

Impact of ICT on virtual learning

---



DOI: <http://dx.doi.org/10.23857/dc.v6i3.1337>

Ciencias de la Educación  
Artículo de investigación

*Impact of ICT on virtual learning*

*Impacto de las TIC en el aprendizaje virtual*

*Impacto das TIC na aprendizagem virtual*

Evelyn Carolina Macias-Silva<sup>I</sup>  
[maciasevelyn@hotmail.com](mailto:maciasevelyn@hotmail.com)  
<https://orcid.org/0000-0001-7593-6952>

Marco Antonio Aquino-Rojas<sup>II</sup>  
[marcoaquino111@hotmail.com](mailto:marcoaquino111@hotmail.com)  
<https://orcid.org/0000-0002-2252-8397>

Lucio Armando Rodríguez-Pillajo<sup>III</sup>  
[armandorodriguezunach69@yahoo.com](mailto:armandorodriguezunach69@yahoo.com)  
<https://orcid.org/0000-0002-6846-6988>

Edgar Eduardo Heredia-Arboleda<sup>IV</sup>  
[eheredia@unach.edu.ec](mailto:eheredia@unach.edu.ec)  
<https://orcid.org/0000-0002-4099-9811>

\***Recibido:** 19 de mayo de 2020 \***Aceptado:** 21 de junio de 2020 \* **Publicado:** 27 de julio de 2020

- I. Magíster en Pedagogía para la Enseñanza del Inglés como Lengua Extranjera, Docente Ocasional Escuela Superior Politécnica de Chimborazo, Riobamba, Ecuador.
- II. Ingeniero en Administración de Empresas Turísticas y Hoteleras, Docente Escuela Superior Politécnica de Chimborazo, Riobamba, Ecuador.
- III. Magíster en Docencia Universitaria, Docente Ocasional Escuela Superior Politécnica de Chimborazo, Riobamba, Ecuador.
- IV. Magíster en Enseñanza del Inglés como Idioma extranjero, Docente en la Carrera de Pedagogía de los Idiomas Nacionales y Extranjeros, Universidad Nacional de Chimborazo, Riobamba, Ecuador.

## Impact of ICT on virtual learning

---

### Abstract

*“Information and Communication Technology (ICT)”* has transformed over time and is a promising tool for improving the learning process. The core aim of the research study is to evaluate the possibilities of teaching and learning in a virtual learning (networked) environment where both teachers and learners transform. This study relied on a literature review for forming a conclusion about the issue. The review of different articles revealed that ICT focuses on providing quality education, distance learning, low-cost learning, feedback option, and the option to record the session. The negative elements are that the connection may break due to poor internet, noise issues, inability to receive questions properly during the lecture, poor engagement with virtual learners, and deficient examination evaluation. Teachers and learners can transform by considering both the positive and negative sides of the ICT and having a back-up to avoid interruption in the learning session. It is concluded that the advent of smartphones, computers, laptops, and applications like Zoom, YouTube, Facebook, and WhatsApp video is transforming conventional teaching practices. The most common software is ‘Zoom’ in the current environment that encourages the learners to take sessions online. However, it also has drawbacks that have already been discussed. Hence, it is concluded that teachers and learners should consider both benefits and drawbacks of ICT when utilizing a virtual-learning session.

**Keywords:** ICT; education; technology.

### Resumen

La "tecnología de la información y las comunicaciones (TIC)" se ha transformado con el tiempo y es un instrumento prometedor para mejorar el proceso de aprendizaje. El objetivo fundamental del estudio de investigación es evaluar las posibilidades de enseñanza y aprendizaje en un entorno de aprendizaje virtual (en red) en el que se transforman tanto los profesores como los alumnos. Este estudio se basó en una revisión de la literatura para llegar a una conclusión sobre el tema. La revisión de diferentes artículos reveló que las tecnologías de la información y las comunicaciones se centra en la prestación de una educación de calidad, el aprendizaje a distancia, el aprendizaje de bajo costo, la opción de retro-información y la opción de grabar la sesión. Los elementos negativos son que la conexión puede romperse debido a la mala calidad de Internet, los problemas de ruido, la imposibilidad de recibir adecuadamente las preguntas durante la conferencia, la escasa

