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The use of educational technologies: perceptions of the second-year students of the technical course in environmental studies at IFES campus Ibatiba

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ABSTRACT

The use of digital information and communication technologies (DICTs) in education is a reality that is increasingly present in different spaces, where teaching and learning processes take place. OBJECTIVE: This research aimed to evaluate a structured pedagogical intervention in the application of DICTs as a stimulus to the creation of an autonomous culture of learning with the students of the 2nd year of the technical course in the Environmental Studies. METHODS: This is a pedagogical intervention research, carried out in 2020 with 74 students from integrated high school. It was developed from a problem situation verified in the classroom daily in the discipline of Sanitation and Public Health and in the students' experience. Based on Paulo Freire's understanding of education and learning, it was proposed that groups related to the search for diseases related to the lack of basic sanitation, having as common information: disease definitions, statistical data on prevalence, morbidity, disease cycle and prophylaxis. The data of the groups were presented using a DICTs: blog, podcast, comics, static and dynamic infographics and videos. After the activity, students performed an assessment of the intervention using Google Forms. RESULTS: There was ample approval from the students regarding the proposed activity, with only 14.3% being indifferent to the process. The learning built during the development of the pedagogical intervention, as pointed out by most participants, especially with regard to involvement in the activity, and the use of DICTs contributes to the development of students, particularly in relation to the way of studying the contents to work in groups and to develop work independently, using digital technologies, which many of them had no knowledge of. CONCLUSION: The use of DICTs in the school environment are important allies in the search for more autonomous teaching and learning mechanisms, in which students are protagonists of their learning, assuming a unique role of criticality, creativity, collaboration and enthusiasm / motivation to carrying out pedagogical activities. The application of DICTs has a gigantic space in the classroom environment, which still deserves to be occupied, even if gradually, with caution and with a paradigm shift, especially with regard to its form of use and its way of presentation for students and teachers. However, the importance of teacher mediation in the use of these DICTs should not be neglected.

KEYWORDS: Pedagogical intervention. Digital Information and Communication Technology. Educational technologies.

INTRODUCTION

The teaching and learning process is hugely important for the development of any individual, especially when they seek in school the facilitating mechanism for the production of their knowledge and their educational development, notably in the classroom, where a series of changes occur in the student's life. In this transformative space, students are faced with different realities, whether in the way each classmate learns or through the mechanisms and teaching tools used by each teacher (BATISTA; ASSIS, 2019).

The learning mechanisms and processes that occur inside the school, for a long time, have been the object of study by several researchers. There is always a scientific, social, and cultural appeal regarding the way of teaching and the best way for students to learn (OLIVEIRA; SILVA, 2019). There are countless works, papers, and research projects, among others, that have been focusing on making the classroom, increasingly, a space for the production of knowledge, with equity, attractiveness, and motivation for all people involved, as well as making it a space that manages to work with the technologies that currently exist.

The need for a classroom that is modified from its traditional form is a need raised not only by researchers and teachers but also by the students. There are several reports of students who are not attracted to school, either for the subject and/or the content that has been taught and/or the way the contents are worked in the classroom (Reports of the authors' experience in the classroom). Are the educational methodologies used at the time when our parents were in the classroom still attractive for a group of students who were born after the internet and the “explosion” of mobile devices? Are our students motivated to learn content and/or listen to information that they would have access to from a simple internet search? Why not make use of the many technological tools available to help us in the classroom? Would the use of social networks, mobile devices, and the internet in the classroom not make the content more attractive to students? These are questions that promote critical thinking, especially a self-assessment of each teacher's teaching practice and what they do in the classroom.

In this context, it is observed, more and more, the need for students to have greater autonomy and become protagonists of the teaching and learning process so that the teacher will be no longer the center of the classroom, the holder of the content, the source of all knowledge, and starts to occupy a function of orientation and conduction of the process, giving the direction, “trimming the edges”, promoting a less traditional education and making use of several tools as they are called the “Active Methodologies” (SILVA; BIEGING; BUSERELLO, 2017). In this process, in addition to providing greater autonomy to students and using new methodologies, the teacher can count on a powerful tool, technological resources. In this case, Digital Information and Communication Technologies (DICTs).

With all the evolution of the use of technology in various sectors of society, the need to also promote contact with this technology in the classroom becomes ever greater, in order to prepare people for the reality that awaits them out of school or at the next educational institution where he will study.

The teacher's work, as an agent of transformation through education and the teaching and learning process, brings repercussions on the life of any human being who has spent some years of their life in a school. However, over time, the

methods used by teachers have proven to be traditional and, many times, limited in relation to what resources and methodologies are available in the educational area and in other areas of knowledge.

This is a reality when you talk to a student or when you allow them to evaluate the teaching methods used by the teacher (THÜRLER; ZUCCO, 2019). The student refers to traditional ways of explaining the contents, as well as the use of only traditional resources such as blackboard and brush. According to Cruz, Porto, Alves (2018), there is a great need for teachers to search for knowledge, especially in their updating about the technologies that are available for use in the classroom.

According to Freire (1996), “there is no teaching without research or research without teaching”, which means that it is necessary that the teacher is always researching, rethinking, and reinventing themselves in their practices in the classroom. Carneiro, Garcia, Barbosa (2020, p. 53) emphasize that "technological evolution plays a fundamental role in educational development, providing mechanisms for the evolution of the teaching and learning process in order to meet social demands", therefore, the transformation of the classroom is no longer a choice, it is a necessity. It is essential to use new techniques and technologies so that students can feel more attracted to teaching and so that an individual can be prepared to meet the demands of what is happening outside the school.

