

Online Volunteer Networks in Africa: the case of TICE Afrique

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Abstract

In most African countries, the Covid-19 crisis has shaken up academic traditions and sparked enthusiasm from governments to take emergency measures, including remote and online educational continuity. With regard to such measures, which are considered salutary, a host of concerns have been expressed as to the practical conditions for adequate training and networking. In 2020, a voluntary project, called TICE Afrique, was set up by a few committed academics. This group has communicated, first and foremost, via WhatsApp, but also through files and documents shared online, synchronous online sessions, research sharing in the form of collaborative articles, etc. The ultimate goal of this project is to become a permanent platform that is able to complement what is done in schools, high schools, colleges and universities in a formal way. What are the stakes? What constraints exist? What limits hinder the growth of such a networking platform? A survey of twenty (20) volunteer teachers/lecturers and professors constitute the main research tool to explore, in the form of testimonies, the realities of a project of pooling research, experiences and reflections on ICT in the African context.

In order to give a balanced view of the TICE Afrique project, we give a historical overview of project and describe the various activities organised during these first years of existence of the project and the plans we have for the future.

Keywords: TICE Afrique, ICT and educational technology, networking, volunteer, pooling of practices.

Introduction

The issue of the link between online/distance teaching and learning and the sharing of digital practices is part of global concerns formulated by the United Nations Educational, Scientific and Cultural Organization (UNESCO) to effectively educate all people by 2030. Indeed, as soon in the Declaration of Incheon (UNESCO, 2018: 24) a 'New School by 2030' agenda was formulated for member states which aims at putting in place national strategies to address the shortcomings of education systems. Beyond the overall improvement of teacher training, this agenda is particularly based on the integration of Information and Communication Technologies (ICT) in education and their potential to transform national education systems (UNESCO, 2011: 1). In normal times, this integration poses the challenges of adapting to a new form of digital literacy and rebuilding the link to pedagogy, given not only the massive development of technologies, but also the difficulties inherent in their professional use. These challenges are amplified in the context of the Covid-19 pandemic.

In several countries around the world, the Covid-19 health crisis has had an impact on academic traditions and has prompted governments to take emergency measures, including learning continuity, notably through distance/online teaching/learning. It is in this logic that distance/online teaching/learning takes on its full importance and that shared digital skills are valued in the training of trainers. This is, however, not self-evident. In relation to such measures, which are considered salutary,

a host of concerns are expressed as to the practical conditions of adequate training. What is at stake? Which constraints exist? Which limitations?

With a view to answering such questions, the article first presents the context and history of the creation of TICE Afrique (ICTE Africa), followed by the discussion of survey results.

Context and Historical Overview of Tice Afrique

The Covid-19 pandemic accelerated the introduction of ICTs into education and the workplace, dramatically changing the way we work, collaborate and learn, and has put us, as teacher-researchers, in an isolated position. A multitude of tools have been created or improved, giving users the opportunity to communicate, cooperate, inform and train. In early 2020, mainly due to the social distancing measures taken by our governments, we all had to transform ourselves into "online" stakeholders with the important task of innovating and changing our approach to teaching, learning and research, key components of our profession. While information and communication technologies, especially those used in education (ICTE), already existed and their use was increasing, their usefulness redoubled in pandemic times. In order to cope with the isolation caused by the health measures taken in all countries of the world, a solution had to be found: how to keep in touch with colleagues all over Africa and even beyond. The shift to full or partial distance/online teaching and the impossibility of conducting face-to-face group scientific work led a group of teachers to create the WhatsApp TICE Afrique group. So at the beginning of 2020, a few colleagues set up a sharing environment, a platform where we could talk to each other as professionals. Given that the integration of ICTE in Africa goes through the teachers, it seemed appropriate to bring them together virtually so that they can be instructed in the dissemination of technology through knowledge or, for example, the mastery of web tools (Coulibaly, 2014). It was to meet these expectations and share practices that the TICE Afrique group was set up. Today, the group has more than 100 members spread across the African continent and beyond, communicating synchronously and asynchronously. The members are mainly: Higher Education instructors, Secondary School teachers, researchers in various fields, doctoral students, education inspectors, computer scientists, administration officials, and social partners. Our working language is French, but resources in other languages are shared on a regular basis too.

