

Development of a training program for teachers to use Wikipedia as a resource for collaborative learning and the development of skills for digital citizenship.

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Abstract

In this research, we propose to design and pilot a training model for school teachers using the Wikimedia projects as a learning environment to foster digital citizenship and C-21 skills. The designing process will be conducted by an exploration of the teacher's perceptions and needs regarding the use of Wikimedia for digital literacy and citizenship. To achieve this goal, a case study will be carried out with teachers from three different types of school centers in Chile (public, private, and subsidized). The specific methods will include in-depth interviews, surveys, and focus groups.

After designing the initial training model will be implemented in a pilot with teachers from the three participating schools. To evaluate the implementation, class observations and interviews with teachers and students will be carried on.

The training model and all of the resources developed in the context of this research will be disseminated within the Wikimedia and Education Community through different collective instances.

Introduction

The introduction of digital technologies in education learning processes has been developing steadily in recent years, receiving an important boost since the COVID-19 pandemic (Mosa et al., 2023). Despite the

potential benefits that digital technologies and digital practices mean for education, technologies on their own are not necessarily related to an improvement in teaching and learning, on the contrary, research has shown that access and learning inequalities tend to reproduce in technology-mediated contexts (Bellei et al., 2022; Claro & Jara, 2020). In fact, the Internet has a very wide variety of resources for teaching and learning, among these, we found various learning platforms (e.g. Moodle, Google Classroom), and article databases (e.g. Scielo, SCOPUS, WEB of Science, and Science Direct). Some of these resources are free, but more are paid.

Wikimedia collaborative ecosystem represents an opportunity for free access to knowledge and educational resources and, at the same time allows social participation in the production of online content. Among the educational potential of the Wikimedia projects, investigations reveal that integrating tools such as Wikipedia, Wikimedia Commons or Wikidata in teaching and learning can foster digital literacy and 21st-century (C-21) competencies and skills (Mareca & Borel, 2019; Obregón-Sierra & González Fernández, 2021). At least five main transversal competencies are related to using Wikimedia in the classroom: (1) learning depth; (2) high-quality reasoning; (3) findings resources; (4) communicating science to a general audience; and (5) collaborative work ([Wikipedia & Education User Group \[WEUG\], 2024](#)). Moreover, several authors agree that Wikimedia, and

specifically Wikipedia, can be considered a resource in the form of a social movement for the transmission of values associated with social justice (Konieczny, 2009; Reagle, 2010), promoting ethical participation in learning communities, contributing to academic success, but also to critical thinking around political, social and economic issues (McDowell & Vetter, 2022; Petrucco, 2018).

The ongoing Theory of Change for the Wikipedia & Education User Group (WEUG, 2024) evidence that integrating Wikimedia projects in the educational communities remains a big challenge. Thus, while Wikimedia, and its main project, Wikipedia, is significantly used by individuals and groups of all ages outside school contexts, its value in the educational contexts remains variable (Reinsalu et al., 2023). Indeed, research shows that among the factors influencing the engagement of educational communities with Wikimedia initiatives, the perceptions, conceptions, and reluctances of teachers, and the support and accompaniment of newcomers play a key role (Aibar et al., 2015; Meseguer-Artola et al., 2016). At the same time, there is a perceived need in the Wikimedia community for (1) the integration of Wikimedia in educational methodologies; (2) the development of pedagogical projects that go beyond editing in Wikipedia; and (3) the global access and exchange of best practices in Wikimedia Education Programs (WEUG, 2024). In this sense, it is urgent to develop initiatives that contribute to exploring the perceptions and needs of the educators' community and work together to implement training activities that respond to their current needs and contexts, and to produce a set of knowledge and resources that can be used for different Wikimedia community members around the globe.