Despite the advances related to the infrastructure of computational technologies happening in schools, it is necessary to emphasize that there is a need to promote teacher training. In addition, it is important to implement policies aimed at the job and career plan of this professional, who needs to have more planning time to make use of these technologies (CUNHA; CUNHA, 2019). Thus, its use is likely to be implemented in a harmonious and successful way in the school environment, especially in the classroom and in the daily lives of students.

In this case, the application of educational technologies is more emphasized, in view of the training of the technical level professionals who are being formed, meeting not only the necessary requirements for the approval of a student who graduated from high school but of a professional prepared to meet the demand of the world of work in constant technological evolution.

In that regard, this research aimed to evaluate a structured pedagogical intervention in the application of Digital Information and Communication Technologies (DICTs) as a stimulus for creating an autonomous learning culture with the students of the 2nd year of the technical course in Environmental Studies.

METHODOLOGY

This pedagogical intervention was carried out, in the first semester of 2020, at the Federal Institute of Espírito Santo IFES - Campus Ibatiba, with classes A and B of the 2nd year of the Technical Course in Environmental Studies, integrated into High School.

The choice of classes was due to the fact that the teacher responsible for the proposal was working throughout the year. In addition, the classes have, in their list of subjects, the technical core subject called Sanitation and Public Health, and since 2017 it has been the responsibility of the same teacher, which provides a

better basis for carrying out the evaluation of the intervention. These classes have a number of 36 (class A) and 38 (class B) regularly enrolled students.

According to Gil (2010), this research is characterized by qualitative and quantitative in terms of its approach; having applied nature and its exploratory objective. It is a pedagogical intervention, which was developed from a problem situation verified in the classroom experience.

To this end, the problem raised and worked on was the replacement of traditional methodologies of the teaching and learning process that occur in the classroom, giving greater visibility to the student and their capacity for autonomy, the study of the content, and the performance of tasks in a guided manner.

In that regard, the students were divided into groups, with a maximum of five components, who studied and presented the contents, from an informational nature, about some diseases related to the lack of sanitary conditions. Among the diseases, the following stand out: dengue, covid-19, influenza, Chagas disease, amoebiasis, hookworm, cholera, giardiasis, yellow fever, typhoid fever, malaria, and taeniasis, among others. The information requested was: the definition of the diseases, statistical data on prevalence, morbidity, disease cycle, and prophylaxis, among other information that the group deemed necessary.

In this way, the students had the autonomy to carry out their studies and prepare all the informational material. The teacher was given the role of monitoring, guiding, and performing moments of solving doubts and evaluating, the latter at the end of the delivery of activities. Thus, the work methodology is configured with the Active Methodology, in which the students are protagonists of the process, carrying out the theoretical study of the diseases, preparing all the material to be presented, building the activity in a collaborative way, and improving themselves in the use of technologies educational proposals, which they will be able to use at other opportune moments throughout their academic and professional lives (BACICH; TANZI NETO; TREVISANI, 2015).

For this work, the students searched information on specific websites, books (including the textbook adopted in the discipline), interviews, and videos, among other sources of information they found necessary. Regarding the implementation of the activity, using educational technology, research was carried out regarding its application, tutorials, as well as moments of exposition conducted by the teacher. In all these stages, the students were assisted, from a distance, by the teacher.

Considering that the intervention took place during the implementation of Non-Presential Pedagogical Activities (APNP), established within the scope of IFES by Resolution CS 01/2020, due to the Covid-19 Pandemic, all instructions, follow-ups, guidance, and delivery of the work took place remotely, using the IFES Moodle platform (INSTITUTO FEDERAL DO ESPÍRITO SANTO [IFES], 2020). For the follow-up meetings and the socialization presentation that happened in each of the classes, the web conference platform of the National Teaching and Research Network (RNP) was used.

With a view to assessing the aforementioned project with the IFES Human Research Ethics Committee (CEP/IFES), participants were presented and asked for the FREE AND CLEARED ASSENT TERM (TALE) and the FREE AND CLEARED CONSENT TERM (TCLE) to their parents/guardians. The respective documents were

registered in the form of signatures, in duplicate. After its assessment, the project was approved by the CEP through process nº 32601920.8.0000.5072 and opinion nº 4.248.069.

In the execution of the pedagogical intervention, a set of technological tools was used that can arouse in students interest in studying that content, carrying out collaborative activities, autonomy in the learning process in the implementation of the proposed activities, and envisioning new possibilities for the elaboration of other works, making use of these tools. From this perspective, the use of the following tools was proposed: The production of an informative video with characters (students), comics, an informative video with no characters, a podcast, a blog, static infographics, and dynamic infographics. In addition to these technologies, others could be suggested by the group itself.

The choice of these technologies is due to the fact that they are easily accessible to students, some are already quite present in their daily lives, such as video production and the use of platforms to host them, as is the case of YouTube. Another fact that supports the use of these technologies is their ease of handling, particularly among the various free software that can be used. Thus, each group worked with a specific technology, which provided the sharing of information between the groups in the search for learning in a more collaborative way, generating greater gains in learning, in the student's performance, and in their preparation, as a future professional.

