


## Teacher's training practical challenges for the use of applications as pedagogical resources


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### Abstract


The Digital Era brought many changes in how society interacts and acts. As a result, the school's universe is affected as well, reconfiguring itself drastically. Teacher's and student's roles are redesigned, motivated especially by a new student cognitive profile, the unique student. In this context, the article presents a discussion about the practical challenges of teachers training for the use of media in the classroom, focusing in the compression about the pedagogic potential use of the mobile application as a pedagogical resource. For that, were analyzed qualitatively the results of a research made with Florianópolis/SC public schools' teachers. From the teacher's answers come up practical challenges for the digital technologies' integration in classroom about the application: comprehension of the pedagogical potential of the available resources and the necessary methodologies changes for its application; the lack of infrastructure investments at school; and yet the insufficient teacher training for the pedagogical technologies. As a result, are proposed possible methodologies ways to facilitate this integration, as well showing examples of the applications used as digital pedagogical resources, highlighting how important is the structural support for these changes could be made in the classroom.

**Keywords:** Educational applications. Teacher training. Digital resources.

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**Resumo****Desafios práticos na formação docente para o uso de aplicativos como recursos educacionais**

A Era Digital trouxe inúmeras mudanças na maneira como a sociedade interage e atua. Como consequência, também o universo escolar é afetado, reconfigurando-se significativamente. Papéis de professores e alunos são redesenhados, motivados especialmente por um novo perfil cognitivo dos alunos, o aluno ubíquo. Dentro deste contexto, o artigo aqui apresentado se propõe a discutir os desafios práticos da formação docente para o uso das mídias em sala de aula, tendo como pano de fundo a compreensão do potencial pedagógico do uso de aplicativos como recursos educacionais. Para isso, foram analisados qualitativamente os resultados de uma pesquisa feita com professores das redes públicas de educação básica atuantes em Florianópolis, SC. Levantou-se, a partir das respostas dos professores, desafios práticos para a integração de tecnologias digitais em sala de aula, notadamente de aplicativos: a compreensão do potencial educativo dos recursos disponíveis e as mudanças metodológicas necessárias para sua aplicação; a falta de investimentos em infraestrutura na escola; e a ainda insuficiente formação docente para uso de tecnologias educacionais. Como resultados são propostos caminhos metodológicos possíveis para facilitar essa integração, assim como a apresentação de exemplos de uso de aplicativos como recursos educacionais digitais, ressaltando-se a importância fundamental do apoio estrutural para que essas mudanças possam ser efetivadas em sala de aula.

**Palavras-chave:**

Aplicativos educacionais.  
Formação de professores.  
Recursos digitais.

**Resumen****Desafíos prácticos en la formación de profesores para el uso de aplicaciones como recursos educacionales**

La Era Digital trajo inúmeros cambios a la forma de cómo la sociedad interacciona y actúa. Como consecuencia, también el universo escolar es afectado, configurándose de una nueva manera significativa. Papeles de profesores y alumnos son rediseñados, motivados principalmente por un nuevo perfil cognitivo de los alumnos, el alumno ubicuo. En ese contexto, el presente artículo se propone a discutir los desafíos prácticos de la formación de profesores para el uso de las medias en clase, llevando como base la comprensión del potencial pedagógico de las aplicaciones como recursos educativos. Para eso, se analizó de manera cualitativa los resultados de una pesquisa hecha con profesores de la red pública de la enseñanza básica de Florianópolis/SC. A partir de las respuestas de los profesores se levantó algunos desafíos prácticos para la integración de tecnologías digitales en clase, en ese caso, las aplicaciones: la comprensión del potencial educativo de los recursos disponibles y los cambios metodológicos necesarios para su aplicación; la falta de inversión en infraestructura en las escuelas; y todavía la insuficiente formación docente para el uso de tecnologías educacionales. Como resultado se propone caminos metodológicos posibles para facilitar esa integración, así como la presentación de ejemplos de uso de aplicaciones como recursos pedagógicos digitales, resultando la importancia fundamental del apoyo estructural para que esos cambios puedan ser efectuados en clase.

**Palabras clave:**

Aplicaciones educativas.  
Formación de profesores.  
Recursos digitales.

