

Technologies and digital literacy: an experience with Zotero

Tecnologías y alfabetizaciones digitales: una experiencia con Zotero

Tecnologias e letramentos digitais – uma experiência com o Zotero

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ARTICLE



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Abstract

New ways of reading and writing appear in the contemporary context for the production of knowledge. This article aims to analyze the forms of interaction between the students of the interdisciplinary degrees of the Federal University of Bahia with Zotero, which contributes to the digital literacy of these students. For this, a qualitative investigation was carried out using a questionnaire and the observation of the participants for the production of data. The research results indicate the difficulty of students to become literate in digital environments, especially those that require prior knowledge of standardization for academic works such as Zotero.

KEYWORDS

Digital Literacy, Bibliographic management, Zotero, Interdisciplinary Baccalaureate.

Resumen

Nuevas modalidades de lectura y escritura son cada vez más solicitadas para la producción de conocimiento en el contexto contemporáneo. Así, este artículo tiene como objetivo analizar

las formas de interacción entre los estudiantes de las Licenciaturas Interdisciplinarias de la Universidad Federal de Bahía con Zotero, lo que contribuye a la alfabetización digital de estos estudiantes. Por lo tanto, se realizó una investigación cualitativa mediante un cuestionario y observación participante para la producción de datos. Los resultados de la investigación señalan la dificultad de los estudiantes para alfabetizarse en entornos digitales, especialmente en aquellos que requieren conocimientos previos de normalización que gestionan trabajos académicos como Zotero.

PALABRAS CLAVE

Alfabetización digital, Gestores bibliográficos, Zotero, Licenciatura interdisciplinar.

Resumo

Novas modalidades de leitura e escrita têm se tornado cada vez mais requisitadas para a produção de conhecimento no contexto contemporâneo. Assim, este artigo tem como objetivo analisar as formas de interação dos alunos dos Bacharelados Interdisciplinares da Universidade Federal da Bahia com o Zotero,

que contribui com o letramento digital desses estudantes. Portanto, foi realizada uma pesquisa qualitativa utilizando questionário e observação participante para a produção de dados. Os resultados da pesquisa apontam a dificuldade dos alunos em se tornarem letrados em ambientes digitais, especialmente naqueles

que exigem conhecimentos prévios de normatização que gerenciam os trabalhos acadêmicos como o Zotero.

PALAVRAS-CHAVE

Letramento Digital, Gestores bibliográficos, Zotero, Bacharelado Interdisciplinar.

1. INTRODUCTION

The constant expansion of Information and Communication Technologies (ICTs) in all sectors of society is undeniable. This results in an appropriation of increasingly significant spaces in the daily life of society, changing the forms of socially constructed relationship and consequently transforming the way of working, studying, researching and expressing oneself.

Within the universe of digital technologies, the development and expansion of the Internet manifests different demands in the educational field, which poses new institutional challenges, as well as other forms of teaching and learning (Sales & Leal, 2018). Gómez (2015), based on the perspective of Castells (2009), points out that the position of individuals in front of information and knowledge defines their productive, social and cultural potential in the contemporary economy. This results in the direct social exclusion of those who are not able to assign meaning to what is accessed on a network. Therefore, the need to rethink teaching practices through different pedagogical approaches is emphasized, which are more consistent with the exercise of educational practice in the context of cyberculture.

It is also necessary to reflect on the insertion of ICTs in educational settings, in addition to the instrumental conception that places them as mere “tools” that animate traditional teaching and learning processes (Pretto, 2013). It is ne-

cessary to understand them as structuring the contexts that permeate contemporary society.

Pretto (2013) analyzes digital technologies and points out that “the use of instrumentality empties these resources of their fundamental characteristics, transforming them only into an animator of the old education that is rapidly dissolving, since the charm of the novelty also ceases to exist” (Pretto, 2013, p. 138). Therefore, they should be considered more than just tools to support teaching. They must be understood as a basis, that is, as part of the learning process to potentiate new ways of acting, thinking and living; constituting as elements that reflect the demands of contemporary society (Bonilla & Pretto, 2015).

Alves (2016), in dialogue with Lévy (2010), argues that the DICT in educational spaces causes search and research to be applied in order to solve problems. For the author, “the [...] presence of digital and telematic technologies in school environments can be a provocative learning space to investigate and seek ways to discover the different problems that arise when we are immersed in the process of building knowledge” (2016, p. 576). Therefore, when ICTs are used in addition to instruments, the ability to search, process and analyze information is promoted to solve problems critically and autonomously.

