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Technological choices in the elaboration of teaching plans by students in the biology undergraduate course

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ABSTRACT

This study investigates the use of internet tools and technological choices in teaching plans by students in the Biological Sciences undergraduate course. Data were collected through an online questionnaire answered by 106 participants. The participants are frequent users of the internet, 100% of whom declared using e-mail, 99% downloading files from the internet, and 97% using research tools. The uses reported by them were mapped using the categories Study (32%), Didactic (2.6%), Professional (12.1%) and Social (37.7%). Regarding the tools, a survey was carried out on which tools were most mentioned when the criterion was to be used to teach and learn, in which social networks, and cell phone message apps were more frequent. The participants' preferences were also observed in relation to the choice of technological tools when they were asked to create teaching plans with technology integration. We could observe that although they reported the technologies to learn, these were not fully aligned with the choices of technology they made in their teaching plans aiming at formal education.

KEYWORDS: Distance learning. Internet tools. ICTs. Teacher development.

INTRODUCTION

The network society is a result of computerization and the new technological paradigm characterized by fast generation and processing of information (CASTELLS; CARDOSO, 2005). In such context, the internet and the Information and Communication Technologies (ICTs) have enabled the use of new teaching and learning processes in networks, based on interaction and collective creation (CARVALHO; IVANOFF, 2010; GOODYEAR *et al*., 2004). These tools allow the use, dissemination, sharing, elaboration, transformation, and production of information in different formats such as text, image, sound, data, and multi and hypermedia documents, clearly changing means of communication and how individuals communicate to each other (VALENTE, 2014). The ICTs have become an essential communication language in the current society (LÉVY, 1999). More recently, with the internet popularization and the technological advance, more and more digital tools are created, and the trend to use them with educational purposes has grown (MARTIN *et al*., 2011).

The Brazilian government has invested substantial resources to equip schools since the 1990s. These resources have been used to purchase computers, communication tools and to organize courses at the levels of initial education and continuous development of teachers and managers (BRASIL, 2018). This process has been developed through the creation of projects such as the Programa Banda Larga nas Escolas – PBLE (Broadband in Schools Program) and the Programa Nacional de Formação Continuada em Tecnologia Educacional - ProInfo Integrado (National Program for Education Technology Continuous Development – Integrated ProInfo). However, there has been little concern with the reflection upon the use of technologies to improve the education system and teaching practices (FERNANDES *et al*., 2021; HEINSFELD; PISCHETOLA, 2019). Also, when comparing Brazil to other countries regarding education performance, our country still appears in the last positions in the general ranking. Clearly, the education offered has been in expansion, but with its own emerging problems, indicating some stagnation and crisis in relation to the international scenery (SILVA; PAULY, 2017). Even with the public policies that favor the insertion of ICTs in the school routine, the fact that the schools have access to technologies alone is not enough to guarantee learning improvement, since in many schools the resources are not used and, when used, they are not accompanied by a teaching process aligned to the technological moment experienced (SILVA *et al*., 2016).

The quest for the use of internet tools has become evident in official documents in relation to future science teachers, for example. Those documents emphasize the importance of these professionals being prepared to follow the fast scientific technological changes experienced in society (BRASIL, 2001a, 2001b, 2001c). Also, the discussion around teachers' education aiming to integrate technologies and teaching has grown. Teachers must develop competences that have to follow the society evolution process. Prensky (2001) characterizes educators as "digital immigrants", individuals that are following the digital technological evolution process, while the students are "digital native" individuals that were born in the digital era.

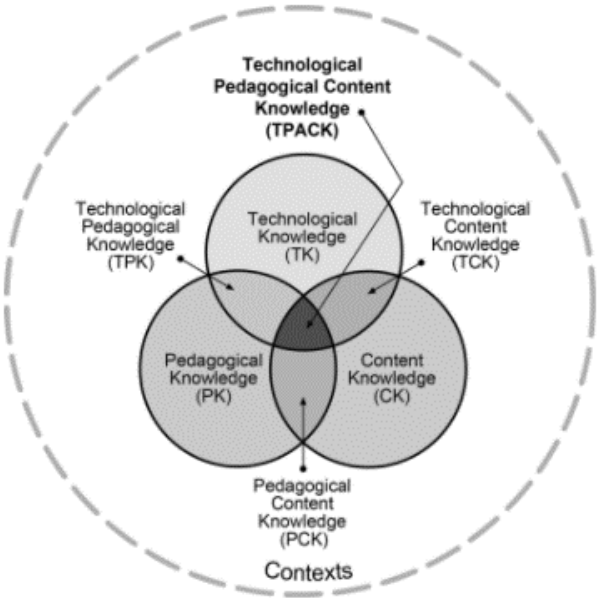
Farias and Dias (2013) pointed out in the document "Metas Educativas 2021" (2021 Education Targets) (OEI, 2010), the direct relation between the use of ICTs and teachers' education. To achieve efficient use of ICTs by teachers, it is

necessary to provide them with a set of skills and competences to optimize the benefits of the use of technologies in the school environment.

According to Bransford, Brown and Cocking (2007), and Kenski (2008), working on teachers' education seeking to improve teaching, stimulating research and the implementation of new technologies in a contextualized way in the school routine might be one of the paths to be built up by researchers and teachers' education programs.

