State-Of-The-Art French Literature Review on Empirical Study of Video Conferencing Technologies

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1. Introduction

The educational use of technologies and network resources has come to the forefront of pedagogy techniques over the last few years under the pressure of an unprecedented health emergency that has led schools and universities to move teaching into the digital dimension, highlighting the unpreparedness of both contexts for the adoption of pedagogical approaches appropriate to the medium. The structure of teaching in physical classrooms does not translate directly into the digital realm.

In Spring 2020 the COVID-19 pandemic forced many educational institutions around the globe to suspend face-to-face classes and hastily replace them with online activities, affecting 94% of the world's student population (Crompton, Burke, Jordan, & Wilson, 2021). The shift from face-to-face to online teaching, however, was not the culmination of a well-considered learning design process inspired by the affordances of online education. Teachers, students, and caregivers had no access to ready-made protocols and procedures.

Since then, education literature shows the attempt to understand the impact (Carretero Gomez et al., 2021) of the so-called "Emergency Remote Education" (ERE) (Williamson, Eynon, & Potter, 2020).

Research considerations have varied between:

- The negative side of online learning compared to in-person learning (Hodges, Moore, Lockee, Trust, & Bond, 2020) versus the optimistic expectations of a great online experience (Zimmermann, 2020);
- A catalyst for change and educational innovation (Crompton, Burke, Jordan, & Wilson, 2021) versus objections to ready-made solutions for all (Williamson, Eynon, & Potter, 2020; Giroux, 2021).
- An amplifier for inequalities in access to education (Beaunoyer, Dupéeré, & Guitton, 2020) due to lack of digital connectivity, with problems like the lack of digital competence in teachers and students and the lack of access to energy, ITC tools, and connectivity.

International organizations like UNESCO (2020) propose solutions to overcome contradictions in the online educational system in the pandemic crises, linking technology systems and human relationships, open educational resources, and the pressure of private companies.

Within Francophone countries, schools, and institutes, science educational literature is treated with special attention, with regular and periodic exchanges within the French speaking community. For instance, conferences take place in French between countries like France, Belgium, Switzerland, and Quebec (see for example, the Conférence Francophone sur l'Interaction Homme-Machine; AREF conference). In addition, several African countries publish French journals and hold yearly conferences in French (Rechidi, 2021).

The medium of videos and movies has been widely experimented with and utilized before the pandemic but received a boost in development in the last two years. In the French scientific literature, the *Centre national d'enseignement à distance*, hosting the journal *Distance and Mediation of Knowledge*, shows how TV, Minitel, software, and the Internet have prepared the techno-pedagogical event of Video Conferencing (2008). This last tool underwent wide-scale implementation within the

education sector in 2013 (Marty, 2020). Other French reviews highlighted the technological issues (Gourvennec, 2013) and, abroad, the pedagogical shifts (Revue Internationale du E-learning et de la formation à distance - de Patoul 2007). *De facto,* French universities were forced to adopt Video Conferencing Systems (VCS) with the pandemic. But by law, the French government put into place MOOCs starting in 2013, with devices including the Talking Face and Live Session, that is to say Video Conferencing. This has also been studied by scientists during the last decade (Cisel, 2016) given a contribution to digital competences through French MOOCs.

An update of French state-of-the-art literature review and empirical exploratory study of video conferencing technologies, methods and principles of use, and good practices for online student engagement is needed. Some literature review was done before the Covid-19 pandemic such as the analysis by Boukerma (2014) or Macedo-Rouet (2009). A study on the tools supporting engagement of students and teachers in various classroom environments of higher educational institutions is required before identifying the diversity of scenarios in post pandemic teaching and learning.

1.1. Methods and principles of use, and good practices to engage students online

This review will enable

1. empathizing with the diverse users of VCS,
2. need of a portable VCS,
3. factors associated with the design and use contexts of VCS, and
4. how various tools are used to engage students online through VCS.

State-of-the-art study and recommendations on recent advancement and adoption of VCS and good practices will inform the academics, researchers, e-learning consultants, IT support, teacher trainers, students, and national higher education and IT policymakers.