According to the survey of the web agency in Strasbourg, WhatsApp is the second largest global communication network with more than two billion active users worldwide. This network has therefore imposed itself on us by its availability on mobile phones today at a lower cost and by the ease of use of the network. For the members of the TICE Afrique group, WhatsApp is a good alternative for group exchanges of texts and various media in addition to possible voice calls (see, for example, Ferreira-Meyers and Martins, 2020).

It should be noted that the TICE Afrique group also uses Google Drive for the storage of its files and YouTube: the YouTube Tice Africa account has been created (<https://www.youtube.com/channel/UCfTWf6pAGgQpWXAnVRwD5cA>). It allows live broadcasting of training capsules and presentations made by its members. In essence, the TICE Africa group offers its members the opportunity to share, disseminate, broadcast and discuss the productions of their peers.

Problem Statement

In the context of sustainable development, ICT is seen as a tool for transforming individuals, communities and societies in an inclusive, qualitative and equitable way. UNESCO (2011: 18) specifies three groups of digital competences essential for the professionalisation of the 'reformed' teacher. First, teachers should develop sufficient digital literacy to facilitate students' technological literacy. Secondly, by applying their understanding of educational policies, they should act as guide and manager of the teaching and learning situation, in order to encourage in-depth disciplinary knowledge construction in pupils and ensure its effective and relevant application in the resolution of complex everyday problems. Deepening of knowledge occurs easily in collaborative work, both from the point of view of the learners and the teachers. Finally, in a pedagogy of self-management, teachers should train students to be reflective citizens capable of constructive vision and leaders in the areas of harmonious societal development. To achieve this, they should actively participate in pedagogical innovations integrating digital tools. From this point of view, the thorny problem of their self-training arises, considered as a determining process.

Such recommendations have often been made. However, the mechanisms for accompanying change that have been put in place or envisaged remain to be perfected, not to mention the fact that the unbridled speed of digital tool production does not always allow them to be questioned (Moussavou, 2017: 313; Tounkara, 2020: 5). Moreover, reflection on the involvement of ICT in e-learning is flourishing and reveals important limitations (Karsenti et al., 2014; Karsenti et al., 2012; Karsenti et al., 2011; Garry et al., 2008). Peraya (2011: 41), for example, contrary to UNESCO's instructions regarding the quality of digital anticipation, shows that the teacher involved in e-learning does not necessarily anticipate actions and results but gradually adapts to the demands of the field. The teacher trains 'on the job', as Kiffer (2018) pointed out. The teacher discovers strategies and characteristics of technologies that have never been revealed before, sometimes in surprising ways. In other words, e-learning involves a number of issues that must also be considered in the context of pooling of practices and experiences.

Nevertheless, collaborative work has indeed been a strategy favorable to the development of the digital skills envisaged. TICE Afrique (Technologies de l'information et de la communication pour l'éducation en Afrique, or, in English, Information and Communication Technologies for Education in Africa), a practice-sharing network, to which the authors of this article all belong, is a collaborative platform for synchronous and asynchronous sharing of research, experiences and reflections on ICT in education on the African continent, with over 80 participants. Within this framework of exchange of professional experiences and field realities, some members organise online training on Zoom, on pedagogical innovations or on the different uses of digital tools. These trainings are recorded and saved in an online folder on Google drive and published on a dedicated YouTube channel, as are the video lessons produced in the same way. Recently, the team has created a Padlet wall, on which several tested experiments are shared in a dynamic way. Communication among the group members happens mainly on WhatsApp, with limited interactions on a similar digital tool by the name of Signal. However, as with any group work, each person adheres to it according to his or her needs and experiences the impact of this new form of socialisation differently. What are the issues relating to the dynamics of digital mediation established within TICE Afrique, in relation to e-learning in the context of Covid-19? Before specifying the modalities that made it possible to construct answers to such questions, it is wise to specify some theoretical aspects.