A certain level of complexity is inherent in the ICTs integration in methodologies commonly used in teaching situations, and some of these proposals must be updated so that they allow for and promote the integration of technologies. Considering these issues, Mishra and Koehler (2006) dedicated several years of their work and proposed a theoretical model of technology integration supported by the basic knowledge required for teaching, and broadening the initial proposal put forward by Shulman (1986). This model is called Technological Pedagogical Content Knowledge - TPACK (Figure 1). It presents the bases of knowledge that teachers must acquire, which is the combination of pedagogical, content and technological knowledge that become central for the professional development of teachers who seek to use ICTs in their professional practice.

Figure 1 – TPACK conceptual model



Source: Souza (2018)

The possibility of using the internet and its tools in the teaching and learning process might unveil a universe of information in the science field that has been underexplored by teachers in their teaching practice. In fact, studies have pointed out that although biology and chemistry teachers frequently use the internet, their use with teaching purposes is limited. In addition, their use is predominantly based on the distributive model with little or no authorial or cooperative use among peers (ROLANDO *et al.*, 2013, ROLANDO *et al.*, 2015).

Considering these issues, this study aims to investigate how students in a Biological Sciences teaching undergraduate course use the internet tools to learn

and teach contents and how this affects their technological choices when preparing their teaching plans. To achieve this objective, we evaluated the answers of a self-report questionnaire applied to the undergraduate students that were enrolled in a subject in the initial education course. In addition, we evaluated teaching plans designed to promote technological integration that were created by the undergraduate students as their end-of-course work.

METHODOLOGY

The study was carried out with participants that were students in the subject "Education Technologies to teach Biology and Sciences" (TECBIO) in 2017-1, which is part of the distance course (DC) biological sciences undergraduate course at CEDERJ[1].

The subject TECBIO aims the didactic-technological development of the future teachers for the use of information technologies and knowledge in teaching sciences. This subject is offered every six months after the 5th term of the course, since the students are reaching the final part of their professional education, and have already concluded, or almost all of them have concluded, the teaching subjects. The materials and activities related to the subject are made available through the education platform Moodle (Modular Object-Oriented Dynamic Learning Environment). The subject also seeks to promote the knowledge of several bases of knowledge from the TPACK model (Figure 1), and mainly the students' TPACK base of knowledge.

The sample of this research comprises 225 students regularly enrolled in the Biological Sciences teaching undergraduate course that attended the subject TECBIO in the first semester 2017. The data was collected by applying the Internet Use Questionnaire (IUQ), validated by Rolando *et al.* (2013), which was adapted and updated. The IUQ was translated, adapted and applied in a Brazilian scenario, and subjected to the same parametric tests originally used by obtaining parameters considered acceptable for application in this context. The original questionnaire contains 36 questions, out of which 12 provide the participants' profile and 24 questions address the use of internet tools (Appendix A). The questionnaire includes objective and open questions. Each objective question can be answered by choosing "yes" or "no". Whenever the answer "yes" was chosen for the objective question, the respondent was asked to answer the open question "What for?".

The questionnaire takes into consideration all types of use of internet tools, from the simplest to the most complex ones. As for the list of tools included by Rolando *et al.* (2013), the following modifications were carried out:

Exclusion of tools: *Wiki, Orkut, MySpace*, and *Ning*. These are tools that have fallen in disuse, have little use, or that have changed their original characteristics.

Inclusion of tools: Tools for editing, creating, and storing files such as *Dropbox, Google Docs* and *One Drive*; image and video sharing communities such as *Instagram* and *Snapchat*; *Google+*; 3D open world such as *Minecraft*, *Sim City*, and *The Sims*; and cell phone message applications such as *WhatsApp, Telegram*, and *Messenger*.

With the purpose of deepening the understanding of how the tools are used to learn and teach, two other questions were added for data collection:

1. Among the internet tools listed above, have you ever used any of them to study and learn? “Yes”, “No”. Which one(s)? Describe how you used it/them.
2. Among the internet tools listed above, have you ever used any of them to teach? “Yes”, “No”. Which one(s)? Describe how you used it/them.

The IUQ was applied as the first activity in the subject TECBIO. We only considered valid those that in all objective questions had the related open questions answered.

The results obtained with the objective answers to all the IUQ questions were quantified and presented employing descriptive statistics. For the open questions, we used qualitative methodology to spot common characteristics, following the content analysis procedure (FRAENKEL; WALLEN, 2003). The categories used are those proposed by (ROLANDO *et al*., 2013), which total five (Table 1).

Table 1 – Categories of the open questions (translated from Rolando *et al*., 2013, p.49)

Categories	Definition
Study	Study or objects of study in the area
Didactic	Related to the teaching practice such as lesson plan preparation.
Professional	Related to the professional practice, and not included in the categories Study or Didactic.
Personal Socialization	Interpersonal communication with friends and family.
Others	Uses that cannot be included in any of the other categories.

Source: Rolando *et al*. (2013).

At the end of the subject TECBIO, there was a concluding activity in which the students were encouraged to create teaching plans based on the instructional sequence by Harris and Hofer (2009) aiming to integrate technologies. The objective was to evaluate whether the students would be able to integrate education technologies in the preparation of their teaching plans. The students received a teaching plan guide and the Science Learning Activity Type (LATs) developed by Blanchard, Harris and Hofer (2011), which was translated and adapted by Souza and Salvador (2021) and are tools to help the choice of technologies and were used in the subject. The students were not given specific themes, but they were instructed to choose topics associated to another biology subject that they had already concluded in the undergraduate course, and to follow the instructions issued by the State Education Secretariat of Rio de Janeiro.