Considering the ideas mentioned above, this research aims to contribute in four directions: (1) to understand the needs of the teachers' community around the integration of Wikimedia in education; (2) to accompany teachers during the process of developing Wikimedia initiatives; (3) to generate teachers training models that could be adapted by other education programs within the Wikimedia movement; and (4) to disseminate a set of good practices as a result of the pilot implementation. In this way, there are three main beneficiaries: (1) teachers who will participate in the training seasons, receiving accompaniment, resources, and assessment support; (2) students who will

participate in the pilot implementation; and (3) Wikimedia & Education Community Members who will be able to know, use, and adapt the products that will be generated in the framework of this research.

The research questions for this proposal are the following:

What are the training needs of teachers for the effective use of Wikipedia as a tool for learning and skills development within their students; which characteristics should a training plan have for teachers to develop skills for the pedagogical use of Wikipedia; what type of activities should be implemented during the training process; how could the implementation of activities for Wikipedia as a pedagogical resource be evaluated; how to evaluate the implementation of this project?

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Related work

In the university context, a study conducted among 133 professors and 1222 students, we found that: (1) 75% of academics and students use Wikipedia; (2) students' use is usually limited to the initial stages of assignments; (3) a quarter of academics explain to their students how to use Wikipedia; and (4) 70% of academics use Wikipedia for background information for teaching purposes, which is not influenced by whether or not student use is tolerated. We conclude that, although Wikipedia is already unofficially integrated into universities, it is not "the" information resource many fear and that an enlightened minority of professors have attempted to assimilate it into their teaching (Knight & Pryke, 2012). However, as a tool used by individuals and groups of all ages outside of school contexts, Wikipedia appears to be very important. In contrast, its valuation in the educational context is variable (Reinsalu et al., 2023).

We have evidence that teachers consider using Wikipedia appropriate for teaching, along with other sources of information and the environment. However, although teachers are active and frequent users of Wikipedia and allow students to search for information, they do not frequently assign Wikipedia-based text creation tasks to students (Reinsalu et al., 2023).

In terms of potential skill development in students, it has been found that students can develop advanced research and writing skills, as well as process steps

such as drafting and soliciting feedback from external readers (Azar, 2023). Similarly, it has been found that the work of developing Wikipedia entries in the educational context promotes the development of communicatively effective writing skills in students (España Palop, 2022).

It has also been found that the guided or mediated use of Wikipedia allows for improving skills for information search, critical analysis of information, as well as creation and editing within the Wikipedia platform (Tan et al., 2022). In this line, a very relevant finding is found. The mediated work with Wikipedia has served students from diverse backgrounds to critically review academic texts, books, and other resources to understand how their learning may be biased in favor of Western-based thinking, allowing them to identify alternative perspectives (Wilson et al., 2022). In addition to the development of collaborative skills, evidence has been found that Wikipedia is associated with positive motivational phenomena such as enjoyment in students (which has been shown to have an important effect on engagement or commitment to learning). Similarly, at the pole of negative emotions, there is evidence of frustration with tasks, difficulty in contacting community editors, distrust of editors, and the perception that the effort to modify an entry does not coincide with expectations about the valuation of personal contribution (Murray et al., 2020). Similarly, it has been found that in mediated activities, there is an improvement in students' perception of Wikipedia as a reliable and useful tool. However, it did not affect the valuation of Wikipedia's social prestige (Soler-Adillon et al., 2018).

Research has been developed on teaching-learning processes using Wikipedia as a platform for content creation through collaboration, finding that Wikipedia is a very relevant tool for the development of collaborative skills as part of the development of 21st-century skills (Bordel & Mareca, 2019; Konieczny, 2023; Squibb et al., 2023), and social responsibility (Bordel & Mareca, 2019).

Despite this important evidence, there are important gaps in the current research in the Wikimedia & Education field. Thus, the majority of the investigation about the use of the Wikimedia Project has been carried out in a university context at the expense of a school context, at the same time that most of the studies are based on the Global North

countries (Rodés & Gewerc, 2021; Rodés et al., 2019).

Methods

Type of study: The research will be developed using a mixed method (qualitative and quantitative) design. We will work with different schools with a design that allows us to investigate the level of individual experiences (students and teachers), those of small groups (the PBL task group), and those of extended groups (courses and schools). In this way, each school will be a case of study, but it is also possible to build new cases differentiating by groups and teachers based on their experiences.

