COLLABORATIVE PRODUCTION IN DIGITAL ENVIRONMENTS: USING WIKI TO PROMOTE DIGITAL LITERACY AND HEALTH COMMUNICATION

PRODUÇÃO COLABORATIVA EM AMBIENTES DIGITAIS: O USO DA FERRAMENTA WIKI PARA A PROMOÇÃO DO LETRAMENTO DIGITAL E DA COMUNICAÇÃO EM SAÚDE

PRODUCCIÓN COLABORATIVA EN ENTORNOS DIGITALES: EL USO DE LA HERRAMIENTA WIKI PARA PROMOVER LA ALFABETIZACIÓN DIGITAL Y LA COMUNICACIÓN EN SALUD

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ABSTRACT: Open collaboration platforms have changed how knowledge is created, shared, and consumed. To open and increase access to knowledge, Wikipedia is an open educational resource and pedagogical tool that allows direct and transparent observation of writing, research, social collaboration and rhetoric practices and concepts in digital environments. This search is bibliographic in nature and analyzed theoretical references selected for their academic relevance and adherence to the context of collaborative production in digital environments to promote digital healthcare literacy and communication. This article discusses the theoretical aspects of using Wikipedia as an active methodology tool, focusing on its applicability in teaching, research, and extension activities and, as a result, on the skills acquired by students, support structures for pedagogical practice, science dissemination and health care education.

KEYWORDS: Digital literacy. Wikipedia. Health communication. Higher education.

RESUMO: *As plataformas de colaboração aberta mudaram a forma como o conhecimento é elaborado, difundido e consumido. Com objetivos de abrir e aumentar o acesso ao conhecimento, a Wikipédia é, em sua essência, um recurso educacional aberto e uma ferramenta pedagógica aberta, que permite a observação direta e transparente de práticas, conceitos relacionados ao processo de escrita, à pesquisa, à colaboração social e retórica no meio digital. A pesquisa, de caráter bibliográfico, apresenta uma análise de referenciais teóricos selecionados por sua relevância acadêmica e aderência ao contexto da produção colaborativa em ambientes digitais para a promoção do letramento digital e da comunicação em saúde. Traz os aspectos teóricos da utilização da Wikipédia como uma ferramenta de metodologia ativa, enfocando a sua aplicabilidade nas atividades de ensino, pesquisa e extensão, e, assim, as competências adquiridas pelos estudantes, as estruturas de apoio para a prática pedagógica, difusão científica e educação em saúde.*

PALAVRAS-CHAVE: *Letramento digital. Wikipédia. Comunicação em saúde. Educação superior.*

RESUMEN: *Las plataformas de colaboración abierta han cambiado la forma en que se crea, difunde y consume el conocimiento. El objetivo de abrir y aumentar el acceso al conocimiento, Wikipedia es, en esencia, un recurso educativo abierto y herramienta pedagógica abierta, que permite la observación directa y transparente de prácticas, conceptos relacionados el proceso de escritura, investigación, colaboración social y retórica en el entorno digital. La investigación es de carácter bibliográfico y presenta el análisis de referentes teóricos seleccionados por pertinencia académica y adherencia al contexto de producción colaborativa en entornos digitales para la promoción de la alfabetización y comunicación digital en salud. Este artículo discute los aspectos teóricos del uso de Wikipedia como herramienta metodológica activa, centrándose en su aplicabilidad en las actividades de docencia, investigación y extensión, y por ende, las competencias adquiridas por los estudiantes, las estructuras de apoyo la práctica pedagógica, la divulgación científica y la educación en salud.*

PALABRAS CLAVE: *Alfabetización digital. Wikipedia. Communicatión en salud. Educación superior.*

Introduction

Information and Communication Technologies (ICTs) refer to the set of technological tools, applications and resources to communicate, manage and process information. More specifically, in education, Digital Information and Communication Technologies (TDIC) are used, which are technological means that allow the educator to teach a class in a more dynamic, interactive and collaborative way than in previous years, in the daily lives of students, covering different levels of academic and professional training. (SCHUARTZ; SARMENTO; 2020). ICTs aim to facilitate the teaching and learning process, while opening up possibilities for new forms of action, interaction, and knowledge acquisition. From this point of view, education and communication practices change as technological innovations are integrated into everyday life and socially appropriated (DIEB; PESCHANSKI; PAIXÃO, 2021).