The LATs provide multiple options of teaching actions, working as a taxonomy in which the types of learning activities that could be used to teach that subject were mapped. Verbs of action of the activity associated with the

digital technologies available for that activity are proposed. The taxonomy allows teachers to refer to that list when starting the creation of a new teaching plan. Thus, they can identify which technological resources will provide support to achieve the pedagogical objectives devised.

RESULTS AND DISCUSSION

Two hundred and twenty-five students were enrolled in the subject; however, only 174 signed the online *Termo de Consentimento Livre e Esclarecido – TCLE* (Free and Informed Consent Form). Out of these, 106 students answered the IUQ and presented their end-of-course work. The students' sociodemographic data is presented below (Table 2).

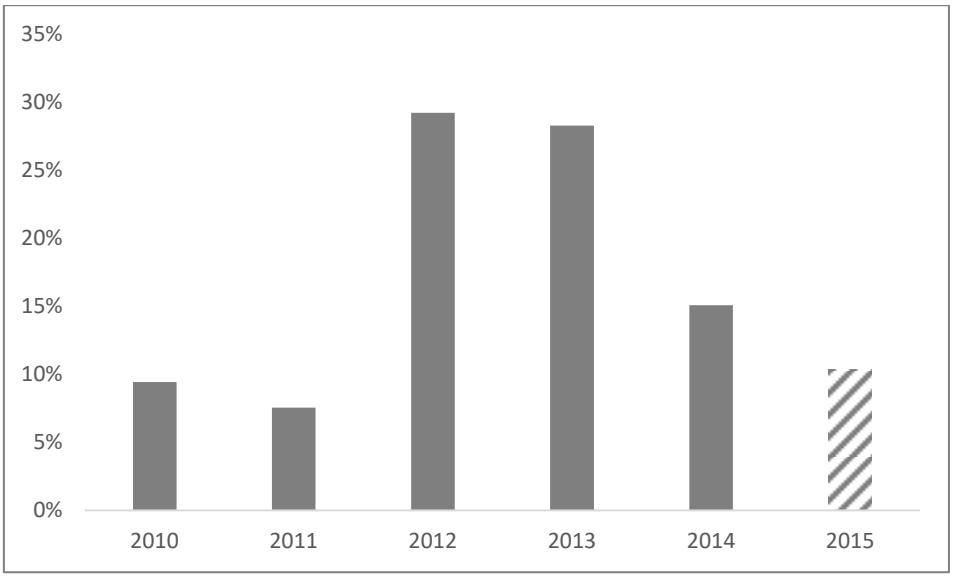
Table 2 – Sociodemographic data

Sociodemographic data	
Male N = 27	Female N = 79
25%	75%
Stratified age	
<25	35%
26 - 30	17%
31 - 35	12%
36 - 40	14%
41 - 45	8%
46 - 50	9%
51>	4%
Mean	32 years
City of residence	
Rio de Janeiro - Capital	23%
Rio de Janeiro - Interior	61%
Grande Rio	11%
Others	5%

Source: Souza (2018)[2].

Among the participants, 20% already held another degree, and in that group 62% declared having concluded a bachelor degree course, while 19% a teaching degree in another area. Regarding the year of entrance in the Biological Sciences course at the CEDERJ, most (58%) entered in 2012 and 2013. In 2015, 10% of the students entered the course (Figure 2), these are the students in the fifth term of the Biological Sciences teaching undergraduate course, in which they were taught the subject TECBIO for the first time.

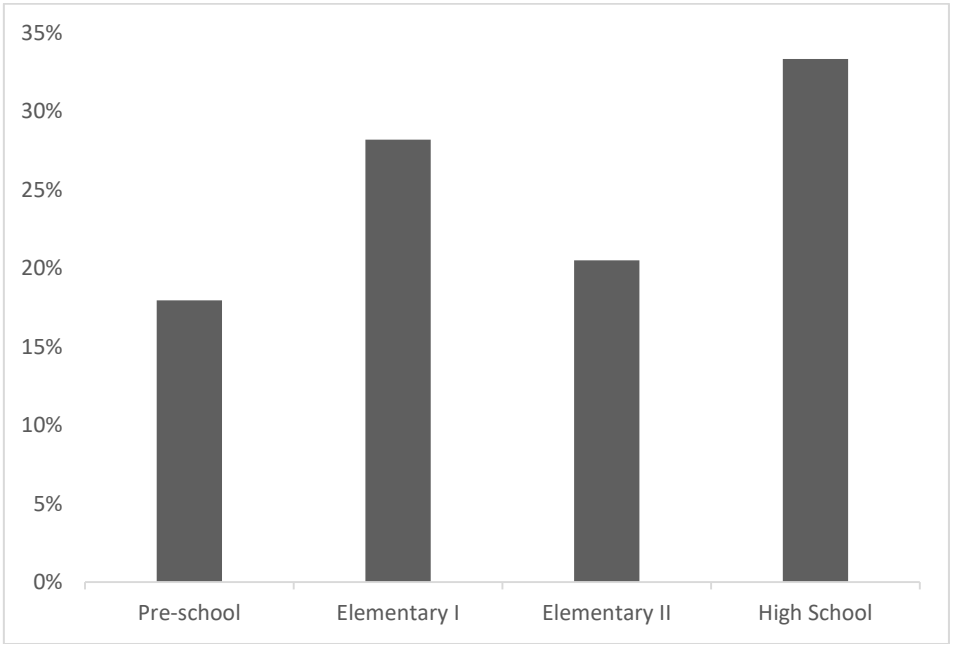
Figure 2 – Year of entrance in the Biological Sciences teaching undergraduate course (N=106)



Source: Souza (2018)[2].