Conceptual Framework

In this section of our paper, we define and describe the main foundational concepts at the basis of TICE Africa, namely mutualization and "social" sharing,

Mutualization

The notion of mutualization of digital practices is associated with a model of the sharing economy in political science. Indeed, for Demailly and Novel (2014), the sharing economy is booming and one of the modalities leading to better sustainability is mutualization. This is a collaborative practice, set up in a particular context, allowing the optimization of the use of goods by sharing them. For the authors, the sharing economy offers environmental hopes in the sense that shared products 'can provide the same level of service while reducing the production of goods and thus the associated resource extraction and waste' (Demailly and Novel, 2014: 7). Households would save up to 7% of their budget and 20% of waste. These hopes are supported by the development of digital platforms for sharing, lending or donating, although the conditions for their implementation and quality remain problematic in view of the diversity of contexts, objectives targeted and needs expressed. Moreover, it is not certain that the environmental impact is minimal in relation to the high rate of consumption of various goods. In some ways, environmental sustainability is compromised, which is why it is important to clarify the issues underlying such an option.

In other words, the digital revolution has not only reinvented the sharing economy in terms of resale, donation or barter, it has above all, in times of Covid-19, amplified the exchange of information on these modalities, thus offering more choices and more decision criteria to the sharing partners. Sharing aims at implementation of a more global hope, beyond simple 'pooling' of resources and experiences. It is in this logic that we apply this concept in the context of the mutualization of digital practices, in the framework of TICE Afrique.

"Social" sharing

It is relevant to recall that mutualization implies permanent interactions, as is the case in the TICE Afrique group, among professionals from diverse socio-cultural origins. It is logical to link the production of knowledge within this group to a socio-constructivist perspective, such as that made popular by Fourez (2003: 9), in the epistemology of science and informed by the sociology of science. We extend this notion in the sense that all knowledge, scientific or otherwise, is first and foremost a socially shared construction within a community (Fourez, 2007: 260). Thus, each member of TICE Afrique is an active, committed and voluntary producer of ICT-related knowledge. E-learning is seen as a technological means of mediating productions, but also as a means of validating them. Such a conception involves power issues, as Moussavou (2020: 134) noted when specifying the social role of endogenous knowledge, but also in the sense that ICTs embody a certain power, just like scientific knowledge (Fourez et al., 2007: 102). Given the different relationship developed by each member of the TICE Afrique group to e-learning, it is important to give them the floor in order to justify their actions and formulate the issues at stake, either explicitly or implicitly.

Thus what are the issues related to “sharing” and “mutualization” of experiences, innovations and professional practices, in a pandemic, such as that of Covid-19, according to selected TICE Afrique members? This is the main question we answer in the remainder of this chapter.

Methodology

In line with our conceptual framework and problem statement, we adopted a comprehensive methodological approach based on a representative qualitative sample, which is suitable for thematic qualitative interpretative content analysis (Savoie-Zajc and Karsenti, 2004: 110, 112).

In order to obtain first-hand empirical data from the WhatsApp TICE Afrique group, we asked twenty (20) volunteers, male and female, from secondary and higher education, for their contribution to our research. After their agreement in principle, we drew up an interview outline in the form of a thematic questionnaire, consisting of open-ended questions, which would be further specified if necessary. They covered four (4) major themes, namely the relationship with digital technology, essential equipment, constraints of e-learning and challenges of mutualization. For the purposes of this article, only the issues of mutualization were considered. Six (6) descriptive criteria were suggested for this purpose, which are specified below in our discussion.

Eleven (11) people responded to our request for participation, via email or by transmitting their responses on Google Drive (using Google Doc). Despite reminders, the other nine (9) did not send in their opinions. Each contribution was anonymized using a letter of the alphabet, different from the initials of their first and last name. The Table below gives some detail regarding the participants to the interviews.

Table 1: Interview participants

	Participants	Level in which they exercise their profession	Country
1	Z, homme	Higher Education	Mali
4	V, homme	Higher Education	DRC
5	W, homme	Secondary/High School	Senegal
6	Y, femme	Higher Education	Spain
8	G, homme	Secondary/High School	Burkina Faso
9	J, homme	Higher Education	Ivory Coast
11	P, homme	Secondary/High School	Mali
12	A, femme	Higher Education	Gabon
15	P, homme	Secondary/High School	Mali
19	T, femme	Higher Education	Gabon

We copied all texts in Word format and pasted them into a single Word file, in order to perform a qualitative thematic content analysis. We applied a content analysis by searching for meanings, as suggested by Blanchet and Gotman (2007: 93), in two steps.