## Introduction

The impacts generated by the advance of Information and Communication Technologies (ICT) and the extension of the internet are very intense in society, to the point of marking a new era, titled by several authors as Digital or Information Era (BANNEL *et al.*, 2016; NUNES *et al.*, 2019; PÉREZ GÓMEZ, 2015; SCHMIDT; COHEN, 2013; VEEN; VRAKING, 2009). It's entitled as Era because the transformations caused by these technologies have affected all spheres of society, developing new forms of communication and, above all, of access and information processing (PÉREZ GÓMEZ, 2015). Through digital devices, information has become omnipresent, instantaneous and abundant, capable of breaking the barriers of space and time. Human relations were reconfigured, giving rise to a new system of global and horizontal communication networks, without borders, which allowed human contact without the need for physical presence (CASTELLS, 2006).

Young people born in this Digital Era grew up in the midst of high technology, incorporated technological languages into their daily lives, watched the pace of life accelerate and were influenced by the globalized world, which is constantly changing. For this reason, their intellectual, sensory and communicative abilities have been modified, and as a consequence, they have developed a cognitive profile with new skills and competences (PRENSKY, 2009; BELLONI; GOMES, 2008; KENSKI, 2008; SANTAELLA, 2013; PÉREZ GÓMEZ, 2015).

In addition, the presence of the internet has provided new spaces for cultural and intellectual expression, allowing young people more autonomy to access, produce and share their own content (VEEN; VRAKING, 2009). If before most of the information was monopolized by the media and public institutions, with access to the internet these young people now have more opportunities to stop being mere recipients and / or consumers and also become producers of knowledge, which was intensified by application development, "[...] *small computer programs that can be downloaded and installed on smart phones and tablets, and that allow users to perform different tasks*" (VÁZQUEZ-CANO, 2019, p. 140), accessing quickly and direct media with different resources.

This new scenario interferes with the traditional hierarchical structure of teaching in the school, which, for many centuries, has been tied to a rigid position system, in which the teacher assumes a higher role than the student as a transmitter of knowledge, while the student receives knowledge passively. In this current scenario, teachers find themselves in a new didactic configuration, in which, in many cases, it is their students who master and appropriate digital technologies, using them in a more effective, natural and internalized way (BELLONI; GOMES, 2008). Then there is the need to rethink the roles of teacher-student and to adapt teaching methodologies to the context of the digital student, used to the dynamic, creative and collaborative environment of the internet.

In this context, if we consider Roger's (2003) concept of innovation, the use of mobile devices (smartphones, tablets, netbooks) and their applications to learn may not necessarily be something innovative for students, since, for it occurs, it is necessary that individuals perceive it as something new (ROGERS, 2003; GUNTER; BRAGA, 2018). However, Pérez Gómez (2015) points out that, although young people are considered "digital experts", their expertise is limited to technical handling, how to use these tools, and not to curating the information received through these technologies.

So, when we look through the schools and teacher's perspective, within a formal teaching context, the use of mobile devices gains a potential for innovation, considering that those technologies, when integrated and combined with a pedagogical objective, are capable of promoting new learning experiences, in which students can effectively take an active role. Martines et al. (2018, p. 3) explain that:

[...] the use of these technologies alone does not represent a pedagogical change, if it is used only as a technological support to illustrate the class, what is necessary is that it be used as a learning mediation. Simple access to technology, in itself, is not the most important aspect, but the creation of new learning environments and new social dynamics. Technology enriches the class, but it cannot be placed ahead of the content.

It is a fact that this integration of technologies and pedagogical practices effectively implies many challenges for teachers and, without a doubt, it is an important point to be discussed, as it helps to understand the limitations, difficulties and new demands of the context school.

## Methodology

This text consists of reflections about a research carried out with teachers of basic education in the municipal and state of Florianópolis, whose general objective was to investigate the potential of integrating educational applications in schools and the practical challenges that this brings to the school context. The study was developed during a training course<sup>1</sup> offered at the Federal University of Santa Catarina (UFSC), which had as main objective to present and reflect on "educational applications as digital technological resources in the classroom", based on five themes: some more theoretical, of reflection and debate on the Digital Age, mobile learning, APP identity and gamification, and other more practical ones, such as the presentation of applications and their possible uses as didactic resources in the classroom.