All information related to the use of software to prepare activities was made available to the groups via Moodle. In addition, several individual consultations were carried out with the groups.

As a way of evaluating the pedagogical intervention performed, an evaluation instrument was applied to the students, a Google Forms form. In addition to this, a web conference was held with all students from both classes so that they could report their experiences and expose their work to the other students; it was a moment of socialization. The results of the evaluations are presented in the form of graphs, charts, and text.

RESULTS E DISCUSSION

Carrying out this pedagogical intervention was very useful and had great effects on the students' development, particularly with regard to the way of studying the contents, working in groups, and developing work autonomously, based on the use of digital technologies, which many of them had no knowledge at all. This corroborates Araújo, Rocha (2020, p. 3) when he says that “[...] teaching and learning no longer mean just being in a face-to-face classroom”. The practice of the intervention was also a successful experience for the conducting teacher, in view of the results that will be presented here and from the moment of socialization that occurred with both participating classes.

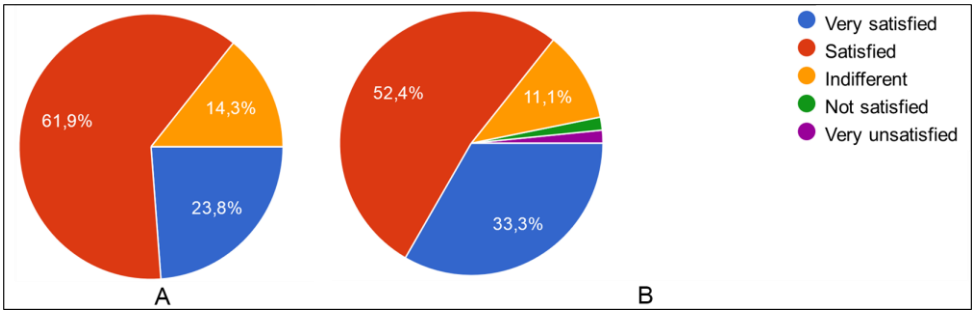
Regarding student participation, involving both classes, there was a greater participation of class B, with 59.4%. This number can be justified by the distribution of students per class, considering that class B is slightly larger than class A. Another interesting aspect is that, even during the APNPs, both classes participated in their totality (64 students, which differs from the number of students who actually

attend classes). It was also verified that most of the responses were given by female individuals, with 67.2% of participation.

When asked about their previous experience regarding the use of the technological tools studied here, 56.3% indicated that they had never had contact with such tools, while the others, although expressing that they had already had contact, this did not occur with all the technological resources addressed here. These values offer support even more so that interventions of this type are increasingly carried out, especially in subjects where students have greater difficulties in understanding the contents, in order to make the learning process more attractive.

Figure 1 illustrates the result of the participants' satisfaction with the intervention proposal itself and with the selected themes (disease related to lack of sanitation) for their group. As noted, there was broad approval from students regarding the proposed activity, with only 14.3% being indifferent. This result corroborates that other activities similar to this one are carried out. As for the chosen topic, 85.7% of the participants were satisfied. This acceptance is due to the fact that the themes are closely related to the students' daily lives, and some of them and/or acquaintances may have already been affected by some of the diseases studied.

Figure 1 - Evaluation of the intervention proposal (A) and the topic drawn for the group (B).