Thirty-seven per cent of the students already had some experience in teaching outside the mandatory supervised internship. Among those, 33% had up to one year experience in one of the four different levels (Figure 3).

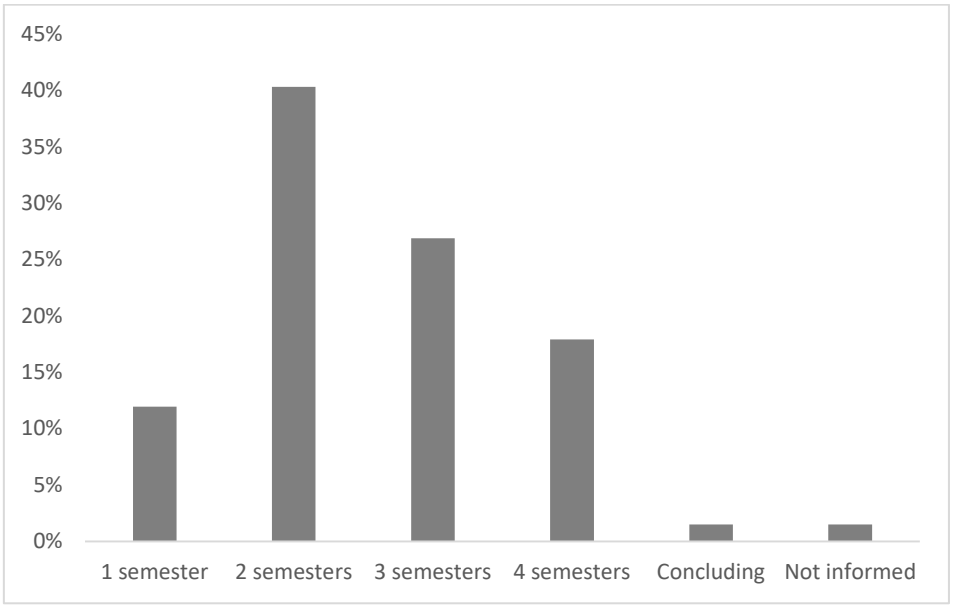
Figure 3 – Level at which they had taught or still teach (N=39 participants)



Souce: Souza (2018)[2].

Among the participants, 63% stated that they were in supervised internship, and out of those 48% were developing their internship at the Elementary II level. Regarding the time they had been in supervised internship, 40% declared that they had been in the internship for two semesters (Figure 4).

Figure 4 –Time in supervised internship (N=67 participants)

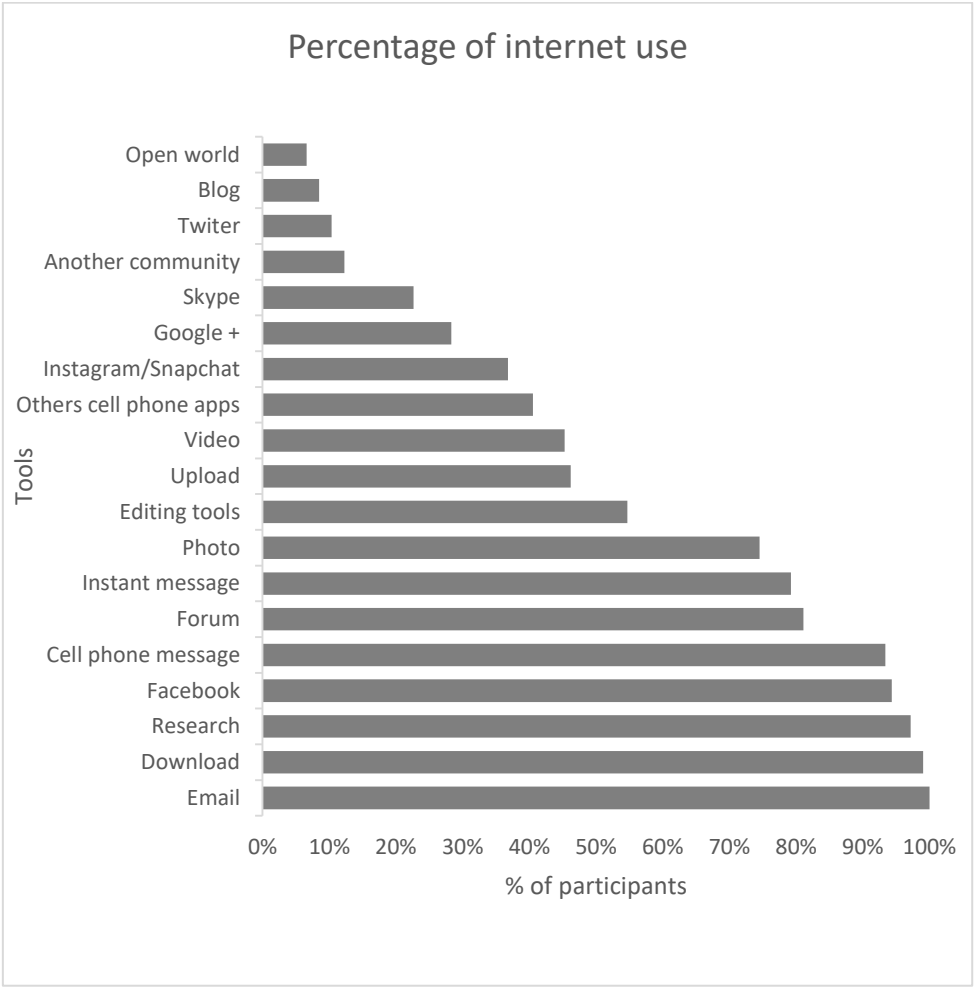


Source: Souza (2018)[2].