## Impact of ICT on virtual learning

---

participación de los alumnos virtuales y la deficiente evaluación de los exámenes. Los profesores y los alumnos pueden transformarse considerando tanto los aspectos positivos como los negativos de la tecnología de la información y las comunicaciones y teniendo un respaldo para evitar la interrupción de la sesión de aprendizaje. Se ha llegado a la conclusión de que la llegada de teléfonos inteligentes, ordenadores, portátiles y aplicaciones como Zoom, YouTube, Facebook y el vídeo de WhatsApp está transformando las prácticas de enseñanza convencionales. El software más común es "Zoom" en el entorno actual que anima a los alumnos a realizar sesiones en línea. Sin embargo, también tiene inconvenientes que ya han sido discutidos. De ahí que se concluya que los profesores y los alumnos deben tener en cuenta tanto las ventajas como los inconvenientes de las TIC al utilizar una sesión de aprendizaje virtual.

**Palabras claves:** TIC; educación; tecnología.

### Resumo

A "tecnologia da informação e comunicação (TIC)" foi transformada ao longo do tempo e é um instrumento promissor para melhorar o processo de aprendizagem. O objetivo fundamental do estudo é avaliar as possibilidades de ensino e aprendizagem em um ambiente virtual (em rede) de aprendizado, no qual professores e alunos são transformados. Este estudo foi baseado em uma revisão da literatura para chegar a uma conclusão sobre o assunto. A revisão de diferentes artigos revelou que as tecnologias da informação e comunicação estão focadas em oferecer educação de qualidade, ensino a distância, aprendizado de baixo custo, a opção de feedback e a opção de gravar a sessão. Os elementos negativos são que a conexão pode ser interrompida devido à má qualidade da Internet, problemas de ruído, incapacidade de receber as perguntas adequadamente durante a conferência, baixa participação de alunos virtuais e baixa avaliação dos exames. Professores e alunos podem se transformar considerando os aspectos positivos e negativos da tecnologia da informação e comunicação e ter um backup para evitar interromper a sessão de aprendizado. Concluiu-se que a chegada de smartphones, computadores, laptops e aplicativos como Zoom, YouTube, Facebook e WhatsApp está transformando as práticas convencionais de ensino. O software mais comum é o "Zoom" no ambiente atual, que incentiva os alunos a realizar sessões on-line. No entanto, também possui desvantagens que já foram discutidas. Portanto, conclui-se que

## Impact of ICT on virtual learning

---

professores e alunos devem levar em consideração as vantagens e desvantagens das TIC ao usar uma sessão virtual de aprendizagem.

**Palavras-chave:** TIC; Educação; tecnologia.

### **Introduction**

ICT has transformed over time and is a promising tool for improving the learning process. ICTs can improve the education quality in various ways; by enhancing the motivation and engagement of the learner, by facilitating the basic skills' acquisition, and by improving teacher training. ICT can be considered the transformational tool that when utilized properly, may promote the shift to a specific learner-centered environment.

### **Problem Statement**

Thorsteinsson (2015) argued that the impact of ICT has not been discussed fully as it does not focus on how the teaching practices have transformed. There is a need to evaluate the possibilities of teaching and learning in a virtual learning (networked) environment where both teachers and learners transform. A major gap exists regarding the aspect that how ICT has achieved success in improving both the learning and teaching process. In this way, it can be observed that whether the teachers are satisfied with the advent of ICT or not. It is important to explore both the positive and negative sides of the ICT in the learning and teaching practices to perform a critical assessment of this technology and propose recommendations for future research.

The core aim of the research study is to evaluate the possibilities of teaching and learning in a virtual learning (networked) environment where both teachers and learners transform. The main focus is on understanding how ICT has transformed the virtual learning practices and whether the teachers or institutions are satisfied with this technology.

### **Methodology**

The research methodology is important to discuss since it explains the methods utilized for collecting and analyzing the data.

## Impact of ICT on virtual learning

---

### **Research Method**

For this study, secondary research was utilized to review past studies related to the impact of ICT on virtual learning. Qualitative analysis of the literature was performed to collect and analyze the data. One of the major benefits of the qualitative analysis was that it helped in critically evaluating the research articles in-depth (Hair, 2015). It helped to understand assess the findings and conclusion of the selected articles. It further helped in comparing different research articles and then reaching a particular finding related to the topic.

