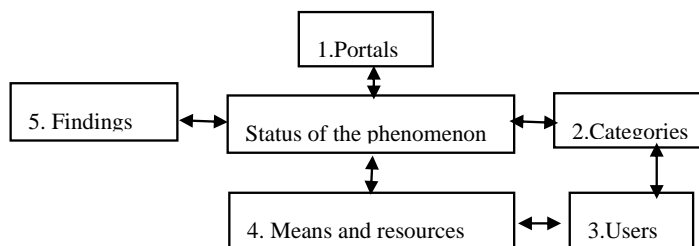
Source: Own elaboration.

The implicit categories are used in the research question: Is there an imprint of the microlearning model during the COVID-19 lockdown in the country's education systems of LACs? Considering microlearning as an independent category and dependent categories: learning context, scope, classification, dwell time, content type, creation, aggregation, integration, recovery, dynamics, target group, and role of teacher and student (Giurgiu, 2017). Data is collected in educational portals to continue the learning process at home, Table 1.

TABLE 1
EDUCATIONAL PORTALS URLS FROM 19 LAC COUNTRIES AVAILABLE DURING THE COVID-19 PANDEMIC

Country	Program and e-mail address
1. Argentina	Programa Seguimos educando. https://xurl.es/fria7
2. Bolivia	Grupo de Educadores Google Bolivia. https://xurl.es/7bf9w
3. Brazil	Educación conectada http://educacaoconectada.mec.gov.br/
4. Colombia	Colombia aprende https://colombiaaprende.edu.co/contenidos
5. Costa Rica	Caja de herramientas https://cajadeherramientas.mep.go.cr/
6. Cuba	Teleclases https://www.mined.gob.cu/teleclases/
7. Chile	AprendoenLínea https://www.curriculumnacional.cl/estudiantes/
8. Ecuador	Aprendamosjuntoencasa https://educacion.gob.ec/plan-educativo-aprendamos-juntos-en-casa/

9. El Salvador	Aprendo en casa https://www.mined.gob.sv/emergenciacovid19/
10. Guatemala	Aprendoencasa http://www.mineduc.gob.gt/portal/index.asp
11. Honduras	Tequeremosestudiandoencasa http://www.conatel.gob.hn/index.php/2020/05/08/gobierno-de-honduras-implementa-la-estrategia-te-queremos-estudiando-en-casa/
12. Mexico	Aprendeencasa https://aprendeencasa.sep.gob.mx/
13. Nicaragua	https://nicaraguaeduca.mined.gob.ni/
14. Panama	http://www.educapanama.edu.pa/?q=planes-y-programas-de-estudios
15. Paraguay	Tuescuelaencasa https://www.mec.edu.py/index.php/es/recursos-educativos/materiales-educativos
16. Peru	Aprendoencasa https://www.gob.pe/institucion/minedu/campa%C3%B1as/914-aprendo-en-casa
17. Dominican Republic	http://www.educa.org.do/2020/04/13/consideraciones-sobre-los-efectos-de-la-covid-19-en-el-calendario-escolar-2019-2020/
18. Uruguay	PlanCeibal https://www.ceibal.edu.uy/es/articulo/recursos-de-plan-ceibal-ante-llegada-de-coronavirus-uruguay
19. Venezuela	Plancadafamiliaunaescuela http://cadafamiliaunaescuela.fundabit.gob.ve/index.php/24ducación-primaria

Source: Authors.

Microlearning is assumed to be the predominant model, although not systematically, for responding to the difficulty of changing routines, making adaptations, and reducing workload in small content units accessible on a platform or social media URL (Ghasia and Rutatola, 2021). These are electronic resources that can be integrated into portable devices, email, web browsers, Google Forms, and Microsoft Forms applications to make questions and answers, as well as the use of PowerPoint to make presentations, WhatsApp to send images, diagrams, videos, animations, photographs, screenshots with the support of the whiteboard and the remote camera (Nicolini and Medeiros, 2021).