INTERNET QUESTIONNAIRE

When asked about how often they used the internet, 94% reported to use the internet between five and seven days a week, indicating that the sample contains individuals who use the internet regularly. They also stated to use the email (100%), download files from the internet (97%), and use research tools (97%). The social network Facebook was mentioned by 94% of the participants, revealing the interest of this population in interacting socially with groups of people using the internet (Figure 5).

Figure 5 – Frequency of use of internet tools by the participants (N=106)



Source: Souza (2018)[2].

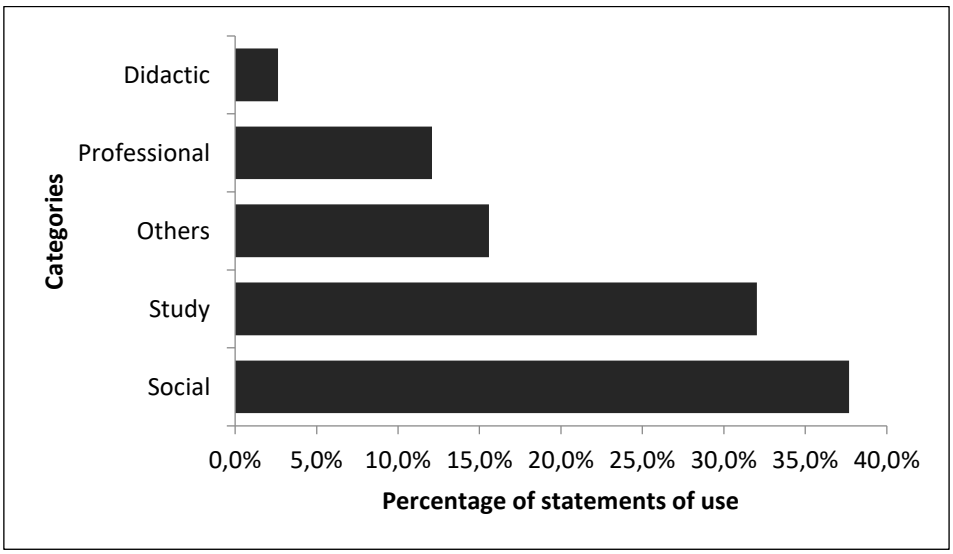
This data is in agreement with previous studies that show a similar profile of students and teachers in biology undergraduate courses (MARTINS *et al.*, 2015; ROLANDO *et al.*, 2013). The frequency of use of the social network Facebook by the participants in this study increased strongly when compared to the data presented by Salvador (2011), which reported the use of this tool by less than 20% of the sample. However, the participants of that study used other social networks more popular at that time. This indicates the consolidation of this tool in the last few years as an important online tool for social communication among these users. Cell phone message apps were also reported as one of the most frequently used tool, being used more frequently than other more traditional tools such as discussion forums.

Regarding the categorization of the open questions (Figure 6), the same answer could be classified in more than one category. Therefore, we obtained 2,603 statements of use. Among the reported uses, the category 'social' obtained the highest percentage (37,7%), while the lowest percentage was observed in the category 'didactic' (2,6%), even if 37% of the participants reported to have teaching experience outside the supervised internship. The category 'study' presented the second highest percentage (32%), which had been expected, since the participants are students in a distance learning course at the initial level of

their professional education. The category 'professional' obtained 12.1% and, finally, the category 'others', obtained 15.6% of statements of use.

When considering the category 'didactic', we believe that even if the participants are regular users of internet tools, they do not use the internet to help them create unique didactic experiences. To guarantee a more constant use of internet tools in teaching, more emphasis on this practice must be provided during the teachers' initial education and continuous development (BRANDÃO; CAVALVANTI, 2015; NOGUEIRA *et al.*, 2015). As for the most frequent use, namely 'social', we consider that it shows that the participants use internet tools with the main purpose to which they were initially developed, that is, to approximate people, reduce distances, without being necessarily physically close to each other.