First, we grouped texts that were significant from the point of view of the selected criteria. In doing so, we used the qualitative analysis grid used by Savoie-Zajc (2004: 140) in education, looking for what is said. In a logic similar to that of Blanchet and Gotman (2007: 93), we reorganized the verbal

expressions according to "the meaning of the sentences from the way they are constructed and thus make it possible to find the hidden links".

Then, we applied the grid's second level, consisting of answering the question of how the information was shared and what was to be understood from it. The categories we thus obtained are shown in the Table below.

Table 2 : Identified categories

Participants	Categories					
	Interest	Engagement	Issues	Advantages	Difficulties / limits	Group activities

Results

The open-ended questionnaire we used made it possible to obtain data whose qualitative analysis led to the view that the context of the health crisis was conducive to distance learning. In the case of TICE Afrique, e-learning is perceived as a means of sharing that is beneficial in several respects. In particular, the pooling of digital resources makes it possible to establish experience-sharing networks and thus improve professional training and self-training. Nevertheless, this mutualization remains to be rethought from the point of view of individual expectations, as we show in the following paragraphs, by presenting some issues relating to the professional and socio-affective realm.

Professional issues

All the participants envisaged TICE Afrique as a distance learning context whose advantages are networking and the enrichment of digital knowledge. For V, who is a researcher in a higher institute in the DRC, this mutualization has enabled him to develop his skills in the setting up of surveys and thus to better satisfy his clients. Moreover, his teaching has become more effective because he applies the strategies shared within the group to his teaching. This opinion is shared by P, who works at the Conservatoire des Arts et Métiers in Mali and whose digital capacities have been strengthened, in particular for distance learning. Other professional and personal benefits are described by Y, a woman, who is a higher education professional in Spain:

I work on digital competence in Africa and it is a real opportunity for me to share this space with colleagues from many countries. This corresponds quite well to my way of looking at processes: trial and error/solution and one learns by doing. The pooling of experiences, sharing in different types of synchronous and asynchronous exchange, everyone has something to contribute.

Similarly, expectations are also expressed, as in the case of Z, a higher education professional in Mali, whose interest is to build an international network and for whom sharing is also beneficial on a personal level:

I am both an intern and a trainer, and my challenge is to create a network of international professionals in order to go further. The advantages are the professional exchanges, the exchange of documents and experiences, which contributes to a moral satisfaction because one benefits from the recognition and requests of colleagues.

For J, a man who works in higher education in Ivory Coast, mutualization allows him to learn and share. The exchange platform allows him to take up the challenge of keeping up with the unlimited advances in digital technology and the group "allows you to update your own knowledge and practices". His expertise has been recognized at the Ministry of Digital Affairs where he works. He adds that the diversity of the members' individual backgrounds and their own experiences is a guarantee of mutual enrichment within the group. This opinion is also shared by N, a secondary school teacher in Mali, whose involvement allows him to learn and improve his knowledge of ICT and whose challenge is to become more familiar with computer tools in order to truly integrate these into his teaching practices: The platform offers a lot of facilities through the use of materials and the online sessions we hold, among others. The advantages of bringing specialists together in the form of a network, sharing and mutual enrichment, among others, are advantages. Bringing specialists together makes it possible to bypass the financial aspect of training, if it were to take place in a context other than our own. This type of training is free.

However, while these reflective practitioners discussed professional issues in a mainly positive manner, they did not fail to point out the difficulties inherent to such a contribution. For some (Z, V,

G, P, A), it is above all the problem of access to high-speed internet and the availability of electricity that constitute obstacles to a better mutualization. For V, participating assiduously in the group's exchanges is a source of enormous economic expense. From J's point of view, the times at which the Zoom sessions are scheduled are unsuitable for his activities. It would be better to schedule them on non-working days, while P also mentions the need to have a high-performance IT tool and to develop a perfect command of digital tools.