Although the use of technological resources in teaching is an advantage nowadays, they must mediate the teaching and learning process, and success in achieving good results depends, to a large extent, on good choices regarding the tools, mainly aiming at motivation of the student. Thus, the use of these integrated teaching tools, despite currently playing an important role in the teaching-learning process, becomes a challenge, as the results may or may not be as expected.

In this context, it is believed that the role of the teacher or tutor is fundamental in conducting proposals that intend to use TDIC as a pedagogical resource, and they must be prepared so that they can use them efficiently in their teaching methodology. According to Alves (2007), the insertion of ICTs in teaching changes the role of the educator from 'transmitter of information' to mediator in the construction of knowledge, provocateur of situations, respecting different types of knowledge. In addition to the role of the teacher in this process, it must be considered that most students were born and raised in the digital age, the so-called digital natives, and therefore are no longer those whose pedagogical practice was structured by the educational system in the past, basically composed of by lectures. On the contrary, students currently make intense use of digital technologies, which has allowed them to exercise control over the flow of information, often discontinuously, dealing with content overload, mixing virtual and real communities, communicating in a network, according to your needs (FRANCISCO; FERREIRA; GOULART, 2019). The presence of digital technology in schools has changed the way students learn, interact and communicate. Given this profile of the students, agreeing with Bizzo (2002), there is a need to provide situations in which the student

can raise hypotheses, make judgments, develop a critical attitude and, in this way, build scientific knowledge.

In line with the advancement of digital technologies and the increasing frequency of devices such as *ipods*, cell phones, smartphones, *tablets* and computers connected to the internet, there was a significant change in society's social practices and, specifically, in reading and writing practices. In the scope of higher education, as well as in other social spheres, different positions regarding reading and writing practices will be assumed by the subjects depending on the ways in which this language modality can mediate, in the case of the referred context, the relations established between academic knowledge, teachers and students (STREET, 2010; OLIVEIRA, 2017), permeated by digital technology and cyberculture. In this context, the concept of digital literacy emerges. Traditional literacy differs from digital literacy, as the latter conducts digital reading and writing practices in cyberculture, in a different way from that where chirograph and topographic reading and writing practices are conducted (SOARES, 2002).

In the current context of cyberculture, communication processes require subjects to have specific knowledge to operate with different means, technologies, devices and supports and with different modes of interaction, genres and languages, transiting between different contexts, cultural practices and events in which literacies digital develop. In this sense, the discussion about required knowledge and skills is a fundamental issue and makes it possible to understand how, where and under what conditions appropriations can occur in such processes (FERNANDES; CRUZ; AMANTE, 2017).

Digital literacy is not just about teaching the subject to encode and decode writing, learning to use graphic interfaces and computer programs, but the ability to construct meaning, and work broadly and interactively with electronic information (BUZATO, 2006). Thus, Digital Literacy does not mean just surfing the web, but using it as a means of obtaining knowledge. This practice of reading in digital format involves new challenges and multisemiotic and multimedia possibilities (GOMES, 2018).

According to Bento and Araújo (2022), the context and period in which the writing process occurs influence, as well as the discursive community where the message circulates. Through the advent of technology, the act of writing presents new characteristics. Digital technologies, as a new discursive practice, consider, in addition to these factors, the digital support for writing, which can influence the way of writing, the means of interaction and the constitution of the discursive genre. From this perspective, the act of writing online it can be

individual and/or collaborative, and the interaction can take place through resources that enable interaction, such as comments and sharing, allowing the written message to be reflected by readers and taken to places beyond the screen it is on. As a result, discursive genres can be elaborated and re-elaborated, bearing in mind the various semiosis that permeate their production and consumption in a digital environment, which enables transformations.

It is important to consider that the popularization of the internet was marked by a new generation of websites, the so-called Web 2.0, characterized by the direct participation of users in the creation, publication and editing of content, and, thus, the World Wide Web revolutionized our access to *information*. According to D'Andréa (2007), an abundant number of remote sources are immediately within our reach, however, with the development of Web 2.0 technologies, the production of informative content is no longer limited to professionals. Anyone with internet access can contribute informational content on the web. Lay people are, therefore, not only receivers of information, but also its producers. Interestingly, a large number of these products are the result of collective actions, as Web 2.0 has allowed people to collaborate at an unprecedented level (D'ANDRÉA, 2007).