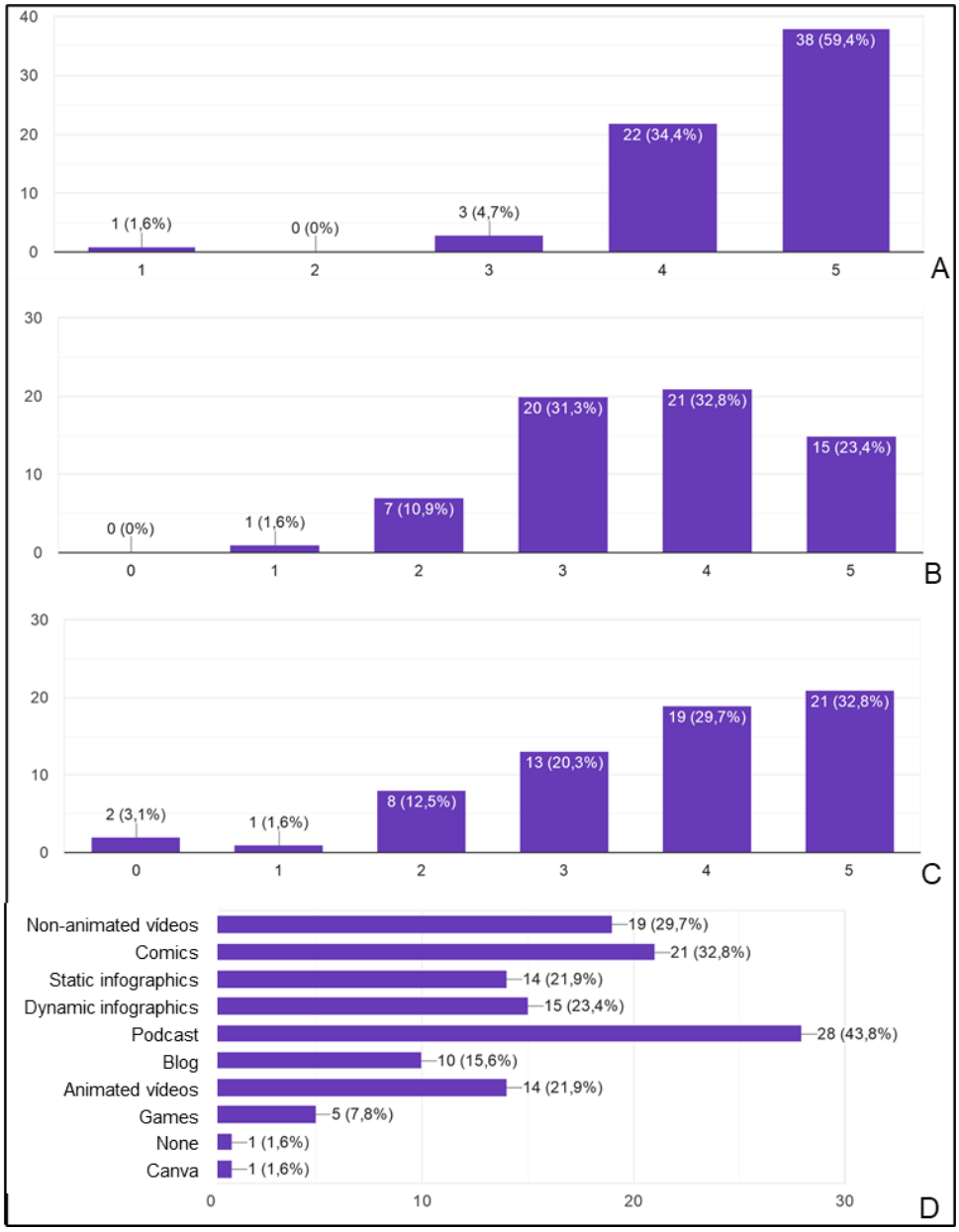


Source: Research Data (2020).

When evaluating the group's performance, 35.9% of the students indicated that, in general, the performance was very good and 57.8% classified them as good; only 6.3% indicated the evaluation as fair and poor. In any case, it is clear that for the most part, the work built collaboratively brought a successful experience for them, corroborating Aquino et al. (2020, p. 7), that the integration of DICTs into classroom practice fosters learning environments, “interdisciplinarity, the dissemination and production of knowledge, in addition to enhancing significant learning”.

Regarding to learning, Figure 2 illustrates some results from 0 or 1 to 5, ranging from “very dissatisfied with learning” (0 or 1) to “very satisfied with learning” (5).

Figure 2 – Self-assessment regarding involvement in carrying out the task (A), learning regarding the topic of work (B), learning regarding the technological tool used (C) and the tool that drew the most attention (D).



Caption: Figures A, B and C, follow the Likert scale, where 0 or 1 represents a very poor/unsatisfactory assessment and 5, a very good/satisfactory assessment.

Source: Research Data (2020).

When self-evaluating with regard to the assimilation of content about diseases, it appears that 12.5% indicate dissatisfaction with learning. This result may be related to the way in which the intervention was carried out, considering that it was carried out at a distance and during the APNPs. A similar result was verified when evaluating the learning of the technological tools used. Although, all of them drew the students' attention, especially the Podcast (43.8%), which was even reported by several people during the socialization stage of the work.

After the self-assessment, regarding the assimilation of the content about diseases, it appears that 12.5% indicate no satisfaction with learning. This result

may be related to the way an intervention was performed, considering that it happened at distance and during the remote pedagogical activities. A similar result was verified when evaluating the learning of the technological tools used. However, all of them caught the students' attention, especially the Podcast (43.8%), which was pointed out by several during the work socialization stage.

Participants' satisfaction with technological tools can be better analyzed from some reports presented in Chart 1. The categories were divided, as recommended by Bardin (2011), according to the researcher's perception and contact with the students a posteriori. From this, three categories were chosen that represented the students' opinions according to their benefits and according to the objective of the pedagogical intervention.

Chart 1 – Indication of aspects related to technological tools, which drew more attention from students.

Category	n	Freq. (%)	Answer
Diversity of tools / Simplicity of use	16	33.3	They are very simple to use
			It's simple to use and has great tools.
			They are simple to use
			The different free templates available that we can use however we like
			The variety of choice
			The diversity of tools that can be used to inform about any content.
			The program interface
			The variety of avaliable tools
			It's an easy-to-use tool, and comes with several ready-made characters and scenarios.
			Practicality
			A new source of doing a work
			The diversity of ways to present content.
			Kind of easy to use
			Different ways to complement work
			Contact with information technology and knowledge in this area
			Quality of the tools
Develops the autonomy	12	25.0	The fact that it was a less used tool and that not everyone knew how to use it and managed to learn it.
			A different type of learning than I am used to, I find it interesting to learn new ways
			This task challenged me to understand more about the tools and learn how to use them effectively and in the end be proud of having done it.
			They are tools that prioritize our learning due to the need for us to participate actively to complete the work.
			We can create the way we want, there are many options and it's all free, contributing to our knowledge