Therefore, if they are understood as structures of the teaching and learning process, they will be placed in a scenario where effective appro-

priation for the development of new senses and meanings is possible, in a critical and autonomous way. Access, create, produce, interact, publish and share are some actions capable of composing a communication flow that allows any person, anywhere, to participate and work authoritatively through the integration of digital technologies in a structured way (Pretto, 2017). It is changed from a transmission paradigm in which each consumes the content produced by others, even critically, to an authorship paradigm in which these products can be shared, used, remixed and socialized again in a “endless virtuous circle” (Bonilla & Pretto, 2015, p. 500).

In this context, reading and writing take on a new aspect, gaining other dimensions that require skills that differ from traditional techniques. Mishra et al. (2017) indicates that it is necessary to develop the ability to manage the large amount of information available on the Internet in a critical and autonomous way and, for this, the exercise of digital literacy becomes essential (Mishra et al., 2017). According to Santos et al., digital literacy is a concept that integrates other literacies. Therefore:

It will make sense that digital literacy is seen as the integrating concept of literacies before the great growth of the digital context, whose focus is technical knowledge and the use of applications, as well as other skills that highlight above all the tendency to use social networks and participatory activities and their importance for new forms of communication, expression, coexistence, learning and work. (Santos et al., 2016, p. 03)

Therefore, it is understood that for the promotion of digital literacy skills it is essential that it exists, at the same time, the integrated develop-

ment of skills to interact with DIC in a way that is not limited only to the instrumental actions of the use of technological artifacts. On the contrary, it is necessary to go further and develop a practice that allows to understand and dominate the new spaces created by cyberculture (Azevedo et al., 2018, Chan et al., 2017).

Therefore, the concept refers to the ability to use information resources to read and write in different situations in cyberspace, with an expansion of the range of contact possibilities with reading and writing also in the digital environment (Azevedo et al., 2018). In addition, we understand that the development of digital literacy implies the critical interaction of subjects with digital technologies in favor of appropriating applicability through a series of creative processes that go beyond mere use.

The problem surrounding this research is the fact that, although almost all new students in the university context are familiar with computers, cell phones, mobile devices and their applications, and sometimes make continuous use of these devices in their (CGI.BR, 2019); many of them have not yet incorporated or developed the systematic and competent use of these technologies in their academic tasks. This is mainly due to the fact that books, pencils, pens and paper continue to be predominant in the Brazilian student culture from preschool to university.

This distance between pedagogical practices with digital devices leads us to reflect on how the school, especially the university, has been creating spaces for interaction with ICTs. Increasingly, it depends on higher education institutions to participate in debates and studies that address this issue, with the aim of seeking new forms and educational models that contemplate the integration of digital technologies in favor of the generation of knowledge. The

teacher in this scenario, in addition to being an agent of education, becomes an agent of literacy (Silva, 2017).

This concern arises in view of the large volume of information available on the Internet that these students find when they arrive at the university, either to research, to study topics related to class content, or to prepare academic papers, reports, articles and others. Because of this, it is essential that digital literacy skills and competencies are developed to critically search, access, organize, store, share, and use the accessed information.

The bibliographic reference management software such as Endnote, Mendeley and Zotero, can help in the exercise of digital literacy because they have a series of functionalities and applications that assist in the preparation of academic works from the stages of search, selection, organization, reading and writing; up to the insertion of citations and references.

Aware of these problems, this work aims to analyze the forms of interaction of a group of students of the Interdisciplinary Baccalaureate (BI) of the Federal University of Bahia (UFBA) with the reference manager Zotero, which contributes to the digital literacy of these students. Among the bibliographic managers mentioned, Zotero was chosen because it is a free software (Yamakawa et al., 2014). The results of an ongoing master's research that took place in a graduate program at UFBA will be discussed.