In addition to the initial diagnostic research on teachers' knowledge of educational technology, all participants answered an online and anonymous questionnaire in the Google Forms tool, prepared with open-ended questions on the topic, so that we could understand what teachers knew on the topic, what they considered as a major obstacle to its use in the classroom and what advantages they sought to find in its application. The extracted data were analyzed qualitatively; therefore, the methodology used for the development of this work was qualitative research.

Thus, the article presented here aims to discuss the teacher's point of view regarding the use of media and its integration into the classroom, having as a background the understanding of the pedagogical potential of the use of educational applications. For this study, the main challenges to the integration of ICTs in the teaching-learning process were defined: the (re)acknowledgement of the educational potential of the available resources; the lack of investments in adequate infrastructure; insufficient teacher training - extremely important for the development of skills, strategies and experiences, which also depends on the lucid and critical commitment on the part of these professionals (CRUZ, 2018; DUARTE; MILLIET; MIGLIORA, 2019); and, finally, the applied methodologies, which sometimes distance themselves from the reality and aspirations of the school community.

### **Teachers facing digital technologies**

As mentioned before, teachers and students have taken on new roles in the digital age, and it is already common in educational literature that teachers have moved from being the sole holder of knowledge to being individuals who, when interacting in their teaching task, are also learning with students and the context in which they are inserted. In this perspective, with the interaction between teachers and students, the teaching-learning process resignifies itself as a two-way street, in which “[...] those who teach learn from teaching and those who learn teach from learning” - in the important thought of Freire (2011, p. 12) - , and no longer with the unidirectional transmission of knowledge and content.

When we talk about digital technologies, it is often the students who master the technological tools. Thus, teachers who, in their praxis, are focused on teaching of a more conservative character, on the one hand, feel secure in their practices, to which they are quite accustomed, but, on the other hand, feel uncomfortable and, somehow, intimidated by the use of digital resources in their classes, since most of the students have a technological domain equal to or greater than theirs, as they were born and grew up together with digital technology, as mentioned by Gardner and Davis (2014).

These anxieties that many teachers go through are partly due to the widespread belief that, to bring some resource to the classroom, it is necessary to completely master it, to know all its functions and commands. Thus, when they do not feel confident and have that technical knowledge, teachers discard the possibility of using it, due to the insecurity of not knowing how to master a technique or that their students master it better, perceiving a complexity, in terms Rogers (2003), which needs to be supplanted. This belief is overcome as soon as there is a vision that the classroom should become a learning community, as mentioned by Bannel et al. (2016), with the teacher in a position of mediator in the relationship between students and content, in a system in which individuals influence each other within the teaching-learning process and walk together, exchanging different knowledge. In this conception, if students master certain

technologies, they are the mediators and disseminators of these techniques in the classroom, while teachers participate in the development of other types of skills.

In addition to the insecurity related directly to the personal mastery of technologies, class control when using devices was another issue related to the use of technology that teachers raised during classroom research. We understand that this factor may explain, at least in part, the lack of use of digital resources in class by some teachers, considering that they still assume that mobile devices are a source of distraction for students. Thus, it is noted that it is not just about inserting the device in the room; there is a whole context behind, which requires planning, in order for activities to work and the use of mobile technologies to become an enhancing element of learning.

Karsenti and Fiévez (2014) call attention to the maintenance of the classroom, citing some strategies that could be effective if combined with the teacher's practice and experience. Therefore, teachers have to use their subjective judgments to find the balance between the rules imposed, their own goals and the reality of the class. The authors cite some strategies for the use of mobile devices in the classroom, highlighting the main one, which, when properly applied, can bring positive results in this practice: keeping students engaged in learning. Karsenti and Fiévez (2014) remind us that, in part, this engagement is related to class time, to its pace; in the opinion of the authors, if the transition between activities takes a very long time, it opens up space for students to use the devices for other purposes and to escape the objective of the class. On the other hand, if there is a well-planned didactic sequence of activities, with significant proposals for students and in a number consistent with class time, the concern with 'losing control of the class' is mitigated, since students will be actively carrying out what was asked of them.

Thus, one of the key points for the success or not of using mobile devices is also a significant pedagogical issue in the planning of classes without the use of digital educational resources; the key is in the didactic sequence elaborated by the teacher and in the pace given to the activities, which must be consistent with the degree of difficulty of each one, so that the students have enough time to do them and are not idle in the classroom.