Among all the technologies that make up Web 2.0, one stands out for its "radicalism" in the application of the concept of decentralized and collective production of content: the publishing systems of wiki technology (D'ANDRÉA, 2007). Based on a web environment, the main feature of a *wiki* publishing system is the possibility for any visitor, at any time, to change any information published in an article, simply entering and accessing the edit page linked to each page. The text edition is immediately published and will be considered the current version until another visitor changes the text produced by the previous user. In this context, open collaboration platforms have fundamentally changed the way knowledge is produced, disseminated and consumed, and are presented as potential tools for education, insofar as they enable a new form of learning and cooperative and collaborative construction of knowledge, as is the case of Wikipedia (BRESCIA *et al.,* 2016). With its goals of opening up and increasing access to knowledge, Wikipedia is, at its core, an open educational resource and an open pedagogical tool. By uniting teaching and technology, Wikipedia tends to change the reader's relationship with the text, becoming a combined space for reading, articulating and distributing knowledge in a different way from books (BRESCIA *et al*., 2016).

The *Wikimedia Foundation* coordinates a set of platforms such as: *Wikimedia Commons*, Wikiversity, Wikipedia, Wikidata, Wikibooks, etc. Among these, the best known, and also one of the most sought after by students around the world, is Wikipedia. Launched on January 15,

2001, it is the fourth most visited website in the world and is available in 306 different languages, with more than 50 million articles. Wikipedia citations in scientific articles have grown over time, as high-impact journals have become more referenced in the digital encyclopedia. Since Wikipedia's inception in 2001, teachers around the world have integrated the free encyclopedia that anyone can edit into their curricula. In 2010, the *Wikimedia* Foundation initiated the Wikipedia Education Program to provide further support to teachers interested in using Wikipedia as a teaching tool, and encourages the adoption of activities to expand the scientific content on the platform by educational graduation and post-graduation programs (WIKIMEDIA FOUNDATION, 2010).

In this model of teaching and learning, the student has the role of active subject in the learning process, acquiring his intellectual autonomy, while the teachers assume the role of tutors or facilitators, guiding the student to build teaching together. Thus, the active approach implies greater involvement, dedication and, consequently, responsibility for the knowledge construction process for the student (SEBOLD *et al.,* 2010).

Working with Wikipedia is increasingly seen as capable of promoting reflection on traditional study models and the re-signification of the roles of students and professors during graduation, extrapolating the didactic character of the teaching-learning process (VITAL, 2017). Education based on Wikipedia allows direct and transparent observation of practices and concepts related to the writing process, research, social collaboration and rhetoric in the digital environment, and may offer opportunities for authentic writing situations (VETTER, 2020). Beyond observation, editing on Wikipedia also provides opportunities for a public-facing writing experience with an authentic audience, where the writing situation becomes immediate and much more tangible for students and often results in increased levels of motivation among students. (VETTER, 2020).

Skills acquired by students

Wikipedia can be defined as a specific form of the interactive internet, a free multilingual electronic encyclopedia, which counts in the sum of its several versions dozens of articles, written according to strict rules about information reliability, considered "the closest analogy of what should be the cooperative authorship of higher order educational resources" (BENKLER, 2009). The educational potentials of this *wiki* project were investigated from several perspectives, including the motivations of teachers (XING; VETTER, 2020), the public

impact of scientific information inserted in wiki-education programs (SMITH, 2020) and innovative models in active didactic methodologies (ZOU *et al.,* 2020).

We start from the premise that the use of Wikipedia as an active teaching methodology tool can contribute to the promotion of digital and scientific literacy of higher education students, as well as to quality professional/academic training in terms of content and issues involved with the area of knowledge in which the profession is inserted. This hypothesis is based, especially, on the fact that its effective implementation presupposes delegating to the student a position as a participant and protagonist of the teaching-learning processes and, therefore, of the teaching-research and extension activities.