### **Secondary Research**

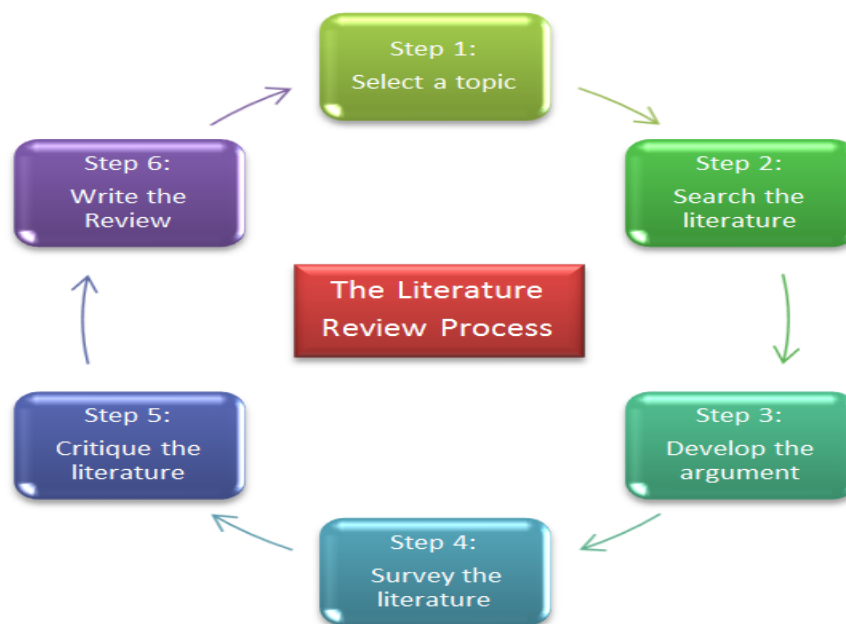
This research relied on secondary research to achieve the findings and research aim. In secondary research, the data is gathered through different secondary sources (Bryman, 2017). For this study, the data was collected through research articles, authentic websites, books, and published sources. Hence, this study was dependent on the opinions of different researchers and the latest developments in the field of ICT and how it can impact virtual learning. There is a drawback of the secondary research that should be discussed.

### **Literature Review**

The core method for collecting and analyzing the data was the literature review. For secondary research, this review was carried out that focuses on collecting, interpreting, comparing, and then analyzing the findings of different research articles (Bryman, 2017). The comparison part of the literature review helped in evaluating the strengths and weaknesses of the research articles. One of the major advantages of using the literature review was that it helped in identifying gaps in the research and determined inconsistencies. The literature review further helped in gaining in-depth knowledge about ICT and how it can impact the virtual learning from both teacher and learner's perspective.

## Impact of ICT on virtual learning

**Figure 1** :Literature Review Process



Source: Bryman, 2017

The above figure indicates the literature review process that has been considered for the study. It involves searching the literature, developing a specific argument, conducting a survey of the literature, carrying out a literature critique, and writing the review.

### Search Strategy

In a literature review, a search strategy should be considered to extract relevant articles and information. Specific keywords were utilized for searching the relevant articles. Some of the keywords that were used include *'ICT and virtual learning'*, *'ICT'*, and *'virtual learning through ICT'*. These keywords proved beneficial in finding the relevant articles and then filtering the required ones.

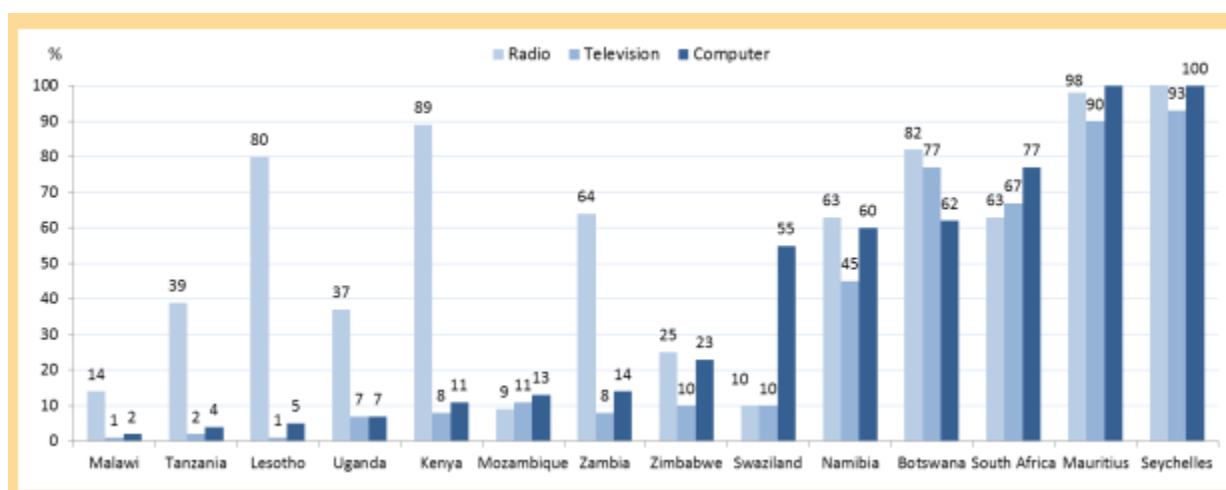
Specific databases were also used to find the required research articles. Some of the databases are *'Elsevier'*, *'ScienceDirect'*, and *'Google Scholar'*. These potential databases proved beneficial in finding relevant information about the topic.