2. DIGITAL LITERACY AND REFERENCE MANAGEMENT SOFTWARE

Literacy goes beyond the practice of decoding linguistic codes, it implies the sociocultural understanding of writing and reading practices (Soares, 2009). Due to the expansion of ICTs in our society, "the [...] concept of literacy, which at first referred only to conventional reading and writing, was extended to other spheres of knowledge construction, including the virtual sphere, giving rise to the expression: digital literacy" (Lima, 2008, p. 4). According to Xavier (2005), being digitally literate implies:

[...]performing reading and writing practices different from traditional forms of literacy. Being digitally literate presupposes changes in the ways of reading and writing verbal and non-verbal codes and signs, such as images and drawings, compared to the ways of reading and writing made in the book, especially because of the support on which digital texts are based. It is the screen, also digital. (p. 135)

Buzato (2007) states that digital literacy is associated with social practices that are intertwined and modified with digital technologies. For the author, this type of literacy requires skills to construct meanings in different semiotic spheres and the ability to locate, filter and critically evaluate the information provided. Also according to Buzato (2009):

The new digital literacies are particularly important for thinking about technological appropriation with a view to social transformations, because they allow [...] content sharing instead of private intellectual property, experi-

mentation as opposed to standardization. In short, sharing collaboration, the breaking of creative rules and hybridism rather than the dissemination of content, vigilance and purity. (p. 2)

The concept is still used in its plural form of “digital literacies”, as previously stated by Buzato (2009), highlighting its non-generic nature that begins to assume and recognize social practices as structuring of its process (Gachago et al. 2014; Gourlay, 2015). In this sense, Roche (2017) emphasizes that digital literacy is the ability to access, critically evaluate, use and create information. These actions are carried out through commitment to individuals and communities.

Suguimoto et al. (2017) problematized this concept in an evaluation with students who entered higher education. The authors carried out a quantitative investigation through a questionnaire with 12 questions that highlighted aspects of computational, communicational and informational knowledge. The authors argue that the phenomenon of digital literacy must be understood beyond the possession of new technologies for reading and writing, but rather as the assumption by the subjects of a position towards the world. That is, in addition to use, the authors point out that being digitally literate includes the need to learn to search for sources available on the Internet, as well as to read, interpret, evaluate, analyze, investigate, add and recombine information and knowledge available in these sources, in a critical way.

From the concepts presented, we understand that digital literacy refers to the skills to search,

select, store, systematize, mix¹ and share information in digital environments and make critical use of these productions in social and discursive practices. This includes contemporary mediation using digital network technologies (Dudeney et al., 2016; Coscarelli & Coiro, 2014). In this sense, interaction with bibliographic managers can contribute to the expansion of these skills by promoting the optimization of the preparation of bibliographic citations and references in accordance with technical standards. In addition, they allow to systematize and manage the selection of primary studies for the composition of academic works, which makes them facilitators of the content production process.

For Pampel and Dallmier-Tiessen (2014), a reference management system is software with a set of characteristics that maintains a database to help in the three basic steps of a search: search, store and write. In addition to organizing, this software allows the user to generate citations and references throughout the writing of the texts, identify duplicate references, select publication periods, recognize the languages of the publications, identify the most cited works, determine the authors who write the most on a given topic and the magazines with the highest number of publications on a certain topic. This type of software allows you to create groups to share, which promotes collaborative production and facilitates the formatting process at the end of the job.

There are several factors that influence the choice of a reference manager that meets the

1 For Pretto (2017), the action of remixing refers to the act of recreating from pre-existing materials and information available on the web. The author also highlights the importance of this action being seen as one of the pillars of support for educational processes, so that students become authors, freelancers and producers of content in an “endless virtuous circle” (Bonilla & Pretto, 2015 p. 500).

demands of each user. Yamakawa et al. (2014) analyzed and highlighted the main advantages of Mendeley, EndNote and Zotero; and highlighted the difficulties identified in the use of each of them. This research was carried out comparing the use of computer programs, describing some steps used during the search and the bibliographic organization.

Based on the results of Yamakawa et al. (2014), this research chose the bibliographic manager Zotero to implement this platform for the development of digital literacy of BI students at UFBA. Zotero was chosen because it is a free software capable of optimizing scientific work. It allows the user to collect, organize, cite and share information of the most diverse types, including articles, books, chapters, theses, among others. In addition to these characteristics, our choice of Zotero is justified because it allows the construction of exchange groups with a large number of people, promoting the interaction of all participating subjects (Yamakawa et al., 2014).