Social networks have played a preponderant role in the delivery of microcontent for microlearning, allowing, on the one hand, the rapid delivery of content in short and flexible formats and, on the other, social interactions based on those contents of the teaching processes, facilitating collaboration with students by promoting the responsibility of learning (Giurgiu, 2017; Kelleci, Kulaksiz and Pala, 2018). Microlearning is mixed with mobile-learning by the predominant use of the mobile phone, with wireless access and multiple online applications, and also because it is cheaper than a laptop, which has led to summarize the main functional moments of mobile phone use and microlearning: 1. Practical application - before and after classes to check what has been learned in a period of 5 to 10 minutes-; 2. Advisory – resolution of doubts–; and 3. Support –access to applications related to the learning process.

RESULTS

In the educational portals of Latin America and the Caribbean (LAC), the prominent use of social networks in the exchange of microcontent to continue the stipulated cognitive work was identified in Table 2.

TABLE 2
NUMBERS OF USERS OF FORMAL SOCIAL MEDIA EDUCATION BY COUNTRIES WHO EXCHANGED MICROCONTENT

Country	YouTube	Twitter	Facebook	Instagram	Pictish	Telegram	Flickr	Vimeo
Argentina	112,000.	55,075.	489,215.	299,256.	0	0		
Bolivia	79,000.	0	17,500.	0	0	10,726.		
Brazil	5,430.	3,262.	29,058.	0	0	0		
Colombia	45,000.	764,000.	418,726.	127,000.	0	0		
Costa Rica	138,000.	0	594,393.	0				275.
Cuba	3,050.	34,132.	20,325.	2,331.	1,302.	3,334.		
Chile	81,500.	416,272.	663,797.	1.	0	134,816.	283.	
Ecuador	25,000.	330,693.	640,406.	0	0	0	447,000.	
El Salvador	6,790.	339,361.	0	0	0	0		
Guatemala	16,800.	70,485.	294,978.	0	0	0		
Honduras	935.	2,760.	70,661.	0	0	0		
Mexico	910,000.	1,105,626.	2,625,102.	0	0	0		
Nicaragua	2,430.	14,101.	73,256.	2,004.	0	0		
Panama	66.	5.	551.	298,000.	0	0		
Paraguay	3,700.	33.	3,426.	0	0	0		
Peru	96,000.	556,521.	130,126.	0	0	0		
Dominican Republic	5,680.	5,062.	6,460.	7,419.	0	0		
Uruguay	27,300.	785.	168,679.	309.	0	0		
Venezuela	14,700.	0	18,906.	22,498.	0	0		
	1,573,381	3,698,173.	6,265,565	460,818	1,302	148, 876	447,283	275.

Source: Authors.

In Table 2, direct consultation on the portals made it possible to identify several users of social networks, mainly primary and secondary education, or a total of 12,446,797, who were allowed to exchange communication and development or microschool activities in video, photos, and documents. A process was carried out from several roles that can be referenced in the theories of Cognitive Load and the Cognitive Theory of Multimedia Learning, such as didactic modeling from the face-to-face to the virtual, the conduction of the intrinsic cognitive load, the complexity of the task and the experience of the learner (Rosell Puig and Más García, 2003; Sweller, 1994 and Mayer, 2014). Where the extrinsic cognitive load promoted by instructional interventions is also managed, trying to make them less undesirable to favor the relevant load directly responsible for contributing to the learning of the different roles of the teacher, Figure 3.