The pertinence of using this tool, as an active methodology, stems from the production conditions involved in the preparation of entries, about topics and contents relevant to academic training, to be published on Wikipedia. This is because such conditions, determined from the interlocutory context in which it is inserted (that is, who the interlocutors are), what is its purpose, and in which time and social sphere it circulates (GERALDI, 2013), demand from the student to appropriate knowledge and resources, scientific and linguistic, that allow them to produce a text that:

- aims to share and disseminate information and technical-scientific knowledge and, in this way, extrapolate the evaluative function that guides, traditionally and predominantly, the reading and production of texts proposed during the teaching-learning process at all levels of school education, including higher education;

- will circulate in a public sphere, through a digital vehicle, thus promoting, in addition to debates and reflections limited to the relations established between professors and students in the academic context, the democratization, dissemination and accessibility of academic knowledge among the population in general;

- is produced from a certain textual structure, from a lexical repertoire and style that contemplates the characteristics and specificities of the textual genre denominated as an encyclopedic entry, as well as from a concise and clear language.

- be based on technical-scientific knowledge already described and systematized around the theme of hearing health, which implies extensive and careful reading and the development of an up-to-date, clear and consistent synthesis around the theme addressed.

The use of Wikipedia in activities with students, focusing on the skills they can acquire in wiki-education programs, goes against a still common view of rejecting the educational potential of this collaborative project (WATERS, 2007; KONIECZNY, 2016). This view is counterproductive, as Wikipedia is a source of research for most students (HEAD; EISENBERG, 2010; KNIGHT; PRYKE, 2012). Barring the use of new technologies in the classroom generates tension between teachers and students (LIM, 2009) and, in the case of Wikipedia, it is not justified, as it is recognized as a reliable source of information (RIBEIRO; GOTTSCHALG-DUQUE, 2011) and an effective means of scientific dissemination (CEBALLOS *et al.,* 2021).

According to Vetter (2020), as students reflect on their learning in co-authoring reflections, they will be able to emphasize opportunities and applications related to teaching writing, research and digital literacy at the undergraduate level. It also complements that future educators demonstrated, by participating in the Education Program based on Wikipedia, the ability to teach about the introduction to academic writing, the evaluation of citations, the integration of sources and documentation, digital literacy, in addition to observing how this type of pedagogy can be a motivating educational task due to its public nature.

The production of a Wikipedia entry in an educational environment has been described as a typical six-step process (MCDOWELL; VETTER, 2022). First, the quality of articles already developed is evaluated, considering criteria such as neutral language, the encyclopedic writing style, the organization of knowledge and the completeness of the available information. Second, there is the selection of the article or topic on which one intends to contribute, which requires the student to confront what eventually already exists on Wikipedia with secondary sources on the same subject. Third, there is research on the selected topic, with the search for reliable sources, as defined in Wikipedia, and the decision on the appropriate references to be used. Fourth, there is a work of synthesis and systematization of the collected information, conforming it to the editing and writing rules in Wikipedia. Fifth, an entry draft is produced, which, among other points, allows the apprehension of basic editing techniques, such as hypertextual writing and the use of basic editing codes. Finally, there is the publication of edits, with the eventual response to questions, interacting with the community of regular Wikipedia editors. The process has variations, for example according to the objectives (MORAES *et al.,* 2016), the levels of interaction with the community (GOMES; PAGANOTTI, 2013) and the context (PESCHANSKI; DIELLO; CARRERA, 2015) of the educational activity in which the words are produced.

Editing on Wikipedia, in the classroom context, can be understood as an open educational practice, in part because the content is potentially read by millions of people, which positively affects the sense of civic and social responsibility (VETTER; MCDOWELL; STEWART, 2019). Practice is also related to the development of various skills and competencies, including those recognized as the most important for teaching and learning processes in the 21st century (BOHOLANO, 2017). These skills and competencies include, according to the literature:

● The production of articles on Wikipedia is related to the development of information literacy, specifically the notion that authority is constructed and contextual (VARELLA; BONALDO, 2020), that the creation of information is an immersive and cooperative process (BALL, 2019; VETTER; MCDOWELL; STEWART, 2019), that research is carried out with critical investigation (MURRAY *et al.,* 2020) and that there are strategies for the search and systematization of quality content (MCKENZIE *et al.,* 2018). In addition, students working on Wikipedia improve their academic and digital knowledge, as they have to deal with multiple sources and develop their ability to differentiate reliable material from other types of content (VETTER; MCDOWELL; STEWART, 2019; DAVIS *et al.,* 2023), in fact-checking practices and combating scientific misinformation (DI LAURO; JOHINKE, 2017; MCDOWELL; VETTER, 2020). Students also develop a systemic understanding of the knowledge they deal with, in the sense that they are able to differentiate well-developed content from those that lack information (CALKINS; KELLEY, 2009).