When the topic is the integration of media, another criterion that defines future teaching practices refers to the interest of teachers regarding their use in the classroom. When the teacher understands and assumes the precepts of a reflective teacher (SCHON, 2000), he tends to constantly analyze his practices, so that in the future they can be improved. In the same way, the reflective teacher, in the face of technological changes, when analyzing how these tools are interfering daily life and the students' daily lives, already creates an automatic interest in knowing these resources and, who knows, adding them to their future practices, considering that the teacher who does not reflect is the one who guides his practice through routine (DORIGON; ROMANOWSKI, 2008).



In order to deepen this discussion, the data extracted from a survey conducted with primary school teachers from the municipal and state education network of Florianópolis, SC, will be analyzed below, which, upon completion of a training course with the theme 'Technological resources in class' answered a questionnaire with open questions related to their teaching practice. These qualitative results were extracted and analyzed in an interpretative way, based on theorists who research on the topic.

If a part of the teachers is intimidated by the technologies and stops using them, another part is interested in integrating them in their practices, rethinking their methodologies based on the potential of digital artifacts. In addition, the participants showed great concern with the issues of handling the artifacts and willingness to learn about new resources that can improve their professional practices. This became clear in the teachers' responses to the question 'What were your goals when choosing the course?'. Most of the participants replied that it consisted of knowing, learning and improving, as well as producing knowledge about digital resources that could contribute to their pedagogical practice, in order to boost, enhance and differentiate their teaching. With that, they showed that they are interested in integrating pedagogically into this new digital world, in understanding a little of what and how their students are consuming digitally and in arousing the interest of their students by taking these digital pedagogical resources to their classes.

The same unanimity was found when all the participants affirmed their preference for the practical part of presentation and knowledge of the applications among all the suggested themes. This trend had already appeared, also, in the research by Karsenti and Fiévez (2014), in which the researchers asked the teachers the type of training they would like to participate in, and the main themes mentioned were the technical-pedagogical training and additional resources. (new programs, time, technical support, list of applications, etc.).

From these answers, it was possible to verify that, out of necessity, curiosity and willingness to learn the most practical and technical part of the educational resources, perhaps the teachers are putting aside a little bit of criticism when using technologies. Although it is necessary for teachers to know how to handle them, it is equally important that they do it critically, as the teacher plays a mediating role and, therefore, not only “[...] ensures the democratization of access to technical means of communication, but it stimulates, gives conditions, prepares the new generations for the active and critical appropriation of these new technologies” (BELLONI, 1998, p. 15).

### **Pedagogical potential of digital educational resources**

We believe that ICTs can be tools that enhance learning, as they allow environments for interactivity and collaboration in which students can participate in a creative and active way, which allows them to have more autonomy in their learning process. In addition, Suárez, Grané and Tarragó (2019) comment that the

digital devices that we currently have access to have features that add new properties related to the digital language (interactivity, hypertextuality, multimedia, etc.), or were developed specifically for the medium digital and therefore cannot be enjoyed in physical environments (videogame, virtual world, virtual reality, augmented reality), providing potentialities not reached by printed materials, in addition to developing new skills and competences, which are part of cyberculture.

During the training course, some tools that we believe have potential application in formal education were presented to teachers, since they allow the expression of personal creativity and the production of content. We understand that, when preparing their activities, the teacher can use some digital resources that meet their pedagogical objective and are relevant to their students, in order to meet their needs and enhance their skills and abilities.

Gardner and Davis (2014) classify educational applications into two categories: App-dependent and App-enabling. This division occurs because, for the authors, App-dependent applications limit and determine the choices, acts and objectives of users, in addition to inducing the achievement of traditional educational objectives through digital means. App-trainers are those that allow and stimulate the search for new possibilities, imagination, creation, publication, production and combination. However, even though an application may be considered App-dependent for its software development characteristics, it can become an App-enabler if its use as a pedagogical digital resource encourages creativity, sharing and autonomy. Likewise, if an application considered an app-enabler is used in a way to mask a modernization of traditional classes, it also becomes an app-dependent.