## Impact of ICT on virtual learning

### Results

Deka & Jena (2017) conducted a study, which revealed that the current scenario of Skype and YouTube learning in the classroom in Asian countries is that it needs to be enhanced more as compared to different advanced regions of the world. The researchers found that YouTube learning is given much importance in some schools only of specific areas; however, other areas do not get the advantage or given such specific technologies. It has been observed in the classroom that the students must not benefit from some recent or difficult topics as there tends to be a lack of teachers' knowledge or sometimes the teacher may not be trained properly. Hence, in such a case the students would get more benefit if the lectures or materials from abroad are arranged or provided to them directly from the specialist of those specific areas as they can make conversations directly with that specific person (Noor-Ul-Amin, 2013). Also, in YouTube learning, there are not enough chances to clarify any specific problems that the students may face while learning.

**Figure 2:** Proportion of students with Computer and other devices



Source: Wastiau et al., 2013

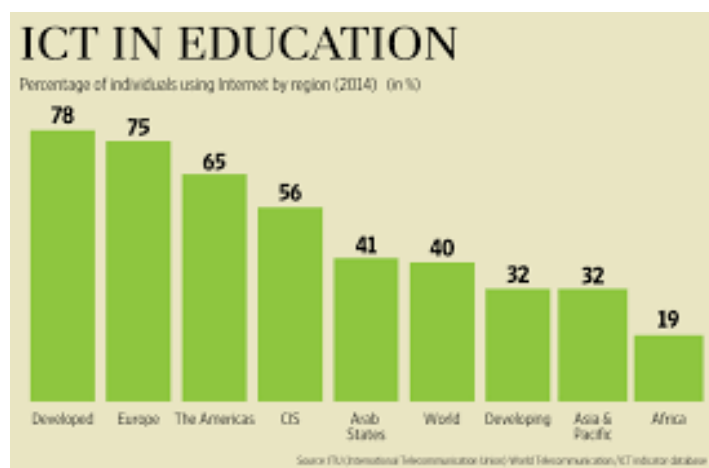
The above figure indicates the proportion of students with computer systems in different regions. This graph shows the statistics for the year 2007, which highlights that at that time, the technology had already grown.

Wastiau et al., (2013) explained that education is considered a socially-oriented activity and the element of quality-education has been associated traditionally with the strong and capable teachers

### Impact of ICT on virtual learning

who possess a high degree of contact with the learners. The utilization of ICT in education takes its attention toward student-centered learning settings. However, with the world developing at a rapid pace into digital information and media, ICT's role in education is becoming more important and it is growing significantly in the current century (Vrasidas, 2018). The researchers concluded that the use and adoption of ICT in education has a positive influence on research, learning, and teaching. Fu (2015) further argued that ICTs provide maximum benefit to both teachers and learners in terms of delivering quality education. Some of the ICTs including smartphones, laptops, and some applications like Zoom and Skype are being utilized in various institutions.

**Figure 3:** ICT in education



Source: Fu, 2015

The above figure points out the proportion of people using the internet as per the year 2014. It represents that the people living in developed countries have the most access to the internet, making it easy for them to use ICT for education. However, Africa represents the lowest proportion that indicates that ICT's use is not prevalent in that region.