The research design can be classified as a pre-experimental, also called a "pre-post" evaluation.

Data collection techniques/procedures: Five data collection techniques/procedures will be used for the research.

1. Semi-structured qualitative interviews with students and teachers: The interviews will be conducted using a semi-structured guideline, which allows defining a set of dimensions and sub-dimensions to be explored and, at the same time, opening new topics (Hernández et al., 2010). These interviews will be developed before and after the workshops' implementation. From these interviews, we will get insights into the training needs of teachers and the learning needs of students in the field of digital citizenship.
2. Participant Observation of project-based Learning workshops for teachers (see description below): will be conducted. All the sessions will be recorded in video for later analysis.
3. Classroom observation: This systematic observation technique records classroom activities according to an observation guideline. Each activity implementation will be recorded in video and analyzed
4. Focus groups for students: After the implementation, students will participate in focus groups to share their insights about the experience.
5. Test on digital citizenship perceptions: This test will be applied to students before and

after the workshops. The specific scale for the measurement will be defined after the interviews and an expert evaluation. Meanwhile, the next scales have been selected as first choices: Jones & Mitchell (2016) and Nordin et al. (2016)

Participants: the participants are differentiated by technique as follows:

- Semi-structured qualitative interviews with students and teachers: a) teachers: a minimum of two teachers by center (a total of 6 teachers at least); b) students: a minimum of four students by center (a total of 12 students at least)
- Participant observation of workshops: at least to sessions by center will be recorded and analyzed (a total of 6 sessions at least)
- Classroom observation: at least to classes by center will be recorded and analyzed (a total of 6 sessions at least)
- Focus groups with students: at least one focus group by center will be conducted (around 8 students by group)
- Digital citizenship test: around 50 students by center (n=150 students)

Analysis: Qualitative data from interviews will be analyzed using the framework of the Grounded Theory (Strauss & Corbin, 2002). On the other hand, quantitative data will be analyzed first using descriptive analysis techniques (Frequency distribution, central tendency measures, measures of dispersion, variance and standard deviation, percentiles, and quartiles, cross-tabulation using contingency tables, and graphical representations). Secondly, we will conduct hypothesis testing (i.e., t-tests, chi-square tests, and ANOVA), multiple regression (including linear and logistic analysis), and correlation analysis. For the analysis, we will use the open software R.

Work plan (procedure): This research will be conducted in three stages: 1) First stage: pre-evaluation. This includes the evaluation using the digital citizenship scale and the qualitative

interviews; 2) Second stage: implementation evaluation. This stage includes classroom observation; 3) Third stage: Post-evaluation. This stage includes focus groups with students and Digital citizenship perceptions; 4) Analysis.

Workshops:

Training teachers' sessions (6 weeks): the sessions will consider a set of workshops for introducing the Wikimedia project as an environment for developing digital citizenship. We will include content related to Wikimedia and Education principles, such as collaboration and participation in digital environments; Open Licences; Open Educational Resources; Wikimedia Governance; Mechanisms to create representative content through Wikimedia projects; Wikimedia in the field of digital technologies and digital platforms; Digital Rights and Digital Data Protection. We will provide resources for supporting the class planning and the assessment. During the sessions, we will focus on the co-designing of learning activities with teachers.

Workshops with students (12 weeks): after the training of teachers, we will support the implementation of Wikimedia activities within the teacher's student courses. During this process, we will work together with the Program of Education and Digital Citizenship (Wikimedia Chile).

Expected output

As a result of this research, we expect to develop:

- 1) A set of methodological tools for exploring teachers' knowledge, perception, and needs regarding Wikimedia projects.
- 2) A training pilot model for teachers to implement activities with their students for fostering C-21 competencies and skills through Wikimedia projects. This expected product will differ from existing resources in the following aspects (1) the training model will be produced using a Project-based Based Learning Methodology that allows us to explore the perceptions and needs of the teachers' community. In this sense, we aim to develop training models that, based on research evidence, can reflect and respond to the educator's pedagogical needs and

foster their participation in the assignment process; (2) the implementation of the training pilot model will allow us to assess their quality and relevance; and (3) the training pilot model will incorporate contents that go beyond the edition in Wikipedia. Thus, it is expected to build a model that contributes to the use of the Wikimedia projects as environments to foster C-21 skills from a broad perspective that converges Wikimedia with other important digital issues such as the protection of childhood rights in digital contexts, the participation and digital citizenship, the privacy protection, the IA in pedagogical contexts, among others.