FIGURE 3
ROLES IDENTIFIED IN EDUCATIONAL PORTALS THAT DENOTE THE
**ROLE OF THE TEACHER**
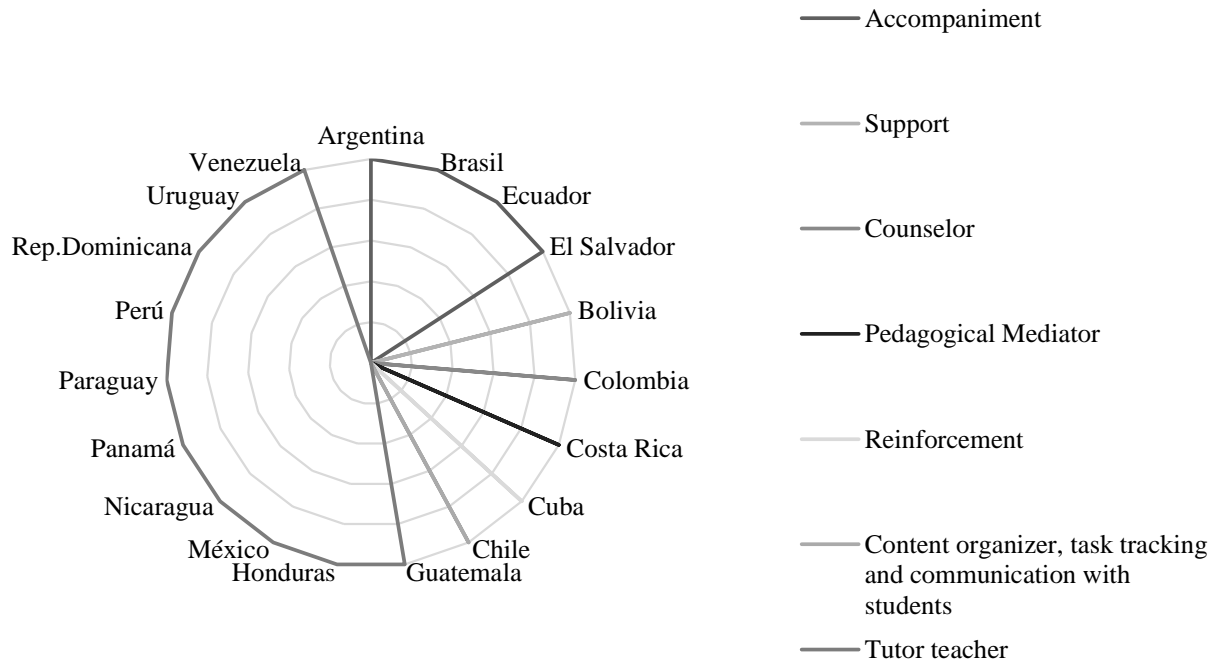
Source: Authors.

In figure 3, ten countries: Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay, and Venezuela predominates the concept of tutor teacher; in four countries: Argentina, Brazil, Ecuador, and El Salvador, accompaniment; in Bolivia support; in Colombia counselor; in Costa Rica pedagogical mediator; in Cuba reinforcement; in Chile organizer of content, follow-up of tasks and communication with students.

The role of the teacher includes, to some extent adapting to human limits in terms of attention span and avoiding cognitive distress (Dolasinski and Reynolds, 2020). It can be assured that failure decreases. However, the effectiveness of the work depends to a large extent on the skills teachers possess in the management of communication and information technologies (Skalka *et al.*, 2020). Basis of the response in most education systems to the technological project available in each country, Figure 4.

FIGURE 4
IT SUMMARIZES THE RESOURCES AVAILABLE TO EACH OF THE EDUCATION SYSTEMS AND WHICH IMPACT THE ROLE OF TEACHERS
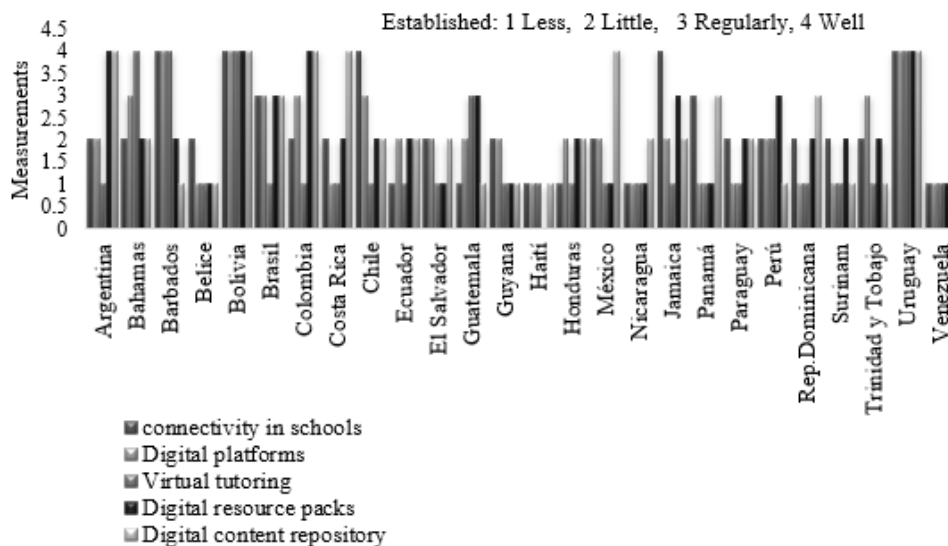
Source: Authors.