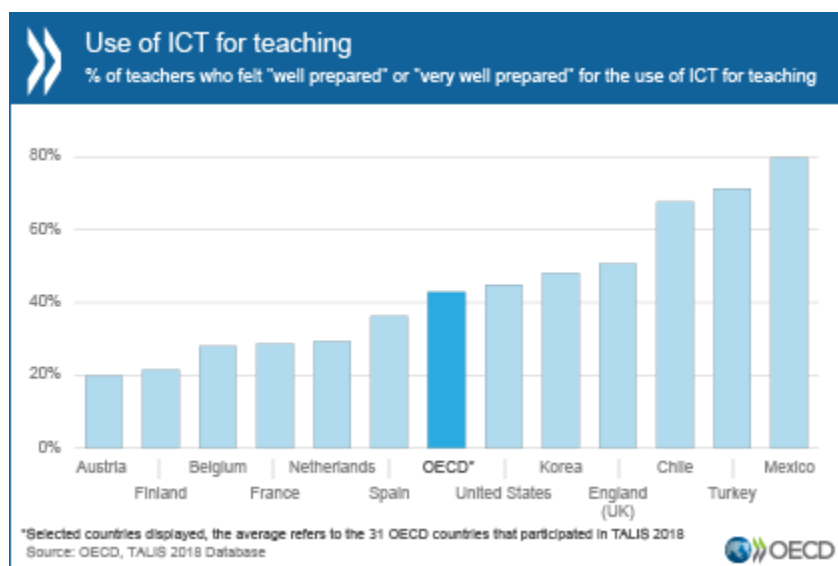
Player-Koro (2016) discussed the drawbacks of the ICTs in virtual learning that can negatively impact both the teacher and the learner. One of the major drawbacks is that ICT cannot resolve every question or query that the student may have. If the lecture is being given through YouTube then it may not be possible for the student to interrupt the teacher to ask questions. This aspect can negatively impact the virtual-learning environment and may demotivate the students to ask questions and participate actively in the online class. Solar et al., (2013) discussed another major



## Impact of ICT on virtual learning

drawback of the use of ICT in virtual learning. It involves a poor internet connection that can hamper the whole learning session. ICTs such as smartphones or any other application make use of the internet to connect teachers with students. However, if there is a poor connection during the lecture then it can put an end to the whole session, thereby causing demotivation among the learners and the teacher.

**Figure 4:** ICT for teaching



Source: Li et al., 2018

The above figure indicates the use of ICT for teaching in different regions of the world. The percentage needs to increase as the developed countries have the chance to make sufficient use of ICT in difficult situations.

The study conducted by Theodotou & Kaitisa-Kulovana (2014) evaluated whether ICTs such as computers can be utilized as an efficient tool for children's social and educational skills. The researchers revealed that computers can improve the social skills of children and enhance communication among them if it is utilized beneficially through the help of a facilitator. The researchers argued that more development in ICTs can make virtual learning a fun place for both the students and the teacher. Apart from some drawbacks, the use of ICTs can help the learners to gain maximum benefit from the lecture and provide suggestions through the messaging system. Underwood & Dillon (2015) recommended that when teaching through smartphones, Zoom

## Impact of ICT on virtual learning

---

application, YouTube, or even Facebook, the advantage is that ICT provides a room to students for providing feedback regarding the lecture and material. It is up to the teachers to utilize that part and enable the learners to ask questions during the lecture or after the session.

Livingstone (2015) argued that ICTs are only beneficial for virtual learning; however, it cannot be considered effective for taking exams. In the current COVID-19 pandemic, institutions are taking maximum benefit of the ICT as they utilize services like Zoom, YouTube, Facebook, WhatsApp video service, and Skype to teach the students (Cao et al., 2020). However, when it comes to the examination, ICT cannot be considered a reliable tool since it can provoke the students to cheat in every exam. The researchers argued that ICT may not prove beneficial for the teachers in terms of taking exams and tests (Talebian et al., 2014). Apart from the drawbacks, a major benefit of the use of ICT is that the applications or devices allow recording the sessions so that students can access the material in the future.

Olaore (2016) discussed the opinions of teachers regarding the use of ICTs in virtual learning. The researchers found mixed opinions from the teachers in terms of quality education. Most of the teachers argued that ICT is a beneficial way to deliver small lectures without any tests or examinations (Salehi & Salehi, 2017). The benefits of ICTs involve distance learning, lecture recording, and room for feedback. However, some teachers discussed the drawbacks that involve poor examination evaluation, need to have high-speed internet, and poor engagement with the virtual learners. Li et al., (2018) indicated that there are both positive and negative sides of the use of ICTs in virtual learning that should be considered by the institutions or individual teachers.