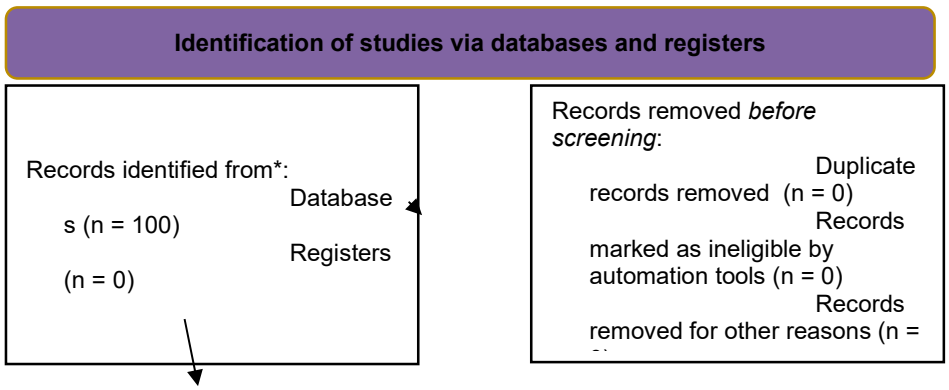
The state-of-the-art will provide foundations identifying contexts of problems, potential alternatives for ideation, and elements for the competence matrix.

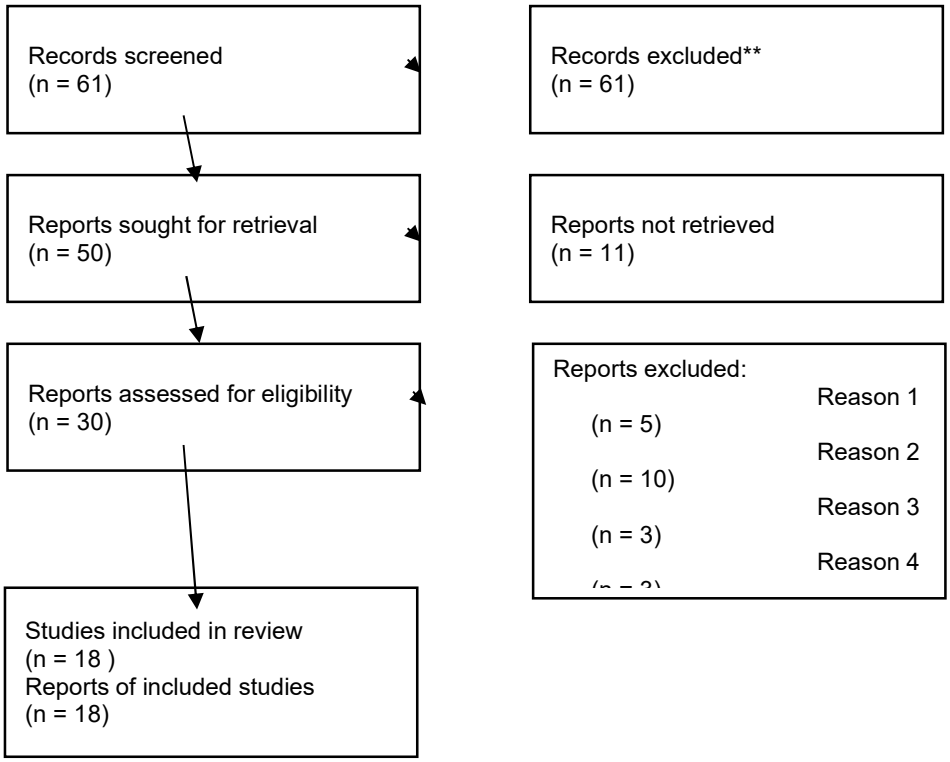
As part of a design thinking process, this review is expected to provide insight on the diverse users of video conferencing systems in higher education context, the needs of a portable VCS, and factors associated with the design and use contexts of VCS. In addition, how various tools are used to engage students online through VCS.