3) As part of the training pilot model, it is expected to also produce a set of resources to support the implementation of digital citizenship training initiatives using Wikimedia projects, as well as assessment materials and recommendations. At the same time, we expect to disseminate in the Chilean context some existing resources, such as the "Reading Wikipedia in the Classroom Teachers' Guide", the "Teaching with Wikipedia Series", the "Teaching with Wikidata Series", and the "Wiki Tools for Heritage Education".

4) As a way to disseminate the results of this research among the Wikimedia community, another expected output is to present the training pilot model and its implementation in different collective instances such as (1) the EduWiki Knowledge Showcase; (2) the EduWiki Conference; and (3) the Learning Clinic as part of the Let's Connect Peer Learning Program.

5) Finally, to contribute to the academic dissemination of this research, we aim to produce at least two scientific articles. The first of these is expected to document the Project Based Learning Methodology for developing training models and the learning that can emerge from this process. The second will be oriented to understanding specifically teachers and student experiences in the context of the pilot implementation.

Risks

The main risk for the development of our proposal is related to the factors that could affect the continuity of the project, in terms of desertion or progressive decline in the participation of the educational communities initially enrolled.

To mitigate this risk, we will considerate for this research only school communities that have a

committed alliance either with the Education Program of Wikimedia Chile or with the Center for the Study of Policies and Practices in Education (CEPPE) of the Catholic University of Chile, both organizations with which the authors of this proposal are involved.

Community impact plan

This research aims to generate a set of learning patterns that contribute to a better comprehension of the school educational communities and an evidence-based development of the Education and Wikimedia initiatives. To ensure the dissemination of this research beyond the academic field, the community impact plan will involve at least the following actions:

A Project-based Based Learning Methodology that allows us to identify the main perceptions, conceptions, and needs of the teachers' community as a basis for the designing of the Training Pilot Model, and, at the same time, to ensure the active participation of educators in the development process.

Develop a Training Model for using Wikimedia as an environment to foster C-21 skills, as a way to respond to the need for global access and exchange of best practices in Wikimedia Education Programs (WEUG, 2024). In this sense, we expect that the model produced can be easily applied and adapted in other educational contexts.

Disseminate the research results within the Edu Wiki Community by sharing the experience in several collective instances such as (1) the EduWiki Knowledge Showcase; (2) the EduWiki Conference; and (3) the Learning Clinic as part of the Let's Connect Peer Learning Program.

Evaluation

For measuring the impact and success of this research we propose to consider a set of qualitative and quantitative procedures.

-Qualitative procedures:

Evaluate the coherence between the training model designed and the pilot implementation, through a comparative analysis between the planning document and the development of each session.

Evaluate the application of the training teacher contents into the class activities with students,

through a comparative analysis between the contents of the training model and the activities developed in the classroom context.

Evaluate the perception of teachers and students regarding the assignment and implementation of the training model, through a survey.

Evaluate the perception and satisfaction level of the Wikimedia Community about the dissemination activities carried out after the training pilot.

-Quantitative procedures:

Evaluate the sample validity through a scope assessment of the number of schools, teachers, and student participants.

Evaluate the continuity of the participant considering an assessment of the assistance report.

Evaluate the number of contributions of the participant to the Wikimedia project.

Evaluate the number of dissemination activities in the frame of the research, including academic amount of articles, and participation in collective instances with members of the Wikimedia and Education Community.

Budget

Kindly please see our [Budget template](#) for details.

