WIKIPEDIA AND MEDIAWIKI: TWO KEY ELEMENTS OF A WIKIPEDAGOGY PRACTICE

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Abstract— **In this text we aim to present the planning of the curricular integration of Wikipedia in Higher Education, more specifically in the course "Research in Education", of the 1st year, 1st semester, of the Master programme in Information Management and School Libraries of the Open University Portugal. The pedagogical exploration of this encyclopedia in this master's degree began in the academic year of 2020/2021. However, the innovation now lies in the fact that we are proposing to replace one of the platforms formerly used (Google Docs) by MediaWiki, and expand the activities in this software. So, in addition to editing the Wikipedia articles in the encyclopedia's main domain, students will simultaneously work in the Wikipedia test pages and in the Open Textbook, also created in MediaWiki, about the topics related to the 3rd theme of the course, 'Research in Education: data collection and analysis'. At a pedagogical level, work is designed to be collaborative, bearing in mind active methodologies, like Flipped Learning, in the framework of Open Education, ultimately targeting at the development of the Wikiliteracies, as embodied in a Wikipedagogy practice.**

Keywords—open education, open educational resources, open educational practices, university education, Wikipedia curriculum integration.

I. INTRODUCTION

Information and Communication Technologies (ICT) and Networked Educational Technologies (NET) today are unavoidable elements in education, namely when we envisage both the curricular and pedagogical integration of the contemporary online encyclopedia – Wikipedia [1]. Undoubtedly, Wikipedia is a resource that is accessed all over the world, being used as a source for carrying out school and academic work [2]. It is important to highlight that, in addition to the acquisition of a broad set of skills, it is transversally embodied in the areas of digital literacy and information literacy, either when promoting a critical reading of Wikipedia articles, or by editing them [3][4][5]. And, although not yet explicitly, nor generalized, we currently identify teachers and institutions that promote it as a tool to stimulate the teaching-learning process in different scientific fields and levels of education [6][7]. However, the curricular integration of Wikipedia, in an educational context, is still essentially carried out in Higher Education, though it also occurs at other levels of education, depending on the function assigned to it [8][9]. In the case reported in this text, the integration refered to is focused on the *Mestrado em Gestão da Informação e Bibliotecas* (MGIBE) (Master in Information Management and School Libraries) of the *Universidade Aberta* (UAb) (Open University Portugal), more specifically on the course or Curricular Unit (CU) of *Investigação em Educação* (Research in Education).

Our purpose is focused in presenting the planning that gave rise to the curricular and pedagogical integration of Wikipedia in the specific course already mentioned, an educational context that is sustained in Open Education, which we address in the following section, among other theoretical milestones. Then, we identify and contextualize the planning of the course itself, before concluding with brief final considerations.

II. THEORETICAL CONTEXTUALIZATION

A. Open Education

Before starting the theoretical contextualization of Wikipedia, it is important to relate this current phenomenon to Open Education (OE) and, consequently, to the role that Open Educational Resources (OER) and Open Educational Practices (OEP) assume in it. Therefore, we understand OE in the line of [2], that is, we revisit both the founding concepts (motivations) and the practices and challenges (implementations) of OE. Thus, we highlight, among the founding concepts, the "Open Access Education" movement, the "Web 2.0 Culture" and the "Open Source Software" movement; among the practices and challenges, we highlight phenomena such as "Open Access", "Open Scholarship" and "Open Educational Resources". As can be seen from the above, the concept of OE is assumed as a broad and aggregating concept, given its wide scope. Hence, with a view to systematizing the concept of OE, as in [2] [10] [11], we remember that this phenomenon integrates Resources, Tools and Practices, whether individual or institutional, with a view to promoting access, efficiency, success, and equity in education around the world. Therefore, we underline the role that OER assume, specifically one of the identified aspects – Resources –, which, as in [12], refers to teaching, learning and research materials regardless of the medium, be it digital or not. Another important feature is the fact that the resource is available in public domain or has an open license that allows access, use, adaptation and sharing by third parties without restrictions or with limited restrictions. The OEP, identified by Practices, refer, among other aspects, to the integration of OER in teaching practices [13], being more concretely understood as pedagogical practices that are associated with collaborative work and the use of "participatory technologies and social networks for interaction, peer-learning, knowledge creation, and empowerment of learners" [14, p. 4], intimately associated with the creation, use and reuse of OER. It is important, in this context, to recognize that Wikipedia can be considered an OER and, as such, it is capable of being translated into an OEP, as in the case presented in [15]. Is is also important to mention that the curricular and pedagogical integration of Wikipedia stems from research that has been carried out in the WEIWER® International Academic