In Figure 4, the results corroborate the information provided in the Education Information and Management Systems (SIGED-IDB, 2020) on primary digital conditions in the educational systems of LAC associated with the fact that 64% of students have access to a computer, increasing the use of mobile phones as an alternative to continuing their studies (Banco Mundial, 2020).

According to the Education Division of the Inter-American Development Bank, the Educational Information Systems and Management Project, the primary digital conditions distributed and classified among countries:

(a) *Connectivity* in schools: in Uruguay, Barbados, Chile, and Jamaica are well established;
(b) The *educational platforms*: Uruguay and Barbados are well established.
(c) *Virtual tutoring*: in Uruguay and Barbados it is well established; Guatemala is regularly established;
(d) *Digital resource packages*: in Uruguay, Chile, Colombia, and Argentina are well established;
(e) *Digital content repositories*: in Uruguay, Chile, Colombia, Argentina, Peru, Costa Rica, and Mexico, are well established.

Fast, affordable learning that enhances memory and contributes to reducing forgetting is attractive and effective in platforms or media and resources mentioned, where there are videos or multiformat materials in text, audio, quizzes, practical exercises, among others (Lee, Jahnke, and Austin, 2021).

The application of knowledge management principles to microlearning strategies can be extended to processes using information technologies, as they allow organizational knowledge to be captured, distributed, and used effectively, considering three fundamental components: conference recording, videoconferencing, information repositories, communities of practice, access to experts and experience (Smolle *et al.*, 2021).

These digital conditions are complemented by social networks' use to deliver macro content in portals in microlearning formats that adapt to social networks in terms of short time, access, reduced text, and context, Figure 5.

FIGURE 5
EDUCATIONAL PORTALS WITH REQUESTS TO SOCIAL NETWORKS TO CONTINUE THE SCHOOL PROCESS DURING CONFINEMENT
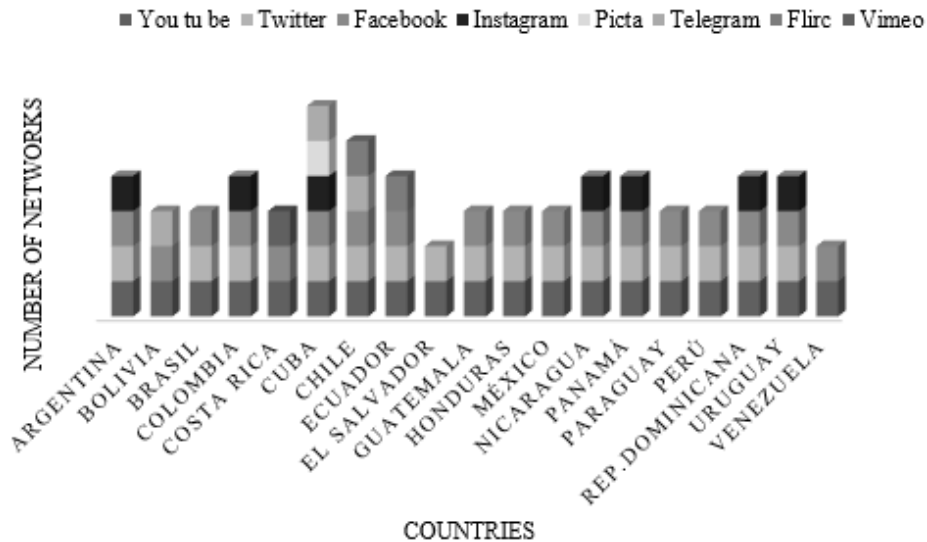

Fountain. Own elaboration.

Figure 5 shows the social networks used in educational portals: 19 countries use YouTube; 16 Twitter; 18 Facebook; 8 Instagram; 1 Picta; 3 Telegram; 2 Flirck; and 1 Vimeo. Gained importance by storing data on physical servers and in the cloud, which reinforces the virtuality of class sessions, as well as mobile phone devices that allow the use of applications to record, edit and distribute microlearning lessons. They are better than traditional spaces and allow accessibility at anytime, anywhere.