● Editing on Wikipedia is also related to the development of a broader understanding of plagiarism and source attribution (PREMAT, 2020) and the use of free licenses, associated with open scientific dissemination practices (RUSH; TRACY, 2010). This understanding is related to the peer review environment, in which students need to collaborate for the production of content with other interested parties, thus stimulating discussions on encyclopedic writing practices (CUMMINGS, 2009).

● One of the fundamental characteristics of work on Wikipedia is its "authenticity", in the sense of being a direct intervention of skills and competencies developed by students in an interface with broad social impact, with collaborative review, and not just a work read by one or a few professors. (SOTIRIADED *et al.,* 2019). Authentic activities in this sense are considered more motivating (VETTER, 2014) and are also related to greater employability, including the production of content on Wikipedia in CVs (JOHINKE, 2020).

Another important aspect is the participation of postgraduate students in the Wikipedia-Based Education Program, which could aim at training teachers for future educators in digital literacy. As they reflect on their learning in co-authorship reflections, graduate students will also be able to emphasize opportunities and applications related to teaching writing, research and digital literacy, working at different levels of academic training. According to the study by Vetter (2020), future educators demonstrated, by participating in the aforementioned program, the ability to teach about the introduction to academic writing, the evaluation of citations, the integration of sources and documentation, digital literacy, in addition to observe how this type of pedagogy can be a motivating educational task due to its public nature.

Support infrastructures: Wikiversity and Outreach Dashboard

The skills and abilities described in the literature do not immediately appear in the work of editing Wikipedia, but depend on educational planning and *design*, sometimes demanding on the part of teachers. Recommendations in the literature include: carrying out more extensive assessments with impact topics, organizing supplementary sessions to develop research and referencing skills, developing critical Wikipedia reading sessions prior to starting encyclopedic writing activity, and formatting the work as a group project (VETTER; MCDOWELL; STEWART, 2019).

The planning of educational activities on Wikipedia, or on Wikimedia in general, is facilitated by the support of groups of Wikipedians, the reference to resources aimed at didactics and technological platforms. Wikipedians, usually organized in what is called "Wikimedia affiliates", act to guide education programs, conduct editing training, organize periodic meetings and resolve doubts of teachers who carry out education programs (DAVIS *et al.,* 2023). There are brochures and multimedia content aimed at wiki-education, for example "Wikipedia from A to Z" in Portuguese (WIKI MOVEMENT BRASIL, 2020), in addition to a periodic bulletin in English on global cases of educational activities (WIKIMEDIA, [21--]).

Technological platforms on Wikimedia have been developed to support work on wiki-education. In 2006, Wikiversity in English was created to: develop and host educational materials, such as videos, guides, essays, lesson plans; provide a space for the development of learning activities and communities; and facilitate research projects and host research results (LAWLER, 2008). In 2022, Wikiversities existed in seventeen languages, including Portuguese. More recently, projects have emerged for the development of broader interactive

and multimedia teaching and learning interfaces, in the format of *Massive Open Online Courses* (MOOC0 with a focus on scientific journalism (DIEB; PESCHANSKI; PAIXÃO, 2021) and hearing health, in the implementation phase, with support from the State of São Paulo Research Foundation (project 21/06902-2).

The Outreach Dashboard is a platform for assigning tasks and tracking student edits linked to an education program, keeping information about the course in a control panel and facilitating the review of work as it is carried out (FERLA; LIMA; FEITLER, 2020). The platform also allows access to training modules and exercises for students and allows the aggregation of results, with potential for communication and research of activities (CEBALLOS *et al.,* 2021). The Outreach Dashboard is also useful for connecting different programs, thus having general data on campaigns, which was carried out in a series of activities with students promoted in several institutions in the context of a global campaign on hearing health (MURPY *et al.,* 2019).