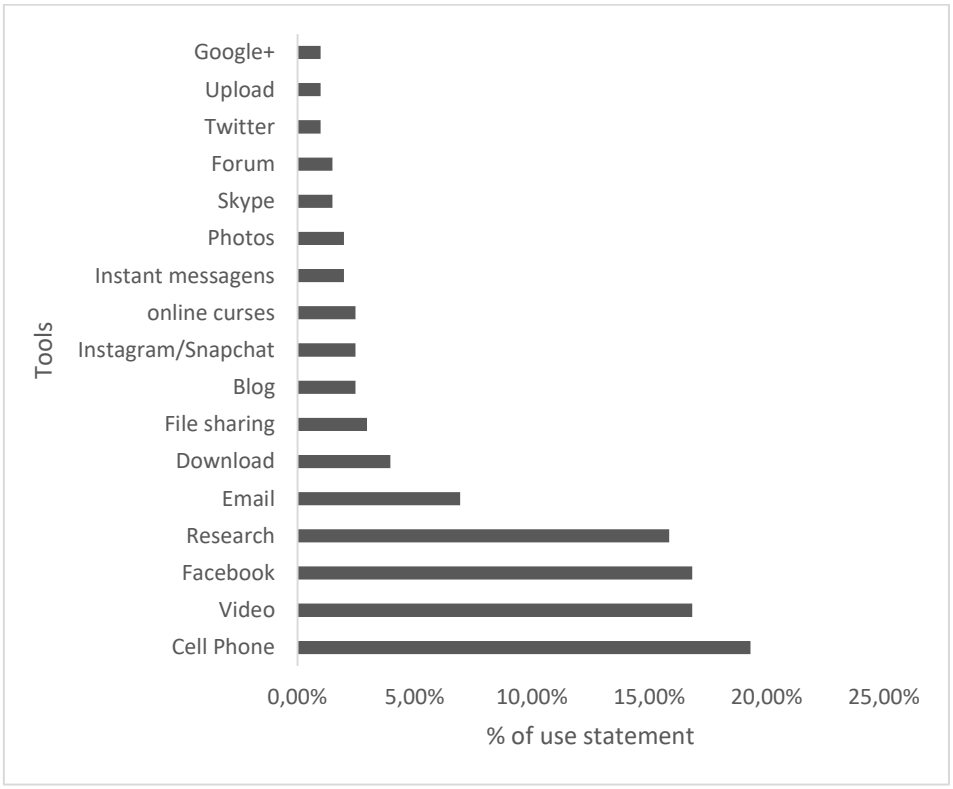
Figure 6 – Statement of use of tools (N=2603)



Source: Souza (2018)[2].

The two open questions added to the IUQ were associated with the category 'social', seeking to understand how the participants used the tools to study and teach. Regarding the first question that addressed the use of internet tools to learn and study, 93% of the participants reported to use the tools with these purposes. Out of the 200 statements collected, 20% used cell phone message apps (*Telegram, WhatsApp, Messenger*), 17% used videos, and 17% used the social network *Facebook* to learn and study. We could observe that even apps that were designed with a focus on social interaction were used to study and learn. Although online courses had not been included in the questionnaire, they were reported by 3% of the students (Figure 7). These courses were accessed using apps such as Duolingo and Coursera, which are considered Massive Open Online Courses (MOOCs). The MOOCs are open online courses available to any person that has access to the internet and do not present minimum requirements for entrance.

Figure 7 – Stated use of internet tools to study and learn (N = 99)

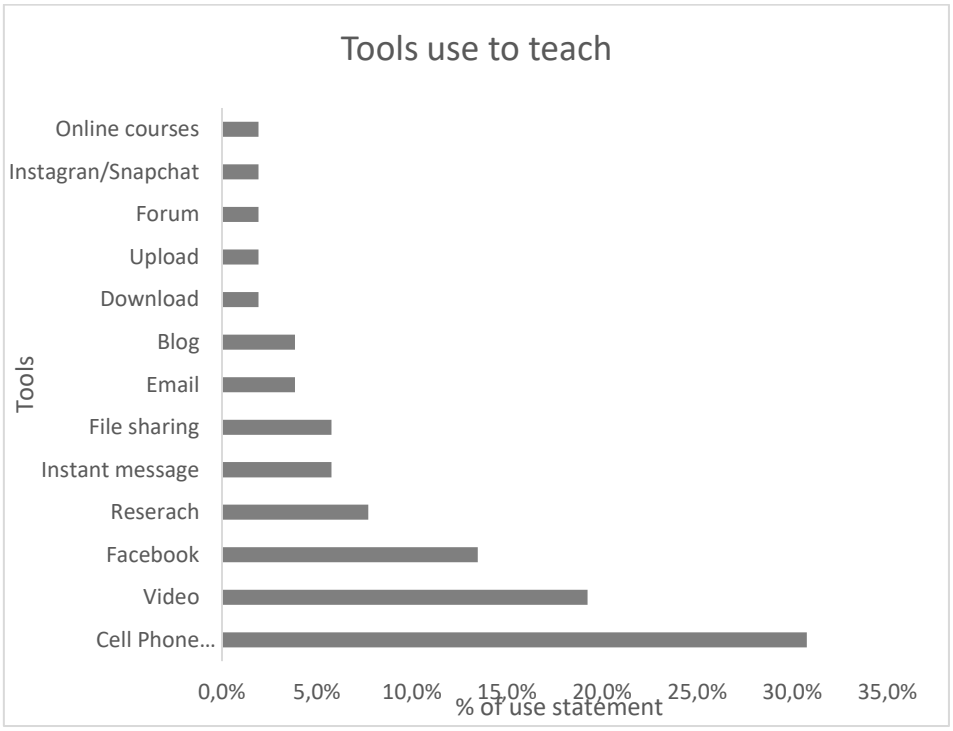


Source: Souza (2018)[2].

The data shows that the tools were mostly used to check doubts with their peers, research several topics, and arrange meetings to study together, that is, they are included in the category 'study'. These findings are in agreement with the study by Martins *et al*., (2015), in which the most common internet uses reported by students in a distance learning course were to do the course activities and deepen the content studied.

Regarding the questions addressing the use of internet tools to teach, only 40% of the 106 participants stated that they had already used them with this purpose. When analyzing the tools they listed, we identified a total of 52 uses with the purpose of teaching, and the "cell phone message apps" (*Telegram, WhatsApp, Messenger*) were the most cited (31%) (Figure 8).