Events have shown that speed of information and communication are priorities, generating concern in the educational field to adapt the teaching and learning process to face current and future emergencies.

According to the Inter-American Development Bank (IDB) (2020), virtual education systems have present with a significant lack of preparation, so they try to reproduce the face-to-face process in the face of limited access to the Internet, leaving thousands of students and teachers out of the usual learning process.

The portals of 19 LAC countries recorded the largest influx to the speed and communicative brevity properties of social networks, where students and teachers found places to share and exchange less extensive content and activities and process exams in an unsystematic way.

FIGURE 6
**MEDIA AND RESOURCES WITH A REQUEST TO CONTINUE THE SCHOOL PROCESS
DURING 2020-21**
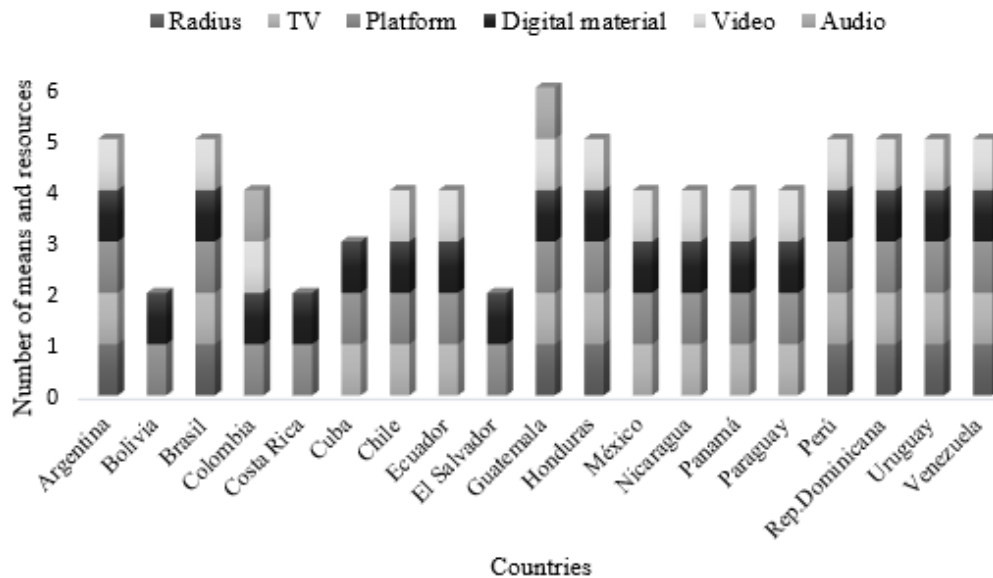
Source: Authors.

Figure 6 shows nine countries: Argentina, Guatemala, Honduras, Peru, Dominican Republic, Uruguay, and Venezuela that use radio; Argentina, Brazil, Cuba, Chile, Ecuador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Dominican Republic, Uruguay, and Venezuela use television and video; and eighteen countries except Uruguay use platforms. All nineteen countries use digital materials. In Colombia and Guatemala, audio stands out.

The ubiquity of microlearning makes it intelligent learning since it is totally centered on the student and transforms into effective cognitive learning based on their needs according to the facilities offered by social networks to share content capsules that can be integrated into cloud computing and mobile devices.

Discussion

Faced with a number of complications caused by the confinement of teachers and students in school closures, hybrid online formats were developed to provide Hyflex experiences, that is, hybrid and flexible educational experiences that could adapt to different scenarios at different times of the class period to facilitate the management of the unique approach to non-face-to-face microlearning (Heath and Shine, 2021).

The conditions in which the components of the approach were used, maintaining the categories of Giurgiu (2017), it is not possible to explain in detail how it worked in formal education, as it is possible in informal or non-formal education where it is traditionally used.

They highlight some crucial changes derived from its use in formal education as a contribution to training at the primary and secondary level to work cognitive or hard skills, as is the case of companies and health where it is used for the same purpose. However, they recognize their limitations in working on the soft skills that constitute education.