Zotero can be used through an extension installed in the Firefox (free browser), Chrome or Safari web browsers, or through its desktop version compatible with Windows, Macintosh and Linux distributions. This allows to import files and references from the computer itself. The software also offers more than 8,000 bibliographic and reference format styles (ABNT, APA, Vancouver, Chicago, among others) that can be integrated with the text editors Microsoft Word, LibreOffice, OpenOffice, Latex, Google Docs and NeoOffice, facilitating the insertion of citations and the generation of bibliographic references. In addition, Zotero allows the free, public or private, exchange of libraries with an unlimited number of participants, as long as they are gathered in groups.

This software supports various databases such as Web of Science, SciELO, Google Scholar, and PubMed, as well as university journals and collections. This allows to export elements in different formats such as BibTex, CSL JSON, RIS, RefWork among others. This compatibility makes it possible to use file metadata to automatically import bibliographic information such as author, title, periodical publication and volume, optimizing manual work and increasing the quality of this type of process. It is also possible to highlight and annotate PDF files through the platform, which allows the creation of files in a simple, fast and systematic way. These files can be exchanged during the writing of new works, either to make a direct or indirect citation or to consult points considered important.

Faced with our research problem, the challenge was to motivate university students to practice digital reading, writing, and instrumentalization, so that they could appropriate the characteristics of Zotero and socialize texts through the creation of networks of exchange. It is intended to subsidize the production of other articles and projects, contributing to continuous and autonomous learning and the production of new collaborative knowledge. This allows the development of skills and competences that provide autonomy for learning and insertion in the contemporary world.

3. METHODOLOGY

We sought to structure our research process through a qualitative exploratory methodological approach. The empirical space of the research was the BI of UFBA.

The BIs are a type of university course aimed at general, artistic, scientific and humanistic university education. BI were conceived as the first cycle of a training regime, a prerequisite for

a second cycle for professional training or for a stricto sensu postgraduate program (UFBA, 2008; UFBA 2010a; UFBA 2010b; UFBA 2010c; UFBA 2010d). This modality is offered in four courses at UFBA: BI in Arts; BI in Science and Technology; BI in Humanities and BI in Health. The BI project involves some curricular innovations, such as intra-institutional and inter-institutional mobility interdisciplinarity, flexibility, comprehensiveness, modularity and progressivity.

The IB subjects participating were Arts, Science and Technology, Health and Humanities with 11 students. These were enrolled in Contemporary Studies I, in the first semester of 2019. Regarding the fundamental ethical aspects for the execution of an investigation, the participants signed a free and informed consent (ICF) on the registration of their knowledge, the purpose and the details of the investigation, guaranteeing their anonymity and responses.

The data production instruments used in this research were participant observation and a questionnaire. The first instrument was used to stimulate constant reflection throughout the research process, based on the demands and needs encountered along the way. This instrument proposes that the observer actively participate in data production activities and requires the aptitude of the researcher to adapt to different situations (Pawlowski et al., 2016). The observation of the participants took place throughout the intervention using a script developed based on the theoretical foundations adopted in this study. It sought to document the digital literacy practices that emerged during the interaction.

The questionnaire was applied using Google Forms and its objective was to help understand the profile of the participants, favoring the impartiality of the observation and specifically

identifying the types of interaction between the participants and the reference management software.

3.1 STAGES OF THE RESEARCH

The first stage of the research was the transversal implementation of Zotero to the pedagogical practice of a BI group at UFBA in 2019. Due to the structural limitations of the institute, the computer lab was not available for the direct interaction of participants with the software. For this reason, the management software functionalities were presented through a participatory exhibition in which the main applications were highlighted with practical examples. The participants were asked to install the bibliographic manager on their personal computers. In the same meeting, a virtual library was created and shared with the class, along with the bibliography that would be used throughout the study. It included articles, book chapters, videos, blog texts and other digital materials.

Among the proposed activities, each participant must individually produce an academic document written in an argumentative essay format. Therefore, the second stage of the research consisted of observing and monitoring the written productions of the students, seeking to identify how they interacted with the software. At this stage, an online exploratory questionnaire with introductory questions about the interaction of these subjects with Zotero was applied to track digital literacy indicators in parallel with the observations made.

3.2 ANALYSIS OF DATA

The records of the observation script and the questionnaire were analyzed based on the works of Rosa (2013), Rosa and Dias (2012) and Dias and Novais (2009), where the authors present a proposed matrix with the description

of skills and competences needed to read and write in digital environments.