In this sense, knowing the potential of the tools is essential so that one can think about their adequacy to the proposals and the pedagogical objectives, in order to facilitate and enhance the teaching-learning process. With regard to applications, it is possible to find programs that use reading, audio, images, videos or interactive activities in different combinations, which enrich the learning experience. For this reason, some of these possibilities were presented to teachers, analyzed and applied throughout the course:

- a) *Padlet*: is an application that works as a 'blank sheet of paper', allowing the posting of different multimedia content (photos, videos, documents, texts, etc.). It is a powerful tool for group work, since these contents can be shared and changed by several people at the same time. Thus, students can collaborate and share their ideas collectively. Another interesting factor is that, with this tool, the teacher can monitor students' work via the internet. Add to that the possibility of working in an out-of-school environment;
- b) *Goconqr*: social platform / network that promotes an online and free learning environment, in which students and teachers create and share study material prepared with digital tools (mind maps, flashcards, simulations, slides and notes). You can participate in study groups and discussions, post comments and create polls. The app can be used online or offline. Its



differential is the possibility of bringing together, in a single space, all the study tools necessary to facilitate the student's life, in addition to encouraging group work;

- c) *Thinglink*: application that allows the creation of engaging and interactive learning materials. Students and teachers can incorporate multimedia content into images, creating sequences that integrate maps and graphs with annotations, videos and recordings, a story told in marked images and 360° presentations. Interactive images can be shared and embedded on the web;
- d) *Anchor*: an application that allows the creation of podcasts. Currently, the creation of digital content is not limited only to visual media, but also allows the creation of audio content, such as podcasts, which are gaining notoriety for being an easy to consume content and presents the most varied themes. They're like radio programs available on the internet and can be listened to via streaming services, anytime and anywhere. Through the Anchor app, students and teachers can become content creators, with the production of the podcast itself. In this application, in addition to audio recording, it is also possible to edit, add sound effects, and, finally, publish content on streaming platforms or keep it private, with access restricted to authorized persons only. Thinking from an educational perspective, the creation of a podcast goes beyond audio recording, as it requires a recording script, with prior research on the topic to be addressed; in addition, joint work is also constantly requested, as the app allows the recording of more than one participant, thus allowing a possible discussion.

Other tools that can be explored in education are those that present virtual reality (VR) or augmented reality (AR). The latter designates the integration between elements or virtual information and visualizations of the real world through a camera, using motion sensors such as gyroscope and accelerometer. Virtual reality, on the other hand, is an interface technology between the user and the operating system through 3D graphic resources or 360° images, whose objective is to create a sense of presence in a virtual environment different from the real one. According to García, Ortega and Zednik (2017, p. 47), these two technologies have “[...] potential for creative and stimulating educational activities, as they allow the content to be displayed in a more attractive way, making students experience unique experiences”.

Aurasma is one of the most popular AR apps today. From this application, students can create and share their own augmented reality projects. With a mobile device, it is possible to incorporate an image, objects and physical locations into interactive digital content, such as video, animation and 3D. Another AR tool is Wallme, an application that also allows students to hide and share messages in the real world using augmented reality. Just take a picture of a wall, add photos or freehand drawings in the app and then share them with other individuals who are present in the same physical space. There are countless

possibilities for creating activities with these tools, depending on the intention of the teacher and the purpose of the activity. However, it is possible to use them in work exhibitions, out-of-school tours, such as museums, fairs, symposia, etc.

Google Expeditions is an RV and/or AR tool that allows the user to explore 3D objects and live immersive experiences, such as historical and scientific tours in museums, virtual visits to new and old buildings, art galleries and natural paradises. RV mode can be used with a Daydream or Google Cardboard display. However, it is a tool limited to the 800 tours that the app offers, with no possibility for the user to create their own augmented reality.

These VR and AR tools, because they enable audiovisual stimuli and interaction, bring abstract concepts to the student's reality that are difficult to understand. In this way, they can facilitate teaching in the areas of science where students deal with more complex concepts. However, we know that harnessing the potentials of ICTs and using them effectively poses many challenges for the school context. For this to be possible, critical reflection and the practical and theoretical study of these tools are necessary, which are made possible through quality teacher training. Add to this the need for a good school infrastructure, which allows the teacher to work with these technologies.

### **The obstacles for the development of activities with digital applications**

Given this scenario, there are two important points that lead us to question and understand the current school situation in the face of digital technologies and the use of applications in the classroom: teacher's training and school infrastructure.