2. Methods

This study applied the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram (Moher et al., 2009), which includes four phases: identification, screening, eligibility, and included (See Fig. 1.).

Figure 1.
PRISMA protocol





Primarily, the inquiry was conducted with the key string "*video conference université*" in Google Scholar returned 14800 results since 2018 and 16400 from 2021 entirely. In French language 10 600 results (0,03 s) since 2018 - that we check only as overview.

We proceed with a first round.

In the first round of screening, we look at the video conferencing system with empirical examples and case study proposed. From there we selected 30 articles. In the second stage of screening, we read the abstract and full text where we looked for the people, context, technology and method they have used and screened 18 articles from there.

2.1 Keywords

Table 1.

Keywords used

Education	**Video Conferencing**	**Online Application**	**Portable**	**Engagement**	**Learning Experience Design**
School	virtual conference	software	mobile	Interaction	learning environment
Learning	hybrid	platform	remote	communication	flipped (classroom)

University	Online conference	system		discussion	
Teaching	Zoom, Teams, Google Meet/Hangout, WebEx, Adobe Connect, Skype,				

2.2 Databases & paper selection

Google Scholars.

2.3 Constraints/Delimitations

- Limited to journal articles only (Exclude book chapters, conference articles, proceedings)
- Five years (from 2018)
- Language: French
- Exclude all systematic reviews & include empirical papers only

2.4 Exclusion Criteria

If not empirical, not focusing on official meetings, PhD dissertation and Master dissertation; conferences acts.

3. Analysis and Synthesis

The reviewed papers on video-conferencing technology-mediated teaching (see Appendix 1 and 2) are categorized and summarized in 2 categories, specificated in Table 2:

- General perspectives on educational programs and institutions
- Pedagogical Elements

The two categories are retrieved through the thematic analysis.

Table 2

Categories

General perspectives on educational programs and institutions	Instant messaging Real-time Q&A Quizzes Functionalities Engagement and playful learning Technologies for visualizations Videoconferences systems
Pedagogical Elements	Teacher difficulties with ITC skills Teacher strategies to reach students Student feedback and student surveys

3.1. General perspectives on educational programs and institutions

It appears that Covid has stimulated scientific publications in the whole of the French-speaking world, whatever the level of massification (standardization) of higher education and technological progress in all French speaking countries, from Canada to African countries (Pélissier, 2021; Peraya, 2020). The published work addresses either pedagogical innovations (from the student, teacher, or public authority point of view) or infrastructure developments (new technological devices that are more or less structuring). The research does not focus solely on video conferences systems but does include reports of video-conferencing being introduced and put into practice in various contexts and fields of study. No specific pedagogical scenarios are discussed as a general model, but rather different single experiences that helped the teachers to ensure the teaching activities are presented.

3.1.1 Instant messaging

Mrabbi (2020) points to new lightweight learning communities like WhatsApp groups. This renews mobile learning with new mobile technologies (Hanaa, 2020). These new communication channels open the possibility of exchanges between actors who could not meet in person: like family doctors in hospital consultations (Jamoulle, 2019).

3.1.2. Real-time Q&A

In a more horizontal way, students' reactions (like, comments on a blog) can help develop their critical thinking (Pirbhai-Jetha, 2020).

3.1.3. Quizzes

Emerging countries are not the only ones concerned: so is Quebec (Pontes, Karsenti, 2019 and Savard, 2021).

3.1.4. Functionalities

The new tools are also virtual reality (Fages, 2022), Google Classroom, Zoom, Slack, Teams (explored by Feki et al. 2022). The scientific field of distance learning is invested by opportunity because of Covid by many researchers who rediscover the advantages and disadvantages (Rosenbaum, 2021).

3.1.5. Engagement and playful learning

We notice a pedagogical renewal: mobile learning, rapid learning, playful learning and therefore of university pedagogy with these virtual tools (Godoi, et al. 2021).