According to Dias and Novais (2009), for the field of education, a skills matrix is a “list of skills and competencies that an individual needs to solve a problem, generally organized by area of knowledge” (Dias & Novais, 2009, p.2). In this sense, the authors point out four great actions of competent users in digital environments as “the main skills that a user must develop to improve their digital literacies, regardless of the nature of their practices” (Dias & Novais, 2009, p. 7). These are: using different interfaces; search and organize information on a network; read digital hypertext and produce texts (oral or written) in cyberspace.

Rosa (2013) and Rosa and Dias (2012) extend this discussion by building a matrix based on two dimensions:

1. Technical-operational skills in ICTs, which refer to the use of computer peripherals and include the identification of icons and features. Turns the computer on and off, recognizes and identifies icons and nomenclatures representing online and offline programs and applications. That is, the recognition of hardware, online and offline graphical interfaces and computer operating processes (Rosa, 2013; Rosa & Dias, 2012).
2. Information skills in ICTs, which refer to the ability to select, collect, organize, cite and share the information that is sought and produced in a virtual environment. Understands copyright rules, using them in the production and remixing of digital texts. Evaluates the information in terms of validity and security (Rosa, 2013; Rosa & Dias, 2012).

Going from the general to the specific scope and with respect to the technical-operational dimension in ICTs, the initial contact with Zotero can promote practices that involve both the recognition of the main icons and software plugins associated with each functionality. It also encourages the ability to navigate the interfaces, identify download icons and record the different ways of organizing personal libraries in Zotero.

In the informational dimension, Zotero can optimize the processes of search, selection, organization and storage of the large amount of information available on the Internet, since it is compatible with various databases and institutional repositories.

Zotero allows you to manage your collection and automate the generation of citations and references, along with the creation of shared libraries in which users can socialize their stored texts through the creation of shared networks and dialogue with their peers. This promotes the production of other content and creates work networks, building knowledge cooperatively and collaboratively from these interactions.

Consequently, it is clear that a digitally literate individual understands himself within a broader context, appropriating digital technologies through a series of creative processes that go beyond mere use; they become critical in the construction of knowledge. From the concepts presented, the results of this research were analyzed considering digital literacy skills in the technical-operational and informational dimensions (Rosa, 2013; Rosa & Dias, 2012).

4. RESULTS AND DISCUSSION

Based on the perspective that “the degree of digital literacy of the subject grows as the mastery of the technological devices that it uses in its daily actions increases” (Xavier, 2011, p.6), we seek to create an environment where university students can implement the different Zotero applications in their daily academic practices. This seeks the development of skills and competencies in: reading and writing on digital devices; search, process, organize and critically evaluate the vast amount of information available on the web; systematize the process of citations and bibliographic references according to normative standards and share their work digitally with the support of the software. Among other actions that could arise from the interaction, they become digitally literate in Zotero (Souza, 2016; Santos, 2016; Buzato, 2009).

The profile of each of the 11 volunteer research participants was identified through the questionnaire distributed among the IB courses in Humanities, Health, and Science and Technology. It is worth mentioning that there was no participation from the Arts students.

Regarding the resources used to read the texts of the topics, 8 respondents reported using their personal computers. This confirms that most of the participants are already immersed in the digital world. It should be noted that, although digital texts were used and the files were made available in the shared Zotero library, 4 participants used printed books (paper) to read.

This shows the resistance of this group to give space to digital reading and writing practices and their applications, mainly in word processors (Microsoft Word, Libreoffice Writer) and PDF readers/editors (Adobe, Preview, Foxit,

Master). This occurs mainly because books, pencils, pens and paper continue to be the predominant in the Brazilian pre-university school culture.

In addition, 100% of the respondents revealed that they did not know about Zotero. Among the hypotheses that can justify this fact, two stand out: the absence of discussions about the functionalities and potential of the reference managers in the classroom and in pedagogical practices; and the possibility of not including students in research contexts or scientific initiation, which require greater attention to academic writing.

According to Xavier (2005) and Azevedo et al. (2018), the acquisition and development of skills and competencies require time and dedication. Therefore, the appropriation of the functionalities of the reference manager may have become a more complex process, considering that the school term is only four months long and that the students had no previous contact with Zotero.