Some of the participants gave their opinion on the socio-affective aspects of this mutualization via distance and online teaching-learning.

Socio-affective aspects

The socio-affective domain is related to values, feelings and everything that situates discourse in a particular emotional context. Indeed, when Z mentions the advantages of the group such as moral satisfaction and recognition by his peers, he expresses a positive feeling linked to his involvement in the group. For W, for example, mutualization certainly has the advantage of generalizing distance learning, but it does not take into account the difference in the level of competence of the members, and changing the e-learning tools used by TICE Afrique constitutes a real problem. Moreover, he is not very involved in the group's activities, whereas Y maintains that all teachers must show intellectual curiosity and value themselves, because exchanges allow for progress and the testing of ICT tools and resources. Earlier she mentioned that the process of learning by trial and error is an interesting strategy on a personal level.

As for P, the development of e-learning makes it possible to question the reluctance to change caused by the health crisis. T is the only one who mentioned the ease of exchanges, allowing her not only to reassure colleagues, but also to take advantage of the cultural richness of the members as a socio-emotional asset, which undoubtedly justifies her significant involvement in "managing" the group, so to speak.

Beyond such issues, several activities have been undertaken and planned by TICE Afrique, as discussed below.

Discussion

Initially, the members of TICE Afrique were asked to give their opinion on mutualization in the context of e-learning during the Covid-19 pandemic. The conceptual framework clarified the concept of mutualization and linked it to an alternative conception, that of socio-constructivism. This is consistent with the framework of the study, that of a synchronous and asynchronous exchange of digital practices, resources and experiences, by people who are motivated, committed and active not only in the verbalisation of their practices, but also in the giving of mutual assistance. Thus, mutualization was considered in a comprehensive way and a critical interpretative perspective made it possible to obtain qualitative empirical data. The qualitative analysis of thematic content made it possible to construct categories, according to the initial themes. This is conform to the principles of educational research, highlighted by Blanchet and Gotman (2007: 93) and Savoie-Zajc (2004: 140).

Epistemological, training and accessibility issues were all discussed under the umbrella of professional issues. Our write-up here does not allow the diversity of points of view to come out clearly. Nevertheless, it does not detract from the quality of the results discussed.

In order to show the level of engagement and the diversity of activities proposed within TICE Afrique, we give a brief overview of such below.

Tice Afrique Activities

TICE Afrique has a number of very active participants who, soon after the group's launch early on in 2020, started getting involved in various resource- and expertise-sharing activities. In order to inform colleagues from African and beyond about the existence and objectives of TICE Afrique, we designed our "visual identity" after our members proposed a series of possible logos and voted online for the most suitable. Our logo (Figure 1) was then created.



Figure 1. Logo of TICE Afrique

We have started working on training modules (in the form of e-modules and/or video resources). As we are a large group we are in a constant adaptation mode, showing the flexibility that is needed from an international and informal network like TICE Afrique. Our members live and work in different time zones, are available at varying moments during the day and evening, have a plethora of interests, respond to, sometimes contradictory, needs in the environments they live and work in, and therefore have a mixture of objectives, personal and collective.

For a few months in 2020 and early 2021, weekly 40-minute Zoom webinars were held where a few members of TICE Afrique would make a formal presentation and a group discussion would follow (if the 40 minutes were not sufficient, the discussion would continue, sometimes for days, on the WhatsApp group). During the same period, one or two members of TICE Afrique would prepare a short, 10-minute video that was then sent to all members. All these videos have aspects of ICT uptake, rollout, practice, etc. in Africa as their themes. Once the videos were watched, a Zoom meeting would be organized where participants could ask questions, give comments, propose additional information and/or experiences.

Here is a list of the short videos that have been shared thusfar (up to June 2021):

- What is e-learning?
- Using Google Apps for learning
- How to use Flipgrid for language learning
- How to use geolocated tours to learn a foreign language?
- How to collaborate with Padlet
- Interactive online assessment
- How to make the best use of Zoom?
- How to make a video clip?
- Distance learning challenges
- How to create a training poster
- Using ICT for education

In addition to the above, TICE Afrique group members share calls for contribution and calls for pap for various international, regional and national conferences, and assist each other in the drafting of proposals for these.