3.1.6. Technologies for visualizations

Videoconferencing has made it possible to test new visualizations, such as the slides of a microscope through screen sharing (Delteil, 2021) or the screen of a student who made a common mistake in a programming exercise, shared with the class to show the correction towards the correct reasoning (for more info, see the project ANR Renoir interview).

3.1.7. Videoconferences systems

The use of Zoom during the pandemic is mentioned in several publications. For instance, in (Godoi 2021), a teacher testimonial discusses the ability to record lectures that were then useful for student discussions where they could correct their misconceptions afterwards. In (Messaoui, 2021), the most-used Zoom functionalities are listed; they are screen sharing, audio discussion, file sharing, and video discussion.

The authors of (Delteil, 2020) discuss video conferencing using SKYPE during meetings in the medical field. They discuss the benefits and difficulties encountered. They focus on screen sharing of images and appreciate the ability to record and consult what was discussed or shown posteriori. They also consider how the security and anonymity of this software are controversial and all the major players are concerned: thus, ZOOM, MEET, TEAMS, SKYPE and WEBEX have all been questioned by several French media outlets.

Limitations and problems with SKYPE are discussed in (Rosenbaum, 2021) and (Jamoulle, 2019). Jamoulle (2019) considers that the general public has become accustomed to using Skype. However, it requires a download. Preference will be given to a system that requires nothing more than Internet access and one URL link.

Dieuzayde & Della Noce (2021) discuss the use of SKYPE in the field of theater to maintain production and rehearsals (see below for their analysis of pedagogical elements).

Video conferencing is discussed in (Mba, 2021) within the context of pedagogical continuity in Gabon. They found that public universities were not as well-equipped to make the transition to e-learning whereas private schools offered many of the known platforms. More education programming was delivered through television and radio rather than videoconferencing systems.

3.2. Pedagogical Elements

It is also the work of the teacher that is called into question and that must find meaning and rhythm in this new configuration and these mediated virtual spaces (Estagnasié et al.,2021).

The application of ZOOM as a problem-solving perspective is highlighted in (Pélissier, 2021). On Zoom there is the course content which can be discussed with the students in order to dispel misunderstandings or confusion. Google Classroom and Google Forms provide options for after-class work and activities (Godoi, 2021).

Dieuzayde & Della Noce (2020) proposed an experience of videoconference system used in teaching university art as an opportunity for art creation and experimentation: the videoconference meeting became an aesthetic experience of multi languages and modalities of connections. They showed how to deal with the need to continue to create in the Covid-19 time with the use of the online mediation : « we found ourselves in a situation of transition, at the same time cut off from the set, immobilized and eager to work and create despite everything, as well as delivered to the randomness of the discovery of videoconferencing as a tool, medium and particular aesthetic field. » (p. 52). They considered "Skype both as a rather hostile foreign land and as a new playground" on which to shift the stakes of the text and invent meaningful modes of representation. Moreover, at the very beginning, it was necessary to break the ice of the computer screen and invent strange warm-ups for the actors in order to free the body, the voice, and the look from the tiny eye of the webcam and make a game out of an experience which normally calls for rigidity and functionality" (p.52).

Mba (2021) deals with the great gap between all new technologies (learning on WhatsApp and artificial intelligence) and fundamental delays related to poverty (weakness of the wired network, even road) in African realities.

3.2.1. Teacher difficulties with ITC skills

Pélissier (2021) indicates, in her research, 83% of the teachers interviewed said they encountered difficulties in installing certain applications (for videoconferencing, audiovisual editing), due to having to self-train quickly in order to respond to pedagogical continuity (producing a .pdf from a .doc). The teachers also state that they have helped each other (65% of the teachers questioned) to find out, in particular, the installation methods (according to the versions that can be downloaded free of charge from the web and the compatible operating systems) and to obtain tutorials for self-help.