### Conclusions

The literature review helped in concluding that ICT has both positive and negative impacts on virtual learning. From the learners' perspective, ICT focuses on providing quality education, distance learning, low-cost learning, feedback option, and the option to record the session. However, teachers have mixed reviews about the use of ICT in virtual learning. The negative elements are that the connection may break due to poor internet, noise issues, inability to receive questions properly during the lecture, poor engagement with virtual learners, and poor examination evaluation. It is concluded that ICT has revolutionized the education sector up to a certain degree. The advent of smartphones, computers, laptops, and applications like Zoom, YouTube, Facebook,

## Impact of ICT on virtual learning

---

and WhatsApp video is transforming conventional teaching practices. However, this revolution also comes with certain drawbacks that have been discussed. It is recommended for the teachers and learners to keep in mind the major drawbacks when providing education through ICT. To cover the damage, teachers should have a backup of internet connection or device to continue the session without interruption. It is further concluded that ICT has both positive and negative sides that should be considered when providing virtual education.

### References

1. Bryman, A. (2014). *Social research methods*. OUP Oxford.
2. Bryman, A. (2017). Quantitative and qualitative research: further reflections on their integration. In *Mixing methods: Qualitative and quantitative research* (pp. 57-78). Routledge.
3. Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry research*, 112934.
4. Deka, M., & Jena, A. K. (2017). Effects of ICT Assisted Real and Virtual Learning on the Performance of Secondary School Students. *Online Submission*, 4(9), 1405-1420.
5. Fu, J. (2015). Complexity of ICT in education: A critical literature review and its implications. *International Journal of education and Development using ICT*, 9(1), 112-125.
6. Hair, J. F. (2015). *Essentials of business research methods*. ME Sharpe.
7. Li, S., Yamaguchi, S., & Takada, J. I. (2018). Understanding factors affecting primary school teachers' use of ICT for student-centered education in Mongolia. *International Journal of Education and Development using ICT*, 14(1).
8. Livingstone, S. (2015). Critical reflections on the benefits of ICT in education. *Oxford review of education*, 38(1), 9-24.
9. Noor-Ul-Amin, S. (2013). An effective use of ICT for education and learning by drawing on worldwide knowledge, research, and experience. *ICT as a Change Agent for Education*. India: Department of Education, University of Kashmir, 1-13.
10. Olaore, I. B. (2016). The impacts (positive and negative) of ICT on education in Nigeria. *Developing Country Studies*, 4(23), 154-156.
11. Player-Koro, C. (2016). Factors influencing teachers' use of ICT in education. *Education Inquiry*, 3(1), 93-108.

## Impact of ICT on virtual learning

---

12. Salehi, H., & Salehi, Z. (2017). Challenges for using ICT in education: teachers' insights. *International Journal of e-Education, e-Business, e-Management and e-Learning*, 2(1), 40.
13. Solar, M., Sabattin, J., & Parada, V. (2013). A maturity model for assessing the use of ICT in school education. *Journal of Educational Technology & Society*, 16(1), 206-218.
14. Talebian, S., Mohammadi, H. M., & Rezvanfar, A. (2014). Information and communication technology (ICT) in higher education: advantages, disadvantages, conveniences and limitations of applying e-learning to agricultural students in Iran. *Procedia-Social and Behavioral Sciences*, 152, 300-305.
15. Theodotou, E., & Kaitsa-Kulovana, H. (2014). Virtual Learning: Examination of ICT as Beneficial Learning Tool for Children's Social Development. Online Submission.
16. Thorsteinsson, G. (2015). Using ICT for Training Teachers in Design and Technology Education (TTDTE). *Journal of Educational Technology*, 9(3), 9-13.
17. Underwood, J., & Dillon, G. (2015). Chasing dreams and recognising realities: Teachers' responses to ICT. *Technology, Pedagogy and Education*, 20(3), 317-330.
18. Vrasidas, C. (2018). The rhetoric of reform and teachers' use of ICT. *British Journal of Educational Technology*, 46(2), 370-380.
19. Wastiau, P., Blamire, R., Kearney, C., Quittre, V., Van de Gaer, E., & Monseur, C. (2013). The Use of ICT in Education: a survey of schools in Europe. *European Journal of Education*, 48(1), 11-27.

©2020 por los autores. Este artículo es de acceso abierto y distribuido según los términos y condiciones de la licencia Creative Commons Atribución-NoComercial-CompartirIgual 4.0 Internacional (CC BY-NC-SA 4.0)

(<https://creativecommons.org/licenses/by-nc-sa/4.0/>).