Towards the end of 2020, TICE Afrique members set up 6 working groups. Members were free to join these on a voluntary basis, depending on their availability and expertise. The activities in the working groups are ongoing. The training working group, for example, started from the observation that the group members needed to be trained in the mastery of educational technologies. The more experienced/advance members of the group train the others. Our training activities are sometimes also be directed externally to our pupils and students. This means that we invite outsiders to participate in some of our activities. In the research working group, information about existing projects and ideas about possible research topics are shared in view of collaborating in these areas. Findings are disseminated in whichever format deemed useful (seminars, webinars, colloquia, posters, videos, etc.) on whatever media preferred by the group or the audience. The legal working group is currently working on internal regulations, legal statutes and an ethical charter in order to make TICE Afrique a fully-fledged organisation. Issues relating to intellectual property, copyright and open access are part

of the mandate of this working group too. Working group 4, which we could describe as our “marketing” group carried the responsibility of the logo, group identity and a general framework to guide TICE Afrique’s activities and events. Finances are part of the mandate of working group 5: fundraising, donor links, partnerships, financial project management, ... while evaluation and quality assurance (through the use of quality norms) are deliberated upon within working group 6.

All the work done by TICE Afrique is shared on Google Drive: this makes continues input from everyone possible. Our motto is that every member of TICE Afrique has something to contribute, something to share (good practices, experiences, ideas, in addition to different types of resources and tests for ICT tools).

The main activities for the coming months include consolidating the group and its actions, ensuring that TICE Afrique is seen as a resourceful structure which, as a collective entity, can participate in projects at a national, regional, continental and international level. Publishing articles, book chapters, online resources will also continue to be one of our focus areas.

Conclusion

This article aimed at providing a non-exhaustive overview of the challenges of mutualization in a Covid-19 context, thanks to e-learning. We addressed a broader context, that of sustainable development, to show the permanency of the issues relating to the sharing of experiences and practices among African professionals. It is therefore a case study, that of our involvement in a group for the sharing of digital experiences, which has enabled us to collect rich opinions and to construct meaning about the issues at stake.

Thus, the members of the TICE Afrique group who took part in the study are all unanimous on training in the sense that training is promoted within the group. Similarly, several people derive personal benefits from participating in the group, which enables them to develop their social and emotional self-esteem because their standing with their peers is improved. Nevertheless, there are still epistemological issues relating to the status of teachers who are resistant to digital changes. Similarly, social equity must be taken into account in a context of mutualization in the sense that the diversity of levels of mastery of digital tools can slow down involvement in group activities. Finally, structural issues such as the electricity divide and limited financial resources must be considered.

We also shared some of the activities undertaken in the first two years of existence of this networked group with a particular interest in ICTs for education in Africa.

E-learning is a commendable initiative in the current context, in many African countries, Colleagues who mastered the ICTE and were involved in TICE Afrique managed to do so on their own or with the help of others, which is a major socio-affective issue if we want to truly sustain motivation during the training sessions envisaged by various African countries. It is in this respect that this research constitutes a real advance in the knowledge of the stakes of the much-valued mutualization, which is nevertheless little questioned from the point of view of the stakes that it raises.

References

- Blanchet, A. and Goteman A. (2007). *L’entretien*, 2^e édition, Paris : Armand Colin.
- Burrows A. and Miras G. (2019), *Pratiques numériques en langues : de la verbalisation à l’analyse des préoccupations enseignantes*, *Apprentissage des Langues et Systèmes d’Information et de Communication*, Vol. 22 (2).
- Demailly D. and Novel, A-S. (2014), *Économie du partage : enjeux et opportunités pour la transition écologique*, Paris, Institut du développement durable et des relations internationales. URL: www.iddri.org, accessed on 28 November 2020.
- Ferreira-Meyers, K. and Martins, J. The use of *Whatsapp* in today’s mobile language teaching and learning, *ITM Web of Conferences* 33, 03007 (2020), 6 pages. https://www.itm-conferences.org/articles/itmconf/abs/2020/03/itmconf_ictessh2020_03007/itmconf_ictessh2020_03007.html
- Garry, R.-Ph., Karsenti, Th., Benziane, A. and Baudot, F. (2008). *Former les enseignants du XXI^{ème} dans toute la francophonie*, Université de Clermont 2 : Presses Universitaires Blaise Pascal. URL: <https://www.rifeff.org/publications.php>, accessed on 19 October 2020.