3.2.2. Teacher strategies to reach students

Pélissier (2021) indicates how some teachers seem to have suffered from a lack of "human visual" in their teaching activity. The students, connected to a videoconference platform, did not turn on their cameras (some did not have one). In order to maintain this contact, some strategies involved to contact the administrative managers to keep them informed of the exchanges they had with certain students of whom they had no news; another strategies was to use tools videoconferencing such as Discord, preferred to Zoom by students to get closer to them; others sought to reassure themselves by asking fellow teachers how their lessons were going and others finally used social networks to communicate (chosen by the students) even if at first sight, they were not registered there. Difficulties with installing certain applications (for video-conference or audio-visual) remained for some throughout the experience.

Finally, Estagnasié et al. (2021) noted, the pandemic presents many challenges and an opportunity to understand why some practices have changed (Zoom meetings, for example) and others have not.

3.3. Student feedback and student surveys

Student feedback is important to understand their initial responses to learning in a very new environment and how it compares to pre-pandemic classrooms. Via student surveys, a few of the publications could gauge the students' experiences in a fully virtual classroom and several noted that students prefer a hybrid strategy consisting of a mixture of on-line and in-person tools and activities. As more virtual tools are implemented in schools, it is essential to continue surveying the students as they adapt to their rapidly evolving academic conditions.

In (Pribhai, 2022), feedback between people through social media and critical thinking was considered. They used blogs and had students produce work before commenting and giving feedback on others. A survey sent to students after the course included questions on topics such as appreciation of the course, skills learned, motivation, and working in groups.

In (Paye, 2021), continuity in teaching during the pandemic in Gambia was studied with a focus on the Google suite of products used because of its wide functionality along with the help from telecommunications companies to ensure internet access. Teaching was mainly done by Excel Powerpoint and PADLET was used for collaborative writing workshops. Student surveys were given to understand student perceptions and their experiences with distance learning. A majority of students preferred a hybrid approach when given the choice.

Benaldjia (2021) studied the impact of Distance Education on the completion of training programs in the medical field in Algeria, along with teacher opinions on the measures taken, and student opinions on the help they received. Zoom and Google Meet were used in approximately half of Distance Education situations and a little over 55% of students found video conferencing to be useful or very useful. They also found most students (~71%) would prefer a hybrid approach in the future.

Pontes (2019) found that mobile learning compliments formal instruction and is already largely employed by students. The terms secondary and complementary are highly used and encompass Youtube videos, Google and Wikipedia searches, as well as communicating through Facebook. A survey of 18 students in their 3rd and 4th year of Bachelors in Education for preschool, primary, and secondary teaching was taken.

Mrabbi (2022) investigated the learning environment and community building possibilities of WhatsApp considering that it is widely used by students.

Conclusion

The panorama that emerges from the review of the literature is varied and not very homogeneous. In fact, we have not found any recent articles that specifically question the use of videoconferencing systems and their technological and pedagogical implications.

The use of videoconferencing systems has been managed in an emergency, becoming a daily practice that the scientific literature has begun to investigate in the post-emergency phase. The experiences that result from the papers selected give an overview of the need to think about the future of teaching and learning in terms of technologies based on human perspective (Malhotra, 2021). Eliciting comprehensive student feedback in a continual manner will be essential to this process.