#### *The teacher's training*

In times of great transformations and new ways of learning, it is essential that the teacher has opportunities to critically reflect on his pedagogical practice and that he seeks to adapt it to the context in which he is inserted, in order to promote more effective learning conditions. Reflecting on one's own practice requires the teacher to have a continuous process of training and learning, through which he constantly transforms and (re) creates his practice, in order to meet the demands of the community with which he is involved. In this perspective, the teacher, aware of the potential that digital devices can bring to the field of education, needs to become familiar with cyberculture and incorporate it into his classroom, with the aim of bringing pedagogical content closer to the reality of his students.

As noted in the teachers' speech, many teachers know the importance of integrating new technologies in the classroom and are interested in exploring them, but fail to apply them due to lack of skills or difficulties in handling them. This fact was noticed at the end of the activity, when the teachers were asked about possible improvements to the course offered; the majority stated that "there was not

enough time to learn the application practice". Although the course did not focus on the manipulation of tools, but on the creation of pedagogical content with mobile devices, there was a need for a workshop focused on the practice of using applications. On the other hand, it was observed that some of the teachers knew how to manipulate and even used technological resources in their daily lives, outside of school, but did not incorporate them in their teaching practice, because they did not see a pedagogical objective or because they did not relate them to an activity to be explored. This fact shows the need for an initial and continuous training aimed at teachers that not only enables them to manipulate and learn the techniques and languages of these new technologies, but above all that makes them go further, so that they become able to transform the space school, to modify and innovate the teaching-learning process through these technologies, to promote new experiences and learning (MORAN, 2005).

The answers raised by our study are also present in investigations by other researchers. In a study by Karsenti and Fiévez (2014) in Montreal, Canada, where schools adopted tablets as a teaching resource, teachers and students answered several questions about this experience, pointing out its positive and negative points. One of the negative aspects mentioned by the teachers was the technical problems that occurred in the classroom. Based on this demand, they were offered pedagogical and technical training on the use of mobile devices, the results of which showed a significant decrease in problems. Another question asked by researchers to teachers referred to how to improve the use of tablets in the classroom, and here, again, the need for training was the most recurring answer. In addition to this, another research, carried out by Elliot, Livengood and Mcglamery (2012), also concluded that the lack of pedagogical and technical training in the use of these tools is the frequent and real cause of the problems experienced by teachers.

In addition to the more instrumental training mentioned above, pedagogical training is essential so that these resources can be used in a meaningful way, and not superficial, since it is the epistemological conception of learning that determines the technological choice, and not the other way around (KARSENTI, 2004). Thus, training must go beyond the appropriation or insertion of technological resources in the classroom; it should provide the teacher with a critical view on the importance of new technologies for the cultural and cognitive development of their students, as well as on the need to integrate them in their pedagogical practices. In addition, it must provide conditions for teachers to stimulate and enable collective learning, autonomy and creativity of their students, in order to place them as subjects of the learning process.

For Mercado (2002, p. 18), it is up to the teacher

[...]the role of being engaged in the process, aware not only of the real capabilities of the technologies, of their potential and of their limitations so that they can select which is the best use to be explored in a given content, contributing to the improvement of the teaching-learning process, through a renewal of the teacher's pedagogical practice and the transformation of the student into an active subject in the construction of knowledge,

leading them, through the appropriation of this new language to insert themselves in contemporary times.

However, for it to be truly effective, it is essential that the training establishes a dialogue between theory and pedagogical practice. This means taking into account the real situations of teachers and students, the experiences they have in the classroom and the difficulties they face. According to Pimenta (2008), what leads to the failure of teacher preparation courses is the emphasis on updating pedagogical content or developing a formal curriculum without considering the social reality in which the subjects are inserted. Bandeira (2006) also points out that, currently, one of the main problems of education is the lack of training courses, because, on the one hand, schools ignore the school context and, on the other, there is excessive academicism, which distances itself from the real school. As a result, there is a discrepancy between an exacerbated academicism and a traditional empiricism.