- Fourez, G. (2007). Knowledge as representation. In Larochele, M. (dir.). *Key works in radical constructivism* (pp.259-266). Taipei : Sense publishers.
- Fourez, G. (2003). *Apprivoiser l'épistémologie*. Bruxelles : De Boeck Université.
- Fourez, G., Englebert-Lecomte V. and Mathy P. (1997). *Nos savoirs sur nos savoirs, Un lexique d'épistémologie pour l'enseignement*. Bruxelles : De Boeck Université.
- Karsenti, T., Toure, K., Lepage, M. and Attenoukon, S. A. (2020). *Usages et appropriation des technologies éducatives en Afrique : quelques pistes de réflexion*. Bamenda : Langaa.
- Karsenti, T. (2008). Former les enseignants du XXIe dans toute la francophonie, https://www.academia.edu/5332449/Former_les_enseignants_du_XXIe_dans_toute_la_francophonie, accessed on 12 October 2020.
- Karsenti, T., Garry, R.-P., N'Goy Fiamma, B. and Baudot, F. (2011). Former à distance des formateurs : stratégies et mutualisation dans la francophonie. Montréal : AUF/RIFEFF. URL: <https://www.rifeff.org/publications.php>, accessed on 19 October 2020.
- Kiffer, S. (2018). Apprendre à enseigner dans le Higher : quels modèles pour la construction des compétences des universitaires novices ?, in *Revue internationale de pédagogie de l'enseignement Higher* [online], 34(3) | 2018, 20 November 2018, accessed on 26 February 2020. URL : <http://journals.openedition.org/ripes/1654>.
- Moussavou, R. (2020). Les savoirs endogènes en contexte gabonais : Enjeux et perspectives. In DIAKITÉ S. (Dir), *Revue Le Caïlcédrat*, no. 009, Québec : Editions différence pérenne, pp. 131-141.
- Moussavou, R. (2017). Les valeurs de la république dans l'enseignement des SVT au Gabon, cas de la devise Union-Travail-Justice chez les enseignants. In Hernandez Diaz, J. M. and Eyeang, E. (eds.), *Los valores de la educacion de Africa. De ayer a hoy*, Salamanca: Ediciones Universidad, pp. 311-321.
- Obono Mba, A. (2017) : Quelles valeurs pour l'école du XXI^{eme} face au numérique ? Cas de l'école gabonaise. In Hernandez Diaz, J. M. and Eyeang, E. (eds.), *Los valores de la educacion de Africa. De ayer a hoy*, Salamanca: Ediciones Universidad, pp. 351-358.
- Peraya, D. (2011). La posture de l'enseignant porteur d'un projet technopédagogique : complexité et déplacements. In Karsenti, T., Garry, R.-P., N'Goy Fiamma, B. a,d Baudot, F. (dir.). *Former à distance des formateurs : stratégies et mutualisation dans la francophonie*. Montréal: AUF/RIFEFF. URL: <https://www.rifeff.org/publications.php>, accessed on 19 October 2020.
- UNESCO (2018). TIC UNESCO : Un référentiel de compétences pour les enseignants. <https://unesdoc.unesco.org/ark:/48223/pf0000216910>.
- UNESCO (2015). Éducation 2030. Déclaration d'Incheon et Cadre d'action pour la mise en œuvre de l'Objectif de développement durable 4, page 8. URL: <http://unesdoc.unesco.org/images/0024/002456/245656f.pdf>.
- UNESCO (2018). Éducation 2030. Déclaration d'Incheon et Cadre d'action pour la mise en œuvre de l'Objectif de développement durable 4. En ligne, https://unesdoc.unesco.org/ark:/48223/pf0000245656_fre, consultée le 7 octobre 2020.