Network, a network devoted to Wikis, Education & Research, with the following goals: to disseminate OEP where Wikipedia plays a relevant role; to disseminate research results in the field of training and open education with Wikipedia, with a view to building new lines of research and development; to stimulate critical reflection on the curricular integration of Wikipedia, namely in the context of continuous training of teachers and trainers; to promote other Wikimedia Foundation ecosystem projects; to establish intervention networks in the field of OEP, specifically in the context of Wikipedia [16].

With regard to the OEP, it is important to mention a set of dimensions and axes within a typology of action. Therefore, as in [14], four dimensions can be identified, the first of which refers to "Balancing privacy and openness", reflecting the need for educators to make a careful assessment of issues associated with privacy as opposed to openness, a situation that we also consider as relevant, namely because it is one of the criteria that we adopted when designing the pedagogical strategy of the WEIWER® Programme, in particular the curricular integration of Wikipedia. This dimension is essential, especially when we are working with young people, specifically from Basic and Secondary Education; in Higher Education and in Adult Education, the situation of "balancing" can assume other aspects. A second dimension, "Developing digital literacies", is associated with the fact that OEP promote digital literacies, mainly with regard to "ICT proficiency; information, media and data literacy; digital creation, communication and collaboration; digital learning and personal/professional development; and digital identity and wellbeing" [14, p. 10], which we also corroborate. In the different proposals for curricular integration of Wikipedia, as we conceive, implement and evaluate them, digital literacies and competences are targeted, moreover in line with Portuguese and European references that frame and support the aforementioned WEIWER® Programme, such as the Action Plan for Digital Education 2021-2027 [17], and the European Framework for the Digital Competence of Educators: DigCompEdu [18]. A third dimension to be considered, also as in [14], still within the scope of the OEP, is "Value social learning", associated with socio-constructivism and, therefore, the role that students can play in their learning process, more specifically in student-centered learning environments, as recommended in [19] [20]. The appreciation of this third dimension results, as a consequence, for example, in the devaluation of the "didactic lecturing style", that is, from the perspective of the teacher, it is articulated with a fourth dimension, "Challenging traditional teaching role expectations", which highlights the innovative character of the OEP, in general, and of the WEIWER® pedagogical-curricular strategies, in particular.

Regarding the axes of a typology of action, for the OEP, as in [13], three axes are identified:

1) from centered on content to centered on process;

2) from teacher-centered to student/student-centered;

3) from primarily focused on pedagogy to focused on social justice.

This last axis, when essentially focused on social justice, can be directed towards three aspects, namely: *a) economic and/or; b) cultural and/or; c) political (political injustice).*

Returning to the three axes identified in [13], and listed above, we proceed to their explanation. Thus, the axis "from centered on content to centered on process" refers to the role played by, among others, by Open Textbooks (OT). Considering, then, the examples of OT, if they are centered on content, they are assumed as OER that support the pedagogical strategy, being created for this purpose (content); if they are centered on the process, their interest lies precisely in the creation process, especially if it is assumed by the students themselves. As for the second axis, "from centered on the teacher to centered on the student/student", and considering the same example, of the OT, it can be seen that they are centered on the teacher if the phenomenon of openness is centered on the teacher; or, on the contrary, they are student/student centered if they are created by the students. In the third axis, "from mainly focused on pedagogy to focused on social justice", the OT are associated with the prevalence of either pedagogical issues or social justice issues; that is, the teacher can use a certain OT mainly for pedagogical reasons, given that it is the most appropriate to the situation, or for reasons of social justice, in particular for economic and/or cultural and/or political reasons (cf. respectively the three aspects – economic, cultural and political – also listed above). Before proceeding, let us dwell on the words of the authors, which we quote [13, p. 11]: "Crowdsourced, collaborative knowledge creation such as in Wikipedia is both content and process-focused, since this creation of knowledge involves conducting research and working with others who are editing the content, including using discussion/talk pages (e.g. Wikipedia) or commenting features (e.g. Google docs) to negotiate knowledge with others. If learners are engaged in creating knowledge in this way, this is student-centric".