Figure 8 – Stated use of internet tools to teach (N = 42).



Source: Souza (2018)[2].

We believe that the apps listed gained more emphasis for being easily found in smartphones, and these are the main means of access to the internet tools in Brazil (TOKARNIA, 2020).

The participants showed different profiles in relation to their teaching experience. However, when asked about the use of internet tools, all of them stated that the use to learn is much more frequent than their use to teach. We believe that this also influenced the result of the category 'professional', which was the one before the last, since 37% of the participants have some experience teaching; however, 33% have been in the classroom as a teacher for less than a year.

TECHNOLOGIES SELECTED

The most frequently selected technologies by the participants for the creation of their teaching plans are presented (Table 4)[3]. Even if a participant had selected the same technology more than once in the same plan, for the sake of data collection, it was considered once only.

The Science learning activity types by Blanchard, Harris and Hofer (2011) presented 65 suggestions of technologies, and out of those 51 were selected by the participants in this research. Other 14 (samples for observation, practical activities, on site activity, DVD, Cartoon editor, *Facebook*, magnifier, optical microscope, notebook, paper and pencil, laboratory practice, smartphone, Falcon tubes, *WhatsApp*), which were not in the LATs appeared spontaneously from the participants' choices.

This was expected since LATs are only suggestions of technologies for each type of learning activity, in addition to the fact that education support technologies are in constant development. The technologies suggested in the LATs are not expected to meet efficiently the requirements of all teaching plans, since the school context is diverse and the users' familiarity with technologies also influence their choices (Harris *et al.*, 2010). Another fact to be taken into consideration is that the authors did not intend to create and exhaustive list, on the contrary, their intention was to exemplify some of the most suitable technologies available.

Table 4 – Technologies mentioned by the participants in their study plans (N=106)

Technologies	Associated LAT	% per participant
Text editor	Take notes, develop predictions, sequence procedures, record data, answer questions, write a report, answer a questionnaire, develop a game, create/represent.	75%
Webpage	Read a text, study, answer questions, a questionnaire or a test.	64%
Ppt presentation program	Attend a presentation or demonstration, write a report, present or demonstrate.	61%
Video	Attend a presentation or demonstration, see images/objects, observe phenomena, distinguish observations from inferences, select procedures, learn and practice safe procedures, collect data, collect samples, create/represent.	60%
Spreadsheet	Organize/classify data, analyze data, compare findings with predictions/hypotheses, record data, calculate.	39%
On site activity	Discuss, debate.	38%
Quiz	Study	29%
Search engine	Explore a topic /conduct context research, establish connections between findings and concepts/scientific knowledge.	21%
Online discussion forum	Discuss, answer questions, debate.	21%
Smartphone	Not associated with LAT	20%

Source: Souza (2018)[2].

When observing the participants' reports (Figure 8), we could observe that the most cited tool is "cell phone message". However, when creating teaching plans, that tool occupied the tenth position (Smartphone). In such case, the participants might not recognize it as a formal teaching tool, but rather as a useful complementary option.

The tool "Video", the second most cited in relation to teaching, when associated with didactic practices, occupied the fourth position, and was cited by 60% of the participants in their teaching plans. At this point, apparently, there was a convergence between the participants that cited the category "videos" as an important internet tool for both teaching and learning, and they were coherent when choosing this tool for the creation of their teaching plans.

The category internet "Research" as a means of teaching appeared in the IUQ with a 97.2% frequency. Thus, when building up their plans, it occupied the 8th position in the list of tools, and appeared as "Search engine" chosen in the teaching plans with technology integration. Again, the participants have not realized that they can use the tool "Research" as a formal learning instrument that could be included in their teaching plans. However, the use of "websites" was cited by 64% of the participants in their teaching plans (third most used tool in the plans), showing how they understand the internet as an important source and didactic resource in their teaching plans.

We could also observe that when building up their teaching plans, "text editor", "ppt presentation program", and "spreadsheet" (Table 4) appeared among the main digital tools cited as supports for the learning process. These are not internet tools, and therefore were not listed in the IUQ. This indicates that, to create their teaching plans, they still prefer digital tools that are not necessarily internet dependent. However, with the growing use and availability of network infrastructure, an evolution process might develop in the choices of these tools, since "file sharing" already appears in the sixth position in their statement of teaching uses.

Based on these observations, we could see that internet based digital tools have become more frequent in the school environment, due to their high potential for the creation of cooperative activities, either in the education environment or in the globalized job marked that is connected in the existing network currently (CASTELLS; CARDOSO, 2005; VALENTE, 2014).

CONCLUSION

Seeking to understand how students of the Biological Sciences undergraduate course use internet tools to learn and teach contents, our results showed that even if they are aware of the educational potential of the internet tools, they still prefer to choose digital tools that are not supported by the internet such as text editors and presentation tools. One of the reasons why this occurs might be that the participants felt more comfortable using these tools in their classrooms.

Regarding the purpose of using internet tools, the category 'Social' is more frequent than the category 'Didactic', and the tools reported to be used to teach and learn are the same, indicating that the participants do not realize their didactic potential. This became even more clear in their choices of tools for their teaching plans, when digital tools not supported by the internet were more frequently used. This might indicate that higher investments in updated teaching proposals are needed to promote greater awareness about the use of internet tools. It seems relevant to mention that investments have been made, but without an effective intent to result in gains for teaching and learning outcomes. Other improvements needed include teachers' initial education and continuous development, which will allow students and teachers to develop such skills.