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Appendix

List of the papers selected for the review

1	Messaoui, A., Redondo, C., Molina, G., & Pironom, J. (2021). Impact du confinement sur les pratiques pédagogiques dans l'enseignement universitaire technologique en France: une étude exploratoire. *Revue internationale des technologies en pédagogie universitaire/International Journal of Technologies in Higher Education*, *18*(3), 1-16.
2	Delteil, C., Haffner, A., Fritih, R., Bouvier, C., Taix, S., & Macagno, N. (2021, February). Point de vue: une leçon tirée du confinement, l'histopathologie en visioconférence. In *Annales de Pathologie* (Vol. 41, No. 1, pp. 4-8). Elsevier Masson.
3	. Pirbhai-Jetha, N. (2022). La rétroaction en ligne par les pairs pour développer l'esprit critique dans des cours de langues: une étude de cas à l'Université des Mascareignes (Île Maurice) Online Peer Feedback to Develop Critical Thinking Skills in Language Classes: a Case Study at Université des.
4	PAYE, N. M. (2021). DÉCIDER, ENSEIGNER ET APPRENDRE DURANT LA COVID 19 À L'UNIVERSITÉ DE LA GAMBIE. *Analele Universității din Craiova, seria Psihologie-Pedagogie*, *43*(1), 65-74
5	Hanane, Benaldjia., Omar, B. J., & Ridha, G. M. Enseignement médical à distance au temps de la pandémie COVID-19 à la faculté de médecine de l'Université Batna 2 en Algérie. *Algerian Journal of Health Sciences*, 43.
6	Estagnasié, C., Vásquez, C., & Bonneau, C. (2021). Créer du sens à distance: une lecture weickienne des pratiques de travail de résilience en période pandémique. *Ad machina: l'avenir de l'humain au travail*, (5), 107-128.
7	Mba, A. O. (2021). Crise sanitaire de la Covid-19 et enseignement à distance au Gabon: entre défis et possibilités Covid-19 health crisis and distance learning in Gabon: between challenges and opportunities.

8	Rosenbaum, S. A. (2021). La persistance de l'enseignement à distance: Options «low-tech» pour l'apprentissage hors les murs. *Cliniques Juridiques*, (15).
9	Dieuzayde, L., & Della Noce, E. (2020). La visioconférence comme scène transmédiale. *Incertains regards. Cahiers dramaturgiques*. PUP (Presses universitaires de Provence), 2020. hal-0322175
10	Mrabbi, F. Z., & Mgharfaoui, K. (2022). L'étude d'une communauté virtuelle d'apprentissage instrumentée par l'application mobile WhatsApp. Cas des étudiants de l'Université Hassan II-Maroc The study of a virtual learning community instrumented by the WhatsApp mobile application. Case of Hassan-II University. Frantice. net.
11	Jamoulle, M. (2019). Améliorer la concertation entre les oncologues et les médecins généralistes par un système de vidéoconférence. *Revue Médicale de Bruxelles*, *40*.
12	Peraya, D. (2020). L'ingénierie pédagogique en 2020: au-delà de la crise sanitaire, faire une place à l'apprenant. Distances et médiations des savoirs. Distance and Mediation of Knowledge, (32).
13	Pontes, R. L. J., & Karsenti, T. (2019). Les représentations sociales des futurs enseignants du Québec sur le rôle de l'apprentissage mobile comme étudiants. Educ. Form., 4(11), 24-40.
14	Savard, D., Larouche, C. and Anne, A. (2021). Higher education system: prospective vision, issues and tensions. CRIRES online books. Online: https://lel.crires.ulaval.ca/sites/default/files/Systeme-denseignement-superieur_Savard-Larouche-Anne_2022.pdf)
15	Godoi, M. R., Kawashima, L. B., Gomes, L. D., & Caneva, C. (2021). Challenges and Successes of Physical Education Teacher Trainers During the COVID-19 Pandemic in Brazil. *International Journal of Technologies in Higher Education*, 5-20.
16	Fages, A., Fleury, C., & Tsandilas, T. (2022, April). ARgus: système multi-vues pour collaborer à distance avec un utilisateur en réalité augmentée. In *IHM'22: Conférence Francophone sur l'Interaction Homme-Machine*.
17	Feki, A., Ben Mlouka, Y., & Leclercq, P. (2022, May). Liens émergents entre l'espace collaboratif réel/virtuel, les moyens d'échange et la modalité de travail en collaboration. In *RAID 2022 Émergences en Design*. Les éditions de l'ESSTED, Manouba, Tunisia.
18	Pélissier, C. (2021). Impact des adaptations pédagogiques dans l'enseignement supérieur en période de confinement. *Management des technologies organisationnelles*, *13*(2), 69-81.