			We made a podcast and then put everything together, I thought this tool was very good, because we did a very good edition
			The designer's edition
			The group's commitment in uniting to overcome challenges
			The result with a very creative work
			The result with a very creative work
			Creativity, as the first idea did not fit the production platform, the activity forced me to be creative to redefine the story in another way
			I presented it in video format, I thought it was very good because I recorded a video and I felt like I was in the room presenting it to the other students
Facilitates the learning	10	20.8	I found that a dynamic way to learn
			The ease it brings us to studies
			The facility
			Creativity and facility
			The organization of information facilitates learning
			The ease of understanding the material, as we had to speak to make the audio, memorizing the content more in our minds
			The facility
			The way information is filtered to just the essentials
			What caught my attention was that everything can be very organized in each part of the video
			The interaction
Dificulties	7	14.6	I never thought that producing a simple video would be so much work and this led me to reflect on the great effort teachers make in wanting to bring excellent quality content to the students.
			The stress involved
			How laborious they are and how that makes us have to reinvent ourselves to use them
			I was struck by how much time is required to create a video
			Difficulty using the tools without any prior explanation
			How to speak to a camera is difficult
			How to speak to a camera is difficult
All	4	8.4	I like everything
			Everything caught my attention, because I didn't know about these tools
Nothing	1	2.1	Nothing
Total	48	100	

Source: Research Data (2020).

The most frequent categories were: Diversity of tools/Simplicity of use (33.3%), Develops autonomy (25%), and Facilitates learning (20%). Less than 15% of students reported difficulties in using the tools.

It appears that creativity is pointed out as something that draws the attention of students, in addition to active participation, the challenges proposed for performing the task, the diversity of tools they can use, freedom of creation, autonomy, and self-assessment, among others. These speeches support and further encourage the use of these tools in the search for students' autonomy, in addition to motivating them to carry out collaborative, critical, free, and creative activities, in which technology becomes a great ally, as well writes Valente (2014, p. 94), in which "There is a great interest in changing and proposing something innovative, which can solve the problem of evasion, the lack of interest of students in the class [...]". When students point out the difficulties or how difficult it is to use these tools, this suggests the idea of maturing and critical thinking, which they also managed to develop throughout the intervention.

In addition to the self-assessment and what caught their attention most about the technological tools, they were asked about the benefits that doing this activity could bring them in the future (Chart 2). The answers were divided into the categories Personal learning (34.61%), Learning technologies (42.30%), Learning content (21.15) and Scoring (5.2%). These categories illustrate each individual's self-assessment ability to get it right in their way of learning a certain content and using tools, which were previously unknown. It is observed that the vast majority present creativity and learning as the main benefit, in addition to the possibility of using applied technologies and how they can be used. The interviewees' reports, despite their young age, bring a very important commitment and maturity view, particularly with regard to preparation for the challenges that will come.

Regarding to the teacher's performance while carrying out the activities, especially in assisting the groups, 52.4% rated it as very good, 39.7% rated it as good and the others as fair and poor. It is important to highlight that, during the pedagogical intervention, several times were scheduled to resolve doubts, in addition to a weekly service and appointment, which was the standard service time for the discipline, and contact via WhatsApp, where students could ask questions to the teacher at times not scheduled in advance.

Chart 2 – Notes from students regarding the benefits of the intervention.

Category	n	Freq. (%)	Answer
Personal learning	18	34.61	I learned how to deal better with stress
			In the form of creativity, because with these new methods presented there is a greater possibility on elaborating of works
			The activity showed me that there are very practical and fun ways to do work
			New experience
			In the exercise of creativity, leaving the ordinary, memorizing the content in different ways
			It's always good to know a little about any subject
			An understanding of new ways of working
			This activity contributed a lot to adapting to new ways of working, which with the fast development of technology today, will be something increasingly necessary both academically and professionally.