The delivery time of content on television and radio is similar to that used in the approach. In addition to teachers and students, other content creators, such as attendees, are included. The role of the teacher in developing the teaching-learning process is diverse and an evaluation process that requires the timely accompaniment of social networks, Figure 7.

FIGURE 7
IN SUMMARY, OUTSTANDING ASPECTS OF THE MICROLEARNING MODEL AS A NEW PERSPECTIVE OF FORMAL EDUCATION FOR PRIMARY AND SECONDARY LEVELS
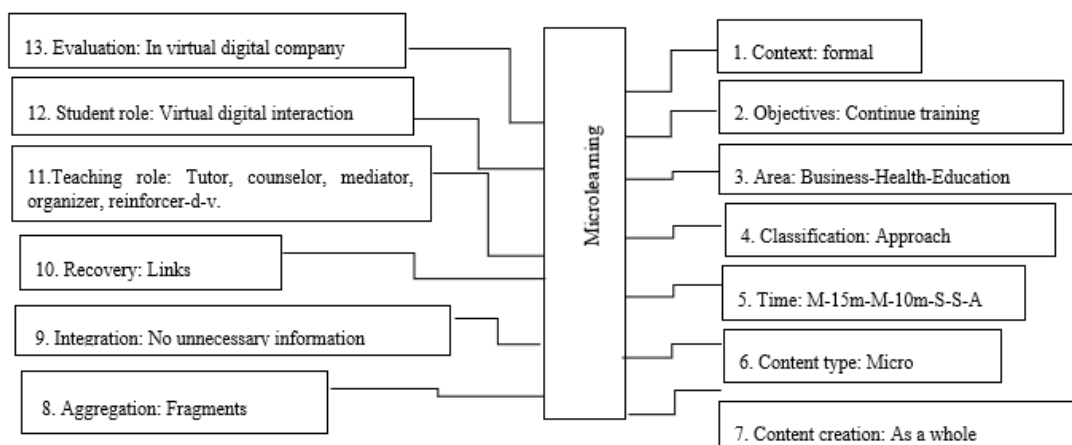
Source: Authors.

(a) The new perspective of the components of the microlearning *approach* can be adapted to different *contexts* at the primary or secondary level, non-formal and informal. Includes education *goals*.

(b) The *scope* of application, mainly in the enterprise, health extends to educational training.

(c) The designations of the approach are *microlearning and microtraining, classified* as a systemic technological approach to work hard skills.

(d) The *time* is self-administered between 8, 12, and 15 minutes to work *microcontents* created jointly by students, teachers, and others.

(e) It is performed on email addresses and has a permanent link to social networks, video, audio, radio, television, digital material, online platforms, and social networks, assisted instruction.

(f) *Aggregation* means *integration* according to time and technology for delivery.

(g) The *retrieval* into delivery media takes place in fast delivery tools: a website, recorded video classes, video episodes, a question bank, and assisted instruction, unlike just a URL.

(h) The *role of the teacher* ranges from making adjustments and corrections for a real environment to being a guide for content consumers, accompanying them, guiding them, acting as a pedagogical mediator, content organizer, monitoring tasks and communicating with students, supporting, guiding, and reinforcing. Follow the instructions and evaluate through systematic reviews of the process of the participating student. For students, this work becomes an intervention that improves classroom performance and management through social interactions.

CONCLUSIONS

From the results obtained, two conclusions can be drawn that characterize the microlearning model used during the confinement of COVID-19 in the educational systems of Latin America and the Caribbean:

1) The prominent use of social networks.
2) The adaptations made to comply with formal primary and secondary education produce changes in the components that characterized microlearning before the pandemic.

Other general results are:

1) The Google Trends query identifies that microlearning stands out in searches between microteaching and microlearning since, in 2019, it is booming;

2) The analysis of educational portals for confinement by COVID-19 reveals the delivery of microcontent through social networks;
3) the fundamental combination of technology and didactics has transformed microteaching into microlearning by redefining its components when used in formal education to work on cognitive skills at the primary and secondary levels;
4) By returning to the "new normal," the microlearning model opens the possibility of automating processes in formal education in the field of cognitive skills and optimizing the time of the teacher and the student in the classroom to strengthen the processes of soft skills.

ACKNOWLEDGMENT

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