Lastly, and also with regard to the OT, it should be noted that these, due to the open license they hold, not only form part of the movement associated with openness, but also register as OER that can be embodied in OEP [21] [22] [23] [24]. And they will be able to assume several characteristics, of which we highlight two, focused on openness: the OT are distributed free of charge, through their open license, to students, teachers and the general public [21]; OT, through their open license, allow everyone "to reuse, remix, revise, redistribute and retain them". That is, they are not static resources, but dynamic resources insofar as they allow their updating and configuration, according to the strategies identified by teachers and/or students involved in the OEP [24, p. 4]. [24] argues that for students, a OT is a resource that "helps them to understand knowledge as an ongoing process in which they play an active role"; for teachers, however, it allows them to be involved "as part of a broader move towards 'open pedagogy', which emphasizes opencontent and open practices". And, those authors also clarify that "[t]his approach not only helps to give learners ownership of the curriculum, but it also shifts their attitude. Knowledge is not fixed and static; it is an ongoing process involving learners" [24, p. 16].

B. Wikipedia in Higher Education

Wikipedia as the current encyclopedia emerged in 2001 by the hand of its founders Jimmy Wales and Larry Sanger; initially, it presented as a project without much credit, due to the idea that anyone could edit it, that is, without the traditional top/down process of creating entries as implemented by traditional encyclopedias. However, today, Wikipedia is an unavoidable resource, particularly when doing an online search; it is used by pupils/students of all

levels of education, including higher education. The Wikimedia Foundation is the foundation that sustains Wikipedia, and a wide range of projects, called sister projects, such as Wikimedia Commons, Wikiversity, Wikibooks, Wikidata; it has formed partnerships with educational institutions around the world, including in Portugal. Wikipedia is governed by a broad set of fundamentals, pillars and rules, and the collaboration of this community of practice [2] is carried out with both human and non-human agents, thus constituting a socio-technical system [25]. With regard to the software that supports it, it is a Wiki, more specifically MediaWiki, which, like Wikipedia articles, is also an OER, as it has an open license. It is important to point out that, as a Wiki, it incorporates the possibility of hosting valid pedagogical practices in the teaching/learning process, namely due to its capacity for collaboration and, despite being a product of Web 2.0, it still presents itself as an innovative resource at a pedagogical level [26] [27] [28].

Within the scope of partnerships established with higher education institutions, we highlight the work carried out both in the USA and in Canada, through Wikipedia Education Program, which began in 2010 [2] [29]. [29, p. 254] identifies a set of data relating to the Wikipedia Education Program that translates the magnitude of the program, namely that has "supported over 43,000 students in higher education institutions across the US and Canada since 2010, adding over 44 million words to Wikipedia". In the United Kingdom, the numbers are lower; in fact, with regard to the institutions involved, and taking into account the 2018/19 academic year, around 15 universities promoted initiatives in that context, of which Edinburgh University, Queens University Belfast, Imperial College London, Stirling University stand out. In the context of Portuguese-speaking Wikipedia, we highlight the Wikipedia at the University Program; [25] mapped and meta-analyzed 92 initiatives carried out by 22 higher education institutions between 2011 and 2018. On the other hand, the University of Derby (UoD), as in [29], from the phenomenon designated by "Wikiliteracy", identifies a framework that fits the issues associated with Information Literacy and Wikipedia (Table I), a literacy especially relevant to the area of MGIBE, UAb.