Wikipedia as a health education strategy

It is well known that scientific publication has tried to promote the dissemination of knowledge, bridging the gap between academia and public knowledge. Despite the fact that today there are countless scientific journals and millions of articles are published annually, the vast majority of scientific knowledge is still not easily accessible to the public because journal subscriptions are expensive and most of it is written in a format and style not easily accessible and understandable by the lay reader.

On the other hand, there is a tendency for the search for information through digital means, by different groups, mainly for the search for information related to health, which receives a large and growing number of views in online searches, whose resources can be explored in the most diverse themes to reach the public (TROTTER; MORGAN, 2008). In this sense, one thinks of the democratization of scientific knowledge, reaching different spheres of the population and giving them power, since they make information accessible that society can use (BIZZOCCHI, 1999), considering health communication as a tool of improvement in the quality of life (RIBEIRO*;* TELES; MARUCH, 1997). In this way, scientific diffusion has been seen as an instrument and social movement, allowing the advancement of citizenship and enrichment of the health of different groups (BIZZO, 2002).

The consultation of this information is expressive and its data are at the top of the results, being accessed by millions of users, including heavily in the areas of science and health, both by the lay population and by its professionals (HEILMAN *et al*., 2011). Furthermore, citations of the electronic encyclopedia in academic articles are on the rise (PARK, 2011), as well as its opposite, as publications of greater scientific impact are increasingly referenced in Wikipedia (TEPLITSKIY; LU; DUEDE, 2017).

In this way, it is understood that Wikipedia is already inserted in the academic environment and, in this scenario, the most advantageous thing is to work towards ensuring and expanding its quality (PAIXÃO *et al*., 2016). In view of this, something very interesting to do is to face this process in a way that benefits the learning of students at universities. It is even more interesting to unite the work in favor of university education with the maximum benefit to the population through the subsequent free availability of the high-quality material to be produced.

The flexible nature of a Wikipedia assignment allows students to direct their own research, find topics they are interested in, and ultimately facilitate public knowledge about something they care about. Students are great "translators" of scientific information because they remember what it was like to learn about these complex topics for the first time. It is also observed the stimulus to collective work, providing access to a discussion environment, enabling the improvement in the understanding of the explored content, in addition to the development of communicative skills, fundamental to health professionals (AMORIM *et al.,* 2019).

Therefore, Wikipedia can be used as a health education strategy, a theme that has been advocated in higher education, with the aim of forming qualified individuals with an understanding of the principles established by the Unified Health System. in addition to technical-scientific knowledge, different practical actions in graduation in the most diverse aspects of public interests, aiming to carry out the responsibilities of ethical education, social and academic equality (MELLO; ALVES; LEMOS, 2014). Thus, professional training in the health area should seek as a reference, in addition to technical-scientific qualification, the development of skills that are consistent with welcoming practices and caution regarding the various dimensions and health needs of individuals and society (NIOSH, 2019).

Universities should provide support to offer healthcare students opportunities to get to know their reality better and train professionals capable of working in teams, thinking critically, learning how to learn, working in an articulated manner with health services and with the

community, to produce relevant knowledge (BRANT *et al.,* 2004). Collaborations related to health that include activities with Wikipedia are examples of advanced internet applications and the use of new technologies in education and health promotion (MIETCHEN *et al.,* 2021). Specifically in relation to written language, TDIC can be a potentiator in the work of promotion and therapeutic practice (DONIDA *et al.,* 2019; BERBERIAN; BORTOLOZZI; GUARINELLO, 2006).

Final remarks

The expansion of the internet provided by the advancement of cyberspace brought new forms of reading and writing practices, making urgent actions to promote digital literacy. Given the approaches presented, we can state that an Education Program based on Wikipedia can work in different educational contexts, including, in addition to teaching activities, actions related to research and extension. In this way, it is configured as a useful tool at the university, helping to develop active teaching methodologies consistent with contemporary demands, with the use of technological resources in the classroom or in any other academic context.

Collaborations between Wikipedia and the academy favor these actions through the creation, editing, revision and translation of encyclopedic entries, which supports not only the development of student skills, but the improvement of the content available on Wikipedia, through a collaborative, interactive and versatile work, benefiting a large number of people who seek information in the most diverse areas of knowledge, but mainly those related to health.

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