With regard to courses aimed at the insertion of technologies in the classroom, Kenski (2003) warns of the fact that these are generally of short duration and are limited to technical learning, focusing on the manipulation of machines and programs. In other words, the concern is restricted to knowing how to apply tools, but there is no deepening of the discussion on how to apply them within the teaching methodology, structured from an epistemological conception of learning. It is clear that mastering the tools is of utmost importance so that the teacher can feel comfortable using them in the classroom and, certainly, is the first step towards a significant change in teaching. However, without the existence of a pedagogical objective, the teacher will reproduce the same procedures that he is used to in the classroom, in activities that will not bring effective changes to the learning process (KENSKI, 2003). In this context, these tools, instead of enhancing teaching, become merely supporting, just the means by which teachers teach their content, that is, they are new technologies with old methodologies, just what you want to avoid. What is expected with digital literacy is the development of digital competence, so that technologies are not only means of transposing paper for the text editor, but instruments for transforming the ways of learning, with which the student be encouraged to develop creativity and autonomy to seek new information, and the teacher knows how to enhance the teaching-learning process.

The simple operation of the machines, then, is insufficient for the pedagogical process, after all, if we consider the mobile devices and their applications, they are used daily by these same subjects, which would presuppose a direct transposition to the pedagogical environment, which, in fact, it does not happen. For this reason, the importance of training that starts from the beginning of the teaching career, in undergraduate and pedagogy courses, and extends through a permanent and continuous qualification process for integration. This training needs to happen in an interactive way, integrated into the school routine, based on the exchange of experiences carried out by schools and universities, so that it is possible to create, progressively, a new culture of teacher training (NÓVOA, 1992, p. 16), based on methodological

paradigms that already include the complexity of digital educational resources and their potential. For Nóvoa (1992, p. 18), this formation can

[...]bring innovative experiences to students, stimulate the professional development of teachers and value training paradigms that promote the preparation of reflective teachers, who take responsibility for their own professional development and who participate as protagonists in the implementation of educational policies.

It is important to note that training courses alone will not be enough for the teacher to be able to modify and improve his practice. For this, the teacher must be willing to overcome his prejudices and difficulties with digital technologies, as well as aware that his profession requires constant training and learning. Instead of replacing his work with machines, he must combine them with his work, in order to give his students new experiences and learning conditions.

With regard to studies on teacher training for the use of mobile devices, scholars point out that they are still in very early stages, although there is already a consistent repertoire from the perspective of use in the classroom. As Gunter and Braga (2018) point out,

If, on the one hand, growth can be seen in studies geared toward the potential of mobile learning in several classroom contexts, studies from the perspective of teacher education are still at an early stage. Studies by Crompton (2013) and Hwang and Tsai (2010), among other works in the area, indicate that the role of mobile learning in teacher training and practice needs to be better investigated, as results could underpin new initiatives, whether through individual or institutional projects, as well as for more comprehensive future initiatives involving the allocation of public or private funds.

We echo, therefore, the need to give more voice to the teacher in studies regarding the use of mobile devices, especially that of applications, highlighting his perspective on the challenges of integrating digital educational resources into the school context.

### Infrastructure

Although the 21st century is marked by globalization and the strong presence of technology in society, the democratization of access to ICTs in countries where there are great socioeconomic disparities is not yet a reality. Even though in recent years there has been a constant increase in the availability, access and use of digital technologies in developing countries (UNESCO, 2017), infrastructure conditions in Brazilian public schools are, in general, precarious and lack quality technical equipment.

Taking into account the use of applications through mobile devices, the possible way out for its use to become effective would be the donation of the BYOD system (Bring Your Own Device), as research done by the Regional Study Center for the Development of the Information Society (Cetic.br) in 2019 point out that the presence of wireless connection is quite common in teaching environments. In this way, each student would be responsible for bringing his own device, which, connected to the wireless internet network, could enable him to develop several activities predetermined by the teacher.

However, other obstacles arise, such as the fact that the internet network does not have a very high speed and, therefore, does not support a large number of connected devices at the same time. In addition, even if students are able to purchase a mobile device, the network is still, for the most part, restricted to students, which limits the use of these devices as possible teaching resources. As research by Cetic.br (TIC EDUCAÇÃO, 2019) on the restriction of connection in urban schools demonstrates, only 8% of educational establishments allow free use of the network by all, including students, while 30% allow use by password, also by everyone. In contrast, 53% of establishments have a password network, but their use is denied to students; and finally, 8% don't even have wi-fi.