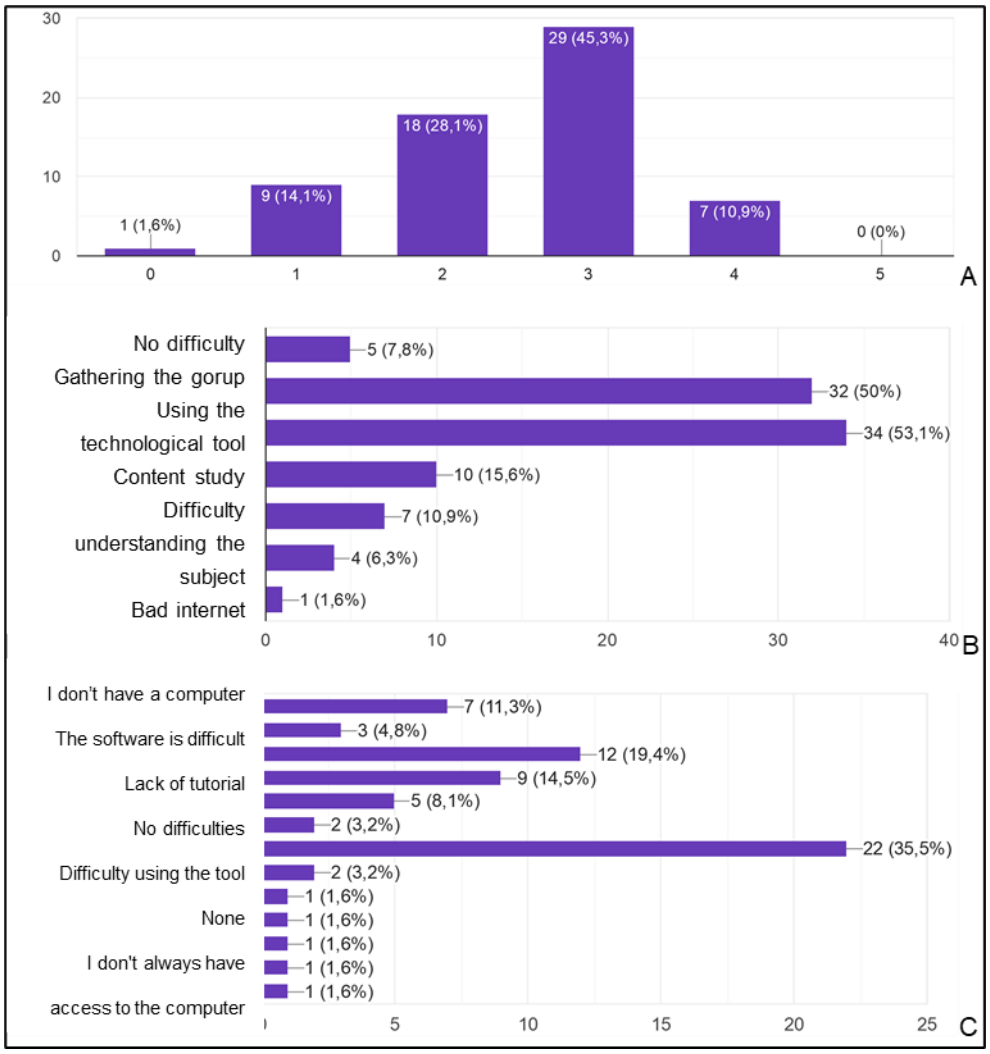
			I had a lot of difficulty because I didn't know how to handle the programs and that led me to a learning experience. I say learning because due to this work, I could see that I need to look for ways to learn how to use the different tools that the internet offers me and not just be stuck using the basics.
			Vai me trazer fácil entendimento
			It is always good to know of other ways to spread and acquire knowledge. So, I believe so. It was a very creative activity with mutual participation by all.
			Served as experience for more activities
			Next time I'll be more prepared
			A lot of information, which will be of great value to me throughout my life.
			I had a somewhat stressful experience, but one that taught me a lot both academically and professionally.
			Next time I'll be more prepared
			Because I learned to speak to the camera
			I had the experience of discovering new types of learning, and a new way of exposing what I learned
			A form of organization of the group
Technology learning	22	42.30	It was an interesting learning experience, and in view of the technology that is increasingly present in education and in the professional environment, it helped a lot to understand how important versatility in doing different tasks is.
			The first contact experience with the tool will help me to carry out tasks through it in the future, if necessary
			The use of the tools may help us in the future
			Through the experience of using other technological means that may be useful in the future
			In using the tools
			Now it will be easier for me to do tasks like this
			In the form of creativity because now I know other tools to use on works
			We had the chance to explore a different platform, I believe that it will be useful in some way in the future
			I can use these tools in the future for other jobs
			Learning in the field of technology, which is essential today.
			I'm starting to learn how to edit video
			Knowledge on the use of new technologies
			Preparation for handling a pedagogical tool
			Experience in creating infographics
			Experience in creating infographics
			I acquired some skills in creating arts, infographics and others
			Knowledge about different teaching and learning technologies
			Because we are learning to work with technology and that is very good
			Understanding new tools

			In the future, if I need to use it, I will have already had a first contact with it, knowing it basically
			For the knowledge acquired that may be useful in future work
			It will bring me benefits, because I was able to learn to use certain technological tools, which I did not know
Content learning	11	21.15	With this activity I was able to separate the most important topics to be memorized, which facilitates a broad understanding of the subject. I believe that this practice helps me not only in this subject but also in my academic life. Technological tools are very important to help us, such as CANVA, with which we can make mental maps to better understand the content.
			I understood well the subject we are dealing with, we can help people around us
			I learned the subject that was proposed to me, certainly, in the future, I will use this information
			This activity made me understand the subject better, and memorize the content. And I was able to better understand the use of CANVA, which can help me to do other professional and academic activities.
			Better understanding of the subjects addressed and the tool used
			Knowledge about other subjects
			Experience in the area
			For the knowledge acquired that may be useful in future work
			The fact that I learned a little bit about an illness helps me a lot and also helps me focus on the college I want to attend.
			It will bring me benefits because I was able to learn how to use certain technological tools, which I did not know
			In knowledge about diseases
Punctuation	1	5.20	Points
Total	52	100	

Source: Research Data (2020).

Figure 3 illustrates the main difficulties pointed out by the students in carrying out the task. In Figure 3 (A), it appears that most consider that the degree of difficulty of the activity was neutral to intermediate, being "using the technological tool" (53.1%) and "gathering the group" (50%) the most indicated by the students, respectively. This result was already expected considering that many of the technologies used are new for the participating students and, in addition to that, the entire pedagogical intervention happened during the period of the Covid-19 Pandemic, which forced them to do non-face-to-face activities and, consequently, the impossibility of carrying out face-to-face planning by the group, in addition to the absence of internet access by some members of the groups. This fact was also confirmed in Figure 3 (C), where only 35.5% stated that they had no difficulties using the technological tool; while the majority mentioned access to the internet, computers, manipulation and lack of software tutorials as the main difficulties.

Figure 3 – Level of difficulty of the proposed task (A), the main difficulties performing the task (B) and the main difficulties in using the tools (D).



Caption: Figures A, B and C follow the Likert scale, where 0 or 1 represents a very poor/unsatisfactory assessment and 5, a very good/satisfactory assessment.