TABLE II.   University of Derby (UoD) Information Literacy Framework and Wikipedia [29, p. 256]

Abilities	UoD Information Literacy Framework learning outcomes	Wikipedia activities
1. Identify	Identify a personal need for information.	Use a Wikipedia article to familiarise self with rough concept and context.
2. Scope	Assess current knowledge and identify potential sources of information.	Use Wikipedia article references to identify sources used.
3. Plan	Construct strategies for locating information and data.	Research topic using open access sources fromWikipedia – then compare same research using library subscription sources.
4. Gather	Locate and access the required information and data.	Use library subscription sources to provide references for articles with unverified claims.
5. Evaluate	Review the research process and	Compare a Wikipedia article with a traditional
	compare/evaluate information and data.	encyclopaedia article, textbook or journal article.
6. Manage	Organise information professionally and ethically Enhance articles by locating references for unverified claims.	Find suitable images for re-use using Wikimedia Commons or Creative Commons.
7. Present	Present, disseminate, apply and synthesise the knowledge gained.	Discuss importance of neutrality in writing Wikipedia articles. Expand existing Wikipedia articles using quality academic sources.Create new articles.

[25], in the Table I, makes it clear how easy it is to work on issues associated with Information Literacy with Wikipedia. At the same time, we would add that this easiness also exists with regard to the possible combinations at the pedagogical level in the advanced framework in [22], previously identified and explained, and which were considered in the curricular amd integration of Wikipedia that we present in this text, particularly as follows.

C. Curricular Integration of Wikipedia in MGIBE

As previously mentioned, the CU "Research in Education" is a CU from MGIBE, a master's degree taught at Universidade Aberta, Portugal; it is a CU of the 1st Semester of the 1st year of the programme. Like all of UAb's pedagogical offer, MGIBE is also delivered completely in distance learning. The CU is organized in three themes:

1) Research in Education: stages and characteristics;

2) Research in Education: paradigms and methodologies;

3) Research in Education: data collection and analysis.

With regard to the third theme, which we focus in this text, it includes two sub-themes:

a) Procedures and techniques for data collection in research in education;

b) Procedures and techniques for data analysis in research in education.

This was, in broad terms, the context that gave rise to the instructional design of the curricular integration of Wikipedia, with students being challenged, at first, to create a team with a colleague, after which they had to select a data collection technique research in education, or a procedure and technique for analyzing data in research in education, to support their work. Once these steps were completed, they should reflect critically on the corresponding Wikipedia article, if it exists, and present a proposal for deepening it; if it did not exist, they should present a proposal for its creation. The support could be the main domain from the Portuguese-speaking Wikipedia, the Wikipedia test pages or in the OT created in MediaWiki, maintaining, however, the formatting that characterizes the articles in this online digital encyclopedia. After completing the work in pairs, there was a peer review by the other teams, with debates taking place in the Theme 3 forum, at the course institutional LMS (moodle). Despite not being the purpose of this text, it is important to note that the activity was well received; as a product, students created an article from scratch on Wikipedia and articles on test pages or in MediaWiki. It is important to point out that we initially worked with Google Docs, so an innovation now is to work for the first time with the MediaWiki OT created for this purpose.

The activity took place in the 1st Semester and integrates an extra synchronous session, promoted by the WEIWER® International Academic Network. Usually in this WEIWER® Open Sessions, under the motto "A look at Wikpedia", one of the administrators of the Portuguese-speaking Wikipedia is invited.

With regard to the pedagogical dimension, and returning to the systematization carried out in [25], which underlies the integration strategy that provided for the creation and/or editing of Wikipedia articles, we can classify our pedagogical and curricular proposal as representative of an axis focused both on the process and on the content, in addition to an axis focused on the student, and, finally, an axis focused on the pedagogy. Moreover, and complementing the systematization carried out as in [25], previously presented in Table 1, we can consider that all the "Abilities" identified in the context of Information Literacy were foreseen and achieved – "Identify", "Scope", "Plan", "Gather" , "Evaluate", "Manage", "Present". Ultimately, with the activity it was intended that, through an active methodology, namely as in [20] via a Flipped Learning approach, students collaborate in the co-compilation of an OT that translates the dimensions associated with both sub-themes explained previously, which we now recall: a) Procedures and techniques for data collection in research in education; b) Procedures and techniques for data analysis in research in education.