Appendix 2 Papers with initial synthesis

No.	Citation	Synthesis
1	Messaoui, A., Redondo, C., Molina, G., & Pironom, J. (2021). Impact du confinement sur les pratiques pédagogiques dans l'enseignement universitaire technologique en France: une étude exploratoire. Revue internationale des technologies en pédagogie universitaire/International Journal of Technologies in Higher Education, 18(3), 1-16.	Questionnaire given after the first confinement to teachers basically about the adaptability of the teachers in the context of an emergency confinement and how they were supported by the university system or not. Also about whether or not new pedagogical methods emerged. In one part of the paper they discuss the use of ZOOM and also two others, discord and BBB. They talk about the most-used functionalities such as screen-sharing, audio discussion, file sharing, video discussion.
2	Delteil, C., Haffner, A., Fritih, R., Bouvier, C., Taix, S., & Macagno, N. (2021, February). Point de vue: une leçon tirée du confinement, l'histopathologie en visioconférence. In Annales de Pathologie (Vol. 41, No. 1, pp. 4-8). Elsevier Masson.	They discuss video conferencing using SKYPE during meetings in the medical field. They discuss the benefits and difficulties encountered. They focus on screen sharing of images and appreciate the ability to record and consult what was discussed or shown a posteriori.
3	Pirbhai-Jetha, N. (2022). La rétroaction en ligne par les pairs pour développer l'esprit critique dans des cours de langues: une étude de cas à l'Université des Mascareignes (Île Maurice) Online Peer Feedback to Develop Critical Thinking Skills in Language Classes: a Case Study at Université des.	Feedback between people through social media and critical thinking. Specifically used Blogs and had students produce work and then comment/feedback on others. Survey sent to students after the course; question topics included appreciation of course, skills learned, motivation, and working in

4	PAYE, N. M. (2021). DÉCIDER, ENSEIGNER ET APPRENDRE DURANT LA COVID 19 À L'UNIVERSITÉ DE LA GAMBIE. Analele Universității din Craiova, seria Psihologie-Pedagogie, 43(1), 65-74	Continuity in teaching during the pandemic in Gambia. Used Google suite of products because of wide functionality along with help from telecommunications companies to ensure internet access. Teaching mainly done by powerpoint. Also used PADLET for collaborative writing workshops. Student survey to find out their perceptions and experiences with distance learning. A majority of students preferred a hybrid approach when given the choice.
5	Hanane, Benaldjia., Omar, B. J., & Ridha, G. M. Enseignement médical à distance au temps de la pandémie COVID-19 à la faculté de médecine de l'Université Batna 2 en Algérie. Algerian Journal of Health Sciences, 43.	Impact of Distance Education on the completion of training programs in the medical field in Algeria, along with teacher opinions on the measures taken, and student opinions on the aide they received. Zoom and Google Meet were used in approximately half of Distance Education situations and a little over 55% of students found video conferencing to be useful or very useful. They also found most students (~71%) would prefer a hybrid approach in the future.
6	Estagnasié, C., Vásquez, C., & Bonneau, C. (2021). Créer du sens à distance: une lecture weickienne des pratiques de travail de résilience en période pandémique. Ad machina: l'avenir de l'humain au travail, (5), 107-128.	A virtual office is similar to a physical one in that you have the ability to quickly chat as if walking by, or to leave away messages informing people of when they can reach you. Interviews with various

		professionals on their modalities of tele-working
7	Mba, A. O. (2021). Crise sanitaire de la Covid-19 et enseignement à distance au Gabon: entre défis et possibilités Covid-19 health crisis and distance learning in Gabon: between challenges and opportunities.	Measures taken to ensure pedagogical continuity in Gabon. Public universities were not as well-equipped to make the transition to e-learning whereas private schools offered many of the known platforms. More education programming delivered through television and radio.
8	Rosenbaum, S. A. (2021). La persistance de l'enseignement à distance: Options «low-tech» pour l'apprentissage hors les murs. Cliniques Juridiques, (15).	Resurgence of Education Television as an alternative to high-tech. Skype and Zoom were used but there problems with internet/audio quality. Many discussions took place over messaging as opposed to auditory.
9	Dieuzayde, L., & Della Noce, E. (2020). La visioconférence comme scène transmédiale. Incertains regards. Cahiers dramaturgiques. PUP (Presses universitaires de Provence), 2020. hal-0322175	Use of Skype in the field of theater to maintain production and rehearsals.
10	Mrabbi, F. Z., & Mgharfaoui, K. (2022). L'étude d'une communauté virtuelle d'apprentissage instrumentée par l'application mobile WhatsApp. Cas des étudiants de l'Université Hassan II-Maroc The study of a virtual learning community instrumented by the WhatsApp mobile application. Case of Hassan-II University. Frantice. net.	Investigating the learning environment and community building possibilities of WhatsApp considering that it is widely used by students