Source: Research Data (2020).

Although there were difficulties in doing the proposed task, when asked if they would like to do more activities like that, 47% said yes, 43.7% said maybe and only 9.4% said no. As a way of better specifying which technological tools they would like to be applied in the classroom, Table 3 presents the referred answers.

The categories were divided according to the researcher's perception and the contact with the students. They represent what the use of tools provided for each of them. The most frequent categories were: Facilitates learning (32.3%), Stimulates interest (16.1%), Develops autonomy (9.7%), Did not know (29%) and the others (12.9 %). About a third of the students did not inform or did not know how to justify the choice of tool. In this context, it is observed that there is an appeal for the way in which the contents and activities are ordinarily worked, being indicated some modifications and the insertion of such technologies in the day-to-day of the classroom. Most of the justifications pointed out by students for the use of these tools are: the possibility of using more creativity, making teaching more

dynamic, improving the assimilation of contents, acquiring new information, valuing research, among others.

Chart 3 – Tools students wish were used more.

Category	n	Freq. (%)	Technological tool	Answer
Facilites the Learning	10	32.3	Infographic and shared wall	Shared wall and infographics, as contente memorizing becomes easier
			Infographics	Dynamic infographics, because it is easier and understandable
			Mental map	The creation of mind maps, because we were able to take the most relevant and broad parts of the material and absorb it, of course, there has to be an in-depth study of the material before doing the activity
			Mental map	I find the creation of mind maps very interesting to better understand the subject
			Shared wall	The use of new tools that contribute to our learning, such as the use of the Padlet (shared wall)
			Not informed/don't know	Because despite being serious subjects, we can learn the subject in an easier way
			Not informed/don't know	Yes, because the tools used, in a way, help us to better understand the functioning of other tools and the use of other devices
			Podcast and infographics	I think they could be used during the presentation process in order to keep students' attention instead of getting them bored. Podcasts and infographics are some of the ones that make it easier to understand the issue.
			Podcast and videos	More podcast, videos etc. Well I think I'll learn more.
			Videos	Making videos, because I think it's a less ephemeral way of presenting the contente.
Not informed/ Don’t know	9	29.0	Comics	Comics
			Games	Games
			Not informed/don't know	Don’t know
			Not informed/don't know	I don't know if I would like to use this option in the classroom, as I saw this activity model as a good evaluation option through the APNPs. At the moment, I have this thought, however I could be wrong.
			Not informed/don't know	I think these methodologies are necessary only during the pandemic

			Not informed/don't know	More activities like this
			All	All
			All	All
			Videos and infographs	Not animated videos, infographics
Stimulates interest	5	16.1	Games	Games, it must be pretty cool
			Not informed/don't know	These methodologies that include new tools that break routine activities, as they are a dynamic and cooler way of learning
			All	All of them, because that way there will always be some different method to learn
			Video	Not animated. I think it would be interesting to show to the class
			Animated videos	Animation making. To make teaching more dynamic
Develops the autonomy	3	9.7	Blog	Blog, pois nós mesmos escrevemos as informações que adquirimos a respeito de nossas pesquisas
			Not informed/ don't know	I think this issue of producing something, of having to be active during learning, was something very interesting, as it changes a little that semi-passive relationship between student and teacher, where most of the time, freedom of creation is trapped in the mold of works like reports and seminars.
			All	All of them, because by presenting the possibility of choice, each group achieves a method that reaches all members of the group
Interest in thetechnological tool	2	6.5	Podcast	Podcast, because it is very popular, and a material that I consume on a daily basis and I really like it, it would be nice to have the class content in a podcast.
			Videos and infographics	I would like to learn more about video editing as I believe it is very useful, not only now in high school, but later in college or in a job in the field. I would also like to know how to assemble dynamic and static infographics more easily.
Reduce inhibition/ shyness	1	3.2	Podcast	Podcast making, as I believe it will help students who are nervous about presenting a seminar
Stimulates creativity	1	3.2	Videos and Comics	Comics, video production, because it stimulates creativity.
Total	31	100		

Source: Research Data (2020).

Chart 4 presents some suggestions given by the participants. The vast majority suggest that more activities of this type be carried out, including in other disciplines and/or in other contents of the same discipline that was worked on. Some

indicated using activities of this type to replace more traditional ones such as exams, seminars, and assignments. Others reported on the need to extend delivery times, given that the use of technology is new to them, in addition to the difficulty of getting groups together during the pandemic. It was also commented on the efficiency of this type of activity remotely, which was judged to be less productive. In general, the students' commitment to carrying out this intervention is noticeable, mainly due to the way in which they express their opinion, always in a constructive way and with the aim of improving the process. This type of evaluation also generates in them the expectation of improvement and changes in the process, in addition to their voluntary participation, considering that the decision to participate in the intervention was free and enlightening.

Chart 4 – Some suggestions made by students for future work.