Response to reviewers and meta-reviewers

For clarity, we have organized our response to the reviewers using a table that you will find attached at the end of the application. The table systematizes the reviewers' suggestions and observations into 5 main review criteria. For each of them, the reviewers' specific suggestions and our responses are summarized. In addition, the sections where you will find the corrections we made based on their comments are specifically mentioned.

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Responses to reviewers

Criteria	Suggestions from the reviewers	Response from the researchers
<p>Methodological and evaluative design of the project</p>	<p>To expand the research and evaluation design by (1) incorporating a timeline; (2) specifying methods; (3) specifying the designing of the supporting materials and resources; and (4) incorporating quantitative evaluation.</p>	<p>A summary of the improvements that we made considering the reviewer's suggestions can be found in the Methods section of this proposal. In the mentioned section we have incorporated the following aspects: (1) the type of study; (2) data collection techniques and procedures; (3) the number and distribution of the participants; (4) the analysis process; and (5) the work plan procedure, and their phases, including a brief description of the workshop sessions.</p> <p>Regarding to the evaluation, we incorporated a detail set of qualitative and quantitative procedures for evaluating the research. More information is described in the Evaluation section.</p>
<p>Impact and contribution of the research to the existing landscape</p>	<p>To describe how the materials designed within the context of the research will differ from the existing Wiki Educational Resources by describing the materials to be produced.</p>	<p>The resources generated in the context of the research will differ from the existing materials in the 3 following aspects: (1) the training model will be designed based on the exploration of the perceptions and needs of the teachers' community using a Project-based learning methodology; (2) the implementation of the training as a</p>

Criteria	Suggestions from the reviewers	Response from the researchers
		<p>pilot initiative will allow us to evaluate its quality and relevance; and (3) the training model will incorporate a broad set of contents beyond the edition in Wikipedia, using Wikimedia projects as an online environment to foster C-21 skills. This point is further elaborated in the Expected Output section of this postulation.</p>
Scope of the research and generalization of knowledge	<p>Clarify how the research will ensure generalizable knowledge beyond the Chilean School System Context, and specify the schools' selection criteria.</p>	<p>One of the main particularities of the Chilean School System is that there is a wide range of diversity in terms of access, development, and, of course, digital literacy. Thus, depending on the economic conditions of schools, there are radically different educational experiences and contexts. To ensure the generalization of knowledge beyond the Chilean case, the sample selection criteria will include the election of 3 schools whose funding conditions and student vulnerability indexes differ radically. For this purpose, the participating schools will be (1) public; (2) private; and (3) private subsidized. For more on this idea, see the Methods section of this application.</p>
Sustainability of the research over time	<p>Describe the mechanisms for ensuring the continuity of the teacher's participation.</p>	<p>To ensure the continuity of the participation of the teacher community, we will select only schools that have a committed alliance with our institution (Wikimedia Chile and CEPPE-UC). More information about this point</p>

Criteria	Suggestions from the reviewers	Response from the researchers
		is available in the Risks section of this proposal.
<p>Contribution of the research to the Wikipedia community and the Wikipedia online community</p>	<p>-Specify how the quality of the potential contributions of teachers and students to the Wikimedia projects will be guaranteed.</p> <p>-Specify how the continuity of participation of the educational communities will be guaranteed beyond the implementation of the training pilot.</p>	<p>This research aims to contribute to the Wikimedia Community in 3 different ways: (1) fostering the exchange of resources and best practices; (2) developing a pedagogical project that goes beyond editing Wikipedia; and (3) diversifying the Wikimedia community with new collaborators. However, we know that sometimes newcomers represent more responsibilities for the wikimedians and volunteers. To avoid that risk, Rocío Aravena, collaborator and ex-education program manager of Wikimedia Chile will lead the tasks of training, supporting, and evaluating the teacher's and student's contribution to the encyclopedia along with the research assistants and the staff of the Wikimedia Chile Education Program.</p> <p>On the other hand, by generating a training model, we hope to provide teachers with better tools to ensure the continuity of Wikimedia and Education initiatives. At the same time, having this material and complementary support resources will help us to replicate the training with other teachers in the following years.</p>