When the participants' perception of how their technological choices might affect their future behavior was investigated, we reached the conclusion that further investigations on the use of digital tools in teaching plans of biology teachers in initial education and continuous development are recommended in

an attempt to find out and clarify the reasons why teachers, who are supposedly digital native individuals, still do not use internet tools more frequently in their teaching plans.

ESCOLHAS TECNOLÓGICAS NA ELABORAÇÃO DE PLANOS DE ENSINO POR LICENCIANDOS EM BIOLOGIA

RESUMO

O presente estudo investiga o uso das ferramentas da internet e as escolhas tecnológicas em planos de ensino elaborados por licenciandos do curso de Ciências Biológicas. Os dados foram coletados por meio de um questionário online respondido por 106 licenciandos. Identifica-se que eles são usuários frequentes da internet, sendo que 100% deles declararam utilizar e-mail, 99% fazem download de arquivos da internet e 97% utilizam ferramentas de pesquisa. Mapeou-se o uso declarado por eles utilizando as categorias Estudo (32%), Didático (2,6%), Profissional (12,1%) e Social (37,7%). Em relação às ferramentas, foi realizado um levantamento de quais foram as ferramentas mais mencionadas quando o critério era de ser utilizado para ensinar e aprender, sendo mais frequente o uso das redes sociais e aplicativos de mensagens. Também se observou a preferência dos licenciandos em relação a escolha das ferramentas tecnológicas aplicadas em planos de ensino com integração de tecnologias durante o trabalho final do curso de formação onde verificou-se que o uso declarado das tecnologias para aprender ainda não estava totalmente alinhado às escolhas tecnológicas de planos de ensino preparados para o ensino formal.

PALAVRAS-CHAVE: EaD. Ferramentas da internet. TICs. Formação de professores

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NOTAS

1 Created in 2000, aiming to provide higher education, free of charge and with good quality to the whole state of Rio de Janeiro, the consortium Cederj (Distance Learning Higher Education Center of the state of Rio de Janeiro) is formed by eight higher education public institutions: CEFET, IFF, UENF, UERJ, UFF, UFRJ, UFRRJ, and UNIRIO, and currently has over 45 thousand students regularly enrolled in their 15 distance undergraduate courses.

2 Tables 2 and 4, as well as Figures 2 to 8, are part of the master's research developed by the author (Souza, 2018), presented here from another perspective.

3 A detailed analysis of the teaching plans created by the undergraduates in this subject is presented in another article by the authors.

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APPENDIX A

Internet Use Questionnaire

- Questions for the qualification of the users' sample

1. Sex:
2. Date of birth:
3. City of residence:
4. Do you have another bachelor or teaching degree?
5. Which one?
6. When did you enter the Biological Sciences teaching undergraduate course at Cederj?
7. Have you ever taught?
8. How long for?
9. At which school level?
    a. Answers: pre-school, elementary 1, elementary 2, or high school
10. Which subject did you teach?
11. Are you developing supervised teaching internship in the Biological Sciences undergraduate course?
12. At which school level did you teach (or are you teaching) in the internship?
    a. Answers: pre-school, elementary 1, elementary 2, or high school
13. How long have you been in the teaching internship?

Questions from the Internet Use Questionnaire. Adapted from Rolando, Salvador and Luz, (2013).

1. How often to you use the internet?
    a. Answers: Never, Rarely, 1 day a week, 2 days a week, 3 days a week, 4 days a week, 5 days a week, 6 days a week, 7 days a week. The even questions are open.
2. Do you research on the internet? Yes, no.
    a. What about?
3. Do you use e-mail? Yes, no.
    a. What for?
4. Do you use instant message (chat) on the internet (Messenger, Hangout, others)? Yes, no.
    a. What for?
5. Do you use Twitter? Yes, no.
    a. What for?

6. Do you use Skype? Yes, no.
    a. What for?
7. Do you download material from the internet? Yes, no.
    a. What for?
8. Do you upload material on the internet? Yes, no.
    a. What for?
9. Do you use tools for creating, editing, storing, and sharing files on the internet (*Wikis, Google Docs, Dropbox, OneDrive*)? Yes, no.
    a. What for?
10. Do you share photos on the internet? Yes, no.
    a. What for?
11. Do you share videos on the internet? Yes, no.
    a. What for?
12. Do you take part in any blog? Yes, no.
    a. What for?
13. Do you take part in any discussion forum? Yes, no.
    a. What for?
14. Do you have a *Facebook* account? Yes, no.
    a. What for?
15. Do you take part in any image and video sharing community (*Instagram, Snapchat*)? Yes, no.
    a. What for?
16. Do you take part in *Google+*? Yes, no.
    a. What for?
17. Do you take part in any other internet community?
    a. Which one(s)?
    b. What for?
18. Do you take part in any 3D open world (*Second Life, Minecraft, SimCity, The Sims*)? Yes, no.
    a. What for?
19. Do you use message apps in groups, videos, audio messages on the cell phone (*Telegram, WhatsApp, Messenger*)? Yes, no?
    a. What for?
20. Do you use other apps to Interact on the cell phone that require an internet connection? Which one(s)?
    a. What for?

21. Among all internet tools listed above, have you ever used any to study and learn? Yes, no.
    a. Which one(s)? Describe how you used them.
22. Among all internet tools listed above, have you ever used any to teach? Yes, no.
    a. Which one(s)? Describe how you used them.