Answer
Mind Maps or summaries related to the subject
I think that making videos explaining some things related to the topic or even publishing some pages on what is being treated in our work
Maybe next time, everyone could use the same tool in the work
I am not able to comment
We could use these same tools in other activities
Include this teaching methodology in the classromm
It is very interesting, instead of doing so many seminars and written works, we use this same method other times
More chats
More work of this type, transferring it to the classroom and, in the end, students being available to the class for questions
We can make creative videos as a presentation and infographics for distribution to colleagues in the classroom
No sugestions
I suggest having more works like this
No work like this
Mental map creation
Podcast creation
This type of remote work becomes less productive and efficient than it could be
This type of remote work becomes less productive and efficient than it could be
Facilitating the work for those who do not have computers, because some things are very difficult to accomplish on the cell phone,
An interesting proposal for the next time would be that everyone would use the same tool to do the work
Having other tools that there weren't this time
Since we are now studying basic sanitation policy, which is a very dense and tiring subject, I think it would be interesting to make dynamic infographics or even create a game so that it becomes a different form of learning and easy understanding in addition to greater class interaction
Podcast and videos
I am not able to comment
Assignment on viral diseases
Assignment in podcast format

It should have a good delivery time, because it is not easy to deal with this or to reach an agreement with the members of the group at a distance
Could happen again, and this time I will be more prepared, but that it will take awhile to do it. I'm still recovering
Future works may be of the same mechanism that was used in this one, with no difference
Mental maps
More work with different methodology
It may be cool and interesting

Source: Research Data (2020).

CONCLUSION

From this pedagogical intervention and according to the reports presented by the students, it appears that the use of DICTs in the school environment are important allies in the search for more autonomous teaching and learning mechanisms, in which students are protagonists of their learning, assuming a unique role of criticality, creativity, collaboration, and enthusiasm/motivation to work on the pedagogical activities. However, one should not neglect the importance of teacher mediation in the use of these DICTs.

The use of the technological tools studied here was highly important for the good use and implementation of the pedagogical intervention, especially with regard to the students' way of learning, whether in the study of the subject contents or in the handling of the tools. Most of the justifications pointed out by them, for the use of these tools, is the possibility of using more creativity, making teaching more dynamic, improving the absorption of content, acquiring new information, and valuing research, among others. With that, these tools can be allies of the teacher as a stimulus to awaken the motivation and, consequently, the creative and autonomous learning of the student.

Added to the above, according to the notes made by the participants, the use of these technologies was approved by the vast majority, including the indication of their use in other subjects/content to be carried out, not only remotely, but mainly in the day-to-day of the classroom. Ways of replacing activities commonly used in traditional teaching by those that were applied here were also pointed out.

Finally, the application of DICTs has a gigantic space in the classroom environment, which still deserves to be occupied, even if gradually, with caution and with a paradigm shift, especially with regarding its use and manner of presentation to the students and teachers.

O USO DE TECNOLOGIAS EDUCACIONAIS: PERCEPÇÕES DOS ALUNOS DAS TURMAS DE SEGUNDO ANO DO CURSO TÉCNICO EM MEIO AMBIENTE DO IFES CAMPUS IBATIBA

RESUMO

O uso das Tecnologias Digitais de Informação e Comunicação (TDICs) na educação é uma realidade cada vez mais presente nos diversos espaços onde ocorrem processos de ensino e de aprendizagem. OBJETIVO: Esta pesquisa objetivou avaliar uma intervenção pedagógica estruturada na aplicação de TDICs como estímulo à criação de uma cultura autônoma de aprendizagem com os estudantes do 2º ano do curso técnico em meio ambiente. MÉTODOS: Trata-se de uma pesquisa de intervenção pedagógica, realizada em 2020 com 74 alunos do ensino médio integrado. Foi desenvolvida a partir de uma situação problema verificada no cotidiano da sala de aula na disciplina de Saneamento e Saúde Pública e na vivência dos alunos. Partindo de uma compreensão freireana da educação e da aprendizagem, foi proposto que, em grupos, fossem pesquisadas doenças relacionadas à ausência de saneamento básico, tendo como informações comuns: definição das doenças, dados estatísticos de prevalência, morbidade, ciclo da doença e profilaxia. Os dados dos grupos foram apresentados utilizando uma TDIC: blog, podcast, histórias em quadrinhos, infográficos estáticos e dinâmicos e vídeos. Após a atividade, os alunos realizaram uma avaliação da intervenção por meio do Google Forms. RESULTADOS: Houve ampla aprovação dos alunos com relação a atividade proposta, apenas 14,3% que foram indiferentes ao processo. O aprendizado construído ao longo do desenvolvimento da intervenção pedagógica, conforme apontado pela maioria dos participantes, sobretudo no que se refere ao envolvimento na atividade e a utilização da TDICs contribuiu para o desenvolvimento dos alunos, particularmente com relação a forma de estudar os conteúdos, de trabalhar em grupo e de desenvolver um trabalho de forma autônoma, a partir do uso de tecnologias digitais, que muitos deles não tinham conhecimento algum. CONCLUSÕES: O uso de TDICs no ambiente escolar são importantes aliadas na busca de mecanismos de ensino e de aprendizagem mais autônomo, em que os alunos são protagonistas do seu aprendizado, assumindo um papel singular de criticidade, criatividade, colaboração e entusiasmo/motivação à realização das atividades pedagógicas. A aplicação das TDICs possui um espaço gigantesco no ambiente da sala de aula, que ainda merece ser ocupado, mesmo que aos poucos, com cautela e com mudança de paradigma, sobretudo no que concerne à sua forma de utilização e a sua maneira de apresentação para os alunos e professores. Contudo, não se deve negligenciar a importância da mediação do professor no uso dessas TDICs.

PALAVRAS-CHAVE: Intervenção pedagógica. Tecnologia Digitais de Informação e Comunicação. Tecnologias educacionais.

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