From this aspect, crucial points were observed. In the first meeting, even after the participatory presentation of the software, 5 of the 11 respondents asked about the real usefulness of Zotero and why we chose to attach the files by this means instead of simply attaching it to the Moodle section of the subject. They still treated Moodle as a repository, leaving aside the functionality of the bibliographic manager and reducing its applicability in an instrumental perspective.

Given the context of cyberculture, it is urgent that teachers, as mediators of the interaction process with ICTs, are prepared to take a critical position in the face of these questions and manifestations. They should try to fill these

gaps through pedagogical practices that promote critical reflection on the use of digital technologies as well as simple tools, repositories, instruments or resources for the pedagogical support of a traditional academic activity (Canto, 2019).

Although some testimonials revealed some resistance to the implementation of Zotero in the proposed activities, 100% of the participants said that they accessed the shared library in the software to download the bibliography files for the course. These actions are associated with technical-operational skills (Rosa, 2013; Rosa & Dias, 2012), which include the use and recognition of the interface and the functionalities present in the initial contact with the bibliographic manager.

Of the 11 students surveyed, 7 revealed that they did not organize their personal libraries through Zotero. Of these, 6 justified that they did not do it due to lack of time. However, we must highlight the justification of the seventh participant: "I prefer to organize my content in Google Drive". This evidence reveals the existence of a gap between the perception of the different functions of each application, since Google Drive is a cloud for storing and synchronizing files. Zotero, on the other hand, is a bibliographic manager capable of optimizing scientific work, allowing the user to collect, organize, cite and share information of the most diverse types; including articles, books, chapters, theses and other types of documents that digital libraries make available.

In addition, 9 of the 11 participants said that they used Zotero to systematize the bibliographic references. This statement is counteracted by important data obtained through the

correction and analysis of written works, 6 of them were not in line with the standards of the Brazilian Association of Technical Standards (ABNT). According to Xavier (2005), being a digital literate presupposes changes in the ways of reading and writing through mediation with digital technologies. The lack of organization of the library, as well as the errors evidenced in the written works, indicate that these students did not appropriate the environment and did not optimize the work of citations and references through the software.

This result indicates that 3 of the 11 students who participated in the research developed informational skills in digital literacy that include the recognition, search, access and retrieval of information available on the Internet with critical importance regarding the quality and reliability of the content (Warschauer, 2006); in addition to the skills to synthesize, produce, remix, share their productions and dialogue with their colleagues through Zotero.

This contrast identified between the observation of the written works and the data of the questionnaire shows a certain inconsistency that can be justified by the apprehension that the participants feel of being in a critical position, fearing that revealing their opinions will affect their evaluations of the subject. Other possible reasons may explain the identified controversy: the participants may not have understood the full potential of Zotero, the contact time with the bibliographic manager may not have been long enough for people to learn to use it in its entirety, and the tendency where research participants answer questions with the intention of pleasing the researcher.

5. CONCLUSIONS

The results indicated the difficulty of the participants to become literate in digital environments, especially those that require prior knowledge of standardization such as ABNT. Because of this, they were reluctant to use the Zotero bibliographic manager. Some preferred to search the bibliographic material on the Internet without making use of the class group in the shared library, while others did not install the software on their own computers and chose to use the web version that does not have most of the features. In addition, it was possible to verify that the Zotero functionalities were not used to make citations and references when correcting the written productions of these participants.

It is worth mentioning that the intervention was not carried out in the institute's computer lab due to the lack of physical space during class hours. The interaction with the software in the classroom was limited to participatory exhibitions. This may have been one of the main factors that hindered the appropriation of the Zotero functionalities and, consequently, the development of some digital literacy skills, since there was no mediation by the teacher throughout the process. This forced participants to interact with the software outside of the classroom, demanding more autonomy on their part.

It is concluded that the evolutionary process observed is still embryonic, since the acquisition of skills for digital literacy does not occur immediately and simply. In addition, the need to strengthen these practices to consolidate skills was identified. Therefore, this study supported the proposal of an extension course entitled "Digital reading and writing with the mediation of Zotero" in which the questions posed in this

article and others that arose during the course were recovered.

The creation of this course was based on the assumption that the participants will be immersed in an environment that promotes the development of skills and competencies to read and write digitally from direct contact with the software and the mediation of a teacher. The proposal of the course is that students are not only literate, but also critical, autonomous and digitally literate, essential characteristics for insertion in contemporary society structured by ICTs.

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