This reveals the country's social inequality, as many children are denied the right of access to ICTs, and as a result, this “[...] hinders or even prevents the development of new cognitive and psychosocial processes, accumulating cognitive delays and socio-affective that will become, in adolescence, almost insurmountable obstacles for any learning” (BELLONI, 2008, p. 739). Not only are students affected by this scenario, but so are teachers, because, by not integrating technologies in their classes, they limit teaching experiences and opportunities. In addition, the teacher lives in a paradox: on the one hand, he is constantly pressured to use ICTs in his pedagogical practice, in order to make teaching more attractive to the student, but on the other, the school does not offer him the conditions to work with these technologies, nor the form for that.

During the research carried out, it was possible to notice, in the speech of some teachers, the lack of motivation to work with new technologies in the classroom, due to the lack of structure in the school network. Some of the complaints referred to the poor quality of the internet, the existence of obsolete equipment and the insufficient number of computers per student. Some teachers presented creative and empowering ideas to work with their students in the classroom, but were prevented from applying them due to the lack of subsidies necessary to carry out the activities, most of them related to school infrastructure.

Although we know that only digital educational resources are not sufficient to cause significant changes in the pedagogical process nor guarantee quality education, “[...] with access to networks, educational possibilities are multiplied, the spaces of schools are expanded for communicate, disseminate and offer information, services and activities carried out at the entire institution by its teachers, students and employees” (KENSKI, 2003, p. 17). Moran (2005, p. 11-12) also states that the school must be constituted as a space in which multiple ways of learning occur:

[...] a space to inform, research and disseminate learning activities. In addition to the chalkboard and chalk, the room needs to be comfortable, with good acoustics and technologies, from simple to sophisticated. At the same time, you need easy access to video, DVD, multimedia projector and, at least, an Internet point, to access websites in real time by the teacher or students, when necessary.



For Belloni (2008), it is the school's role to promote digital inclusion policies to offer opportunities to all, in order to compensate for the existing inequalities in Brazilian society. The author also affirms the importance of collective projects in computational environments, because, in addition to developing cooperation and collaboration, they enable innovative experiences, different from those that students usually experience in a conventional teaching situation.

## Final considerations

The challenges of the formal education system go beyond the integration and use of technologies. It is necessary that the entire school system, as well as State investments, value the importance of teacher training for the use of media in the classroom, considering the need to review methodologies, without the fact that teachers use skillfully applications in your daily life assume a direct transposition of this expertise to the educational context, in addition to guaranteeing the necessary inputs for the success of the activities. It is important to be clear that the Digital Era (BANNEL et al., 2016; NUNES et al., 2019; PÉREZ GÓMEZ, 2015; SCHMIDT; COHEN, 2013; VEEN; VRAKKING, 2009) has arrived not only for students but also for everyone who, directly or indirectly, uses digital mobile devices in their daily activities. Thus, investments in training and infrastructure are crucial points for the insertion of ICTs in the teaching-learning process, but effective teacher training is a matter of first order when integrating digital technologies into schools.

Thus, awareness of the new scenario in which we live, combined with the possibilities that educational applications can bring to the teaching-learning process, together with digital literacy, could prepare teachers more fully, giving them security during the integration of these technologies. Knowing the potential of different digital resources is essential to develop strategies, but the security brought by training and knowledge allows the teacher to rethink his methodologies, exploring other skills with his students and making the critical and creative use of these new tools, thus forming citizens who understand and dominate the information they consume autonomously.

In this sense, the approach to applications as pedagogical resources appears as a good ally of the teacher, who uses them with means that interest students, in an understandable and thought-provoking language. The applications are attractive to young people, who realize the different possibilities of creating content in audio, video or text, among other supports, and feel motivated to explore them, even when they do not know how they work. The proposed activities, if properly integrated with the objectives and planning of the discipline, may have significant effects on the learning process.

It is worth mentioning that, in the whole process of integrating digital technologies at school, it is extremely important to take into account the context in which students are inserted. Working with social reality and, in addition, exploring the new, showing different paths to travel, adds meaning to the learning

process, making it more productive and relevant. This is done through planning with well-defined objectives and, of course, the union of an adequate infrastructure with continuously trained teachers.

Finally, as in cyber space, it is necessary for students to face a dynamic environment, in which they can work in an active and collaborative way in the elaboration of strategies and problem solving. Thus, in their mediating position, the teacher needs to value and stimulate the skills and competences developed by the ubiquitous student, so that he can thus provide him with creative and meaningful activities, as well as promoting innovative experiences.

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## Notas

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