11	Jamoulle, M. (2019). Améliorer la concertation entre les oncologues et les médecins généralistes par un système de vidéoconférence. Revue Médicale de Bruxelles, 40.	Video conferencing between medical general practitioners and specialist oncologists. The general public and academics are used to Skype and Zoom, however it would be preferable to have a system that required only internet access and not the downloading of software
12	Peraya, D. (2020). L'ingénierie pédagogique en 2020: au-delà de la crise sanitaire, faire une place à l'apprenant. Distances et médiations des savoirs. Distance and Mediation of Knowledge, (32).	Teacher and students feedback
13	Pontes, R. L. J., & Karsenti, T. (2019). Les représentations sociales des futurs enseignants du Québec sur le rôle de l'apprentissage mobile comme étudiants. Educ. Form., 4(11), 24-40.	Mobile learning compliments formal instruction an is already largely employed by students. The terms secondary and complementary are highly used and encompass Youtube videos, Google and Wikipedia searches, as well as communicating through Facebook. Survey of 18 students in their 3rd and 4th year in Bachelors of Education for preschool, primary, and secondary teaching.

14	Savard, D., Larouche, C. and Anne, A. (2021). Higher education system: prospective vision, issues and tensions. CRIRES online books. Online: https://lel.crires.ulaval.ca/sites/default/files/Systeme-denseignement-superieur_Savard-Larouche-Anne_2022.pdf)	Book written on Canadian colloquia that took place in 2019. Overall it discusses evolutions in higher ed mainly in Quebec but also in the developing countries Haiti and Congo. The chapter on Congo discusses the need for professor training in numerical tools such as search engines and databases and their experiences providing these types of training sessions. The goal was to improve the curriculum in Congo by making it more up to date and relevant. Group discussion with 15 professors
15	Godoi, M. R., Kawashima, L. B., Gomes, L. D., & Caneva, C. (2021). Challenges and Successes of Physical Education Teacher Trainers During the COVID-19 Pandemic in Brazil. International Journal of Technologies in Higher Education, 5-20.	Focus group of 6 professors of PhysEd in Brazil and their experiences during the pandemic. In one teacher testimonial, Zoom allowed them to record he lecture and thus the course material shared during the Zoom session could be discussed by students and their misconceptions corrected.
16	Fages, A., Fleury, C., & Tsandilas, T. (2022, April). ARgus: système multi-vues pour collaborer à distance avec un utilisateur en réalité augmentée. In IHM'22: Conférence Francophone sur l'Interaction Homme-Machine.	Communication and collaboration in a virtual reality environment.
17	Feki, A., Ben Mlouka, Y., & Leclercq, P. (2022, May). Liens émergents entre l'espace collaboratif réel/virtuel, les moyens d'échange et la modalité de travail en collaboration. In RAID 2022 Émergences en Design. Les éditions de l'ESSTED, Manouba, Tunisia.	How collaboration happens at a distance and in hybrid mode. Modalities of working and methods of information exchange through varied platforms are discussed.

18	Pélissier, C. (2021). Impact des adaptations pédagogiques dans l'enseignement supérieur en période de confinement. Management des technologies organisationnelles, 13(2), 69-81.	Teacher reactions and perceptions to the transition to all digital work during the beginning of the pandemic given in surveys and interviews. Many felt alone in navigating the difficulties presented.