Before concluding, we visually represent, in Figure 1, the articulation between the different virtual learning environments of the activity proposed and described in the context of the MGIBE's course, "Research in Education", at UAb; in Table 2, we present its curricular characterization form.

Fig. 1. Articulation between the different virtual learning environments of the activity

TABLE III. CHARACTERIZATION OF THE ACTIVITY "RESEARCH IN EDUCATION: DATA COLLECTION AND ANALYSIS" [29]

Guidelines Theme 3	Research in Education: Data Collection and Analysis
What is expected	[1st week] – Individual and group work to create/update a Wikipedia article on a data collection technique and respective(s) analysis technique(s). In the end, the various Wikipedia articles should allow to answer to the following questions: *1) What data collection procedures and techniques should research in education favor?* *2) What procedures and techniques are suitable for data collection in research in education?*
	[2nd and 3nd week] – Participation in the Theme 3 Forum, sharing the created/updated Wikipedia article and commenting on those of the colleagues.
Resources	In addition to those previously indicated, as well as in addition to those students are expected to search and share, the following should be considered: Metodologia da pesquisa científica. (2019, setembro 8). Wikipédia, a enciclopédia livre. https://shre.ink/l0DI Pestana, F. & Cardoso, T. (2020). Wikipédia como um REA no Ensino Superior: um Caminho da Utopia à Realidade. *Internet Latent Corpus Journal*, 9(1), pp. 80-93. Programa Wikipédia no Ensino – Brasil e lusofonia. (2021, março, 2). Wikipédia a enciclopédia livre. https://shre.ink/l0DI Wikipédia: Livro de estilo. (2022, dezembro, 16). Wikipédia a enciclopédia livre. https://shre.ink/l0DW
Assessement	Wikipedia article, prepared according to the following criteria for appreciation and classification: *1) mastery of concepts and perspectives, distinguishing what is essential from what is not;* *2) reasoned argumentation, with scientific rigor, clarity and linguistic correctness;* *3) Compliance with stylebook and deadline.* Participation in the Theme 3 Forum, according to the following evaluation and classification criteria: *1) relevant and timely comment, with constructive suggestions, to a minimum of 2 Wikipedia articles submitted by colleagues;* *2) meeting the deadline and the ability to contribute to an effective dialogue.*

III. CONCLUSION

For this text, which refers to a broader research, we don't aim to present results; these will be presented afterwards. Instead, we set the aim of presenting the planning of the curricular and pedagogical integration of Wikipedia, in a master's degree course, corresponding to an open educational practice in a university context. In fact, the issues associated with the phenomenon of openness in education allow that, together, both ICT and internet tools play a relevant role, namely in the scope of the integration of Wikipedia in higher education. Moreover, as in [31, p. 1026], Wikipedia "is an open educational resource that connects readers, writers, and editors across communities all over the world". [30] argues that, at the level of higher education institutions, there should be better knowledge of the current encyclopedia, namely the open and free character of open knowledge in which its product results from collaborative work governed by a broad set of policies, norms, rules, processes and evaluation criteria for Wikipedia articles, thus improving perceptions and attitudes towards its use. It is in this scenario that we frame the work we have been developing in the WEIWER® International Academic Network. In other words, we have been implementing the integration of Wikipedia at different levels of education, that is, we have been developing OEP that represent, for example, the acquisition of skills that go beyond the skills that are possible to mobilize when working only with traditional resources. This is illustrated in the curricular and pedagogical integration of Wikipedia we proposed in the CU of "Research in Education" of the MGIBE at UAb, Portugal, which took place specifically throughout the Theme 3

"Research in Education: data collection and analysis". To conclude, such a curricular and pedagogical design is yet another evidence that Wikipedia Participation is a Novel Literacy [4], catering for multiple 21st Century abilities [29], in which Wikipedia and MediaWiki are two key elements, to be taken into account towards a Wikipedagogy practice.

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