University students in the educational field and Wikipedia vandalism

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ABSTRACT
Wikipedia is an online, open and free encyclopaedia edited collaboratively. Today it is the fifth most visited website and the most used online encyclopaedia. Volunteer editors from around the world can edit its content, allowing users to intentionally provide incorrect information. This research aims to find the extent to which a particular group of university students vandalize Wikipedia, while also exploring their perceptions of vandalism. Data is obtained from a questionnaire sent to university students in educational psychology, early and primary childhood education, and related master's programs, as well as a focus group involving a sample of these students and interviews with editors in charge of maintaining Wikipedia. Results show that only a small percentage of students do in fact vandalize. In line with the implicit theories approach, it seems that students and editors have some preconceived ideas (boredom, amusement, or ideological motivations) about what pushes individuals to vandalize.

Author Keywords
Wikipedia, vandalism, university students, editors, educational field.

ACM Classification Keywords
H.5.3. Group and Organization Interfaces: Collaborative computing;

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1. INTRODUCTION
The concept of a website which anyone could edit entered public consciousness in 1994 thanks to Ward Cunningham [49] when he developed *Wikiwikiweb* as a part of a collaborative project on coding. Since then, Wikis have become extremely popular in different fields such as business and education, with Wikipedia becoming the fifth most visited website and the most used online encyclopaedia in the world [26]. Wikipedia is an extremely valuable educational resource, enabling quick access to almost any kind of information [2]. By allowing students and teachers to edit and create new content, Wikipedia empowers them to critically analyse the information provided by previous editors. [29, 31]. Previous studies show that even though around 80% students use Wikipedia for their projects [13, 36], many teachers still do not consider it a valid source of information [20, 28]. This lack of confidence in Wikipedia has to do with its reliability and trustworthiness, since anyone can make alterations to the content, which potentially compromises users' intellectual integrity. The Wikipedia community refers to these acts as vandalism [39]. The Cambridge Dictionary defines vandalism as "any activity that is considered to be damaging or destroying something that was good" [45]. In a similar vein, Merriam-Webster defines it as "willful or malicious destruction or defacement of public or private property" [46]. The Wikipedia community understands vandalism as any change made to content with the intent to compromise its integrity. This definition establishes some differences between vandalism and related terms such trolling, which is seen by several authors as an attempt to argue with and upset people by posting inflammatory and malicious messages [5, 10, 11].

Wikipedia estimates that vandal activities constitute around 1% to 5% of all the editing [14, 48]. Articles most commonly vandalised are those of a controversial nature, works that focus on political or religious affairs, biographies of famous people, and articles about recent events [17]. These articles can be protected or semi-protected by administrators when they detect an act of vandalism. Once the act is being committed, a first warning is given and, if the behaviour persists, the editor can be expelled. Occasionally, several IPs have to be blocked, which can lead to a whole educational institution losing the privilege of editing.

In the history of Wikipedia, different biographies have been altered, affecting its reputation negatively [30]. This lead the English Wikipedia to prohibit non-registered users from writing new articles, even though they could still edit [2], and to create the *Office Actions* in order to protect and modify some articles [25]. Along the same lines, the Internet association *Wikipedia Class Action* was created to protect victims. Wikimedia Foundation was forced to change publishing rules in order to control editors' roles, raise money for the victims, and protect other websites from possible attacks.

Some attempts at vandalism have been experimental, such as exploring the time that mistakes remain online [37] or persuading the viralization of fake news [32]. Also, in computer sciences, frequent experiments (such as generating random articles) are carried out without the community's consent [3]. Occasionally vandals do not limit themselves to small, difficult-to-detect hoaxes, but instead create high-quality, full-length articles. Some examples are the false Bicholim conflict, the case of the director Yuri Gadyukin or the hoax on God Jar'Edo Wens [9, 23].

Most research on vandalism in Wikipedia focuses on possible prevention methods such as programming bots and algorithms for detection [33, 34, 42, 47]. Detection methods have improved through these investigations; in 2006, bots began to be used to prevent vandalism. However, these bots only have simple heuristic rules, black lists of words and lists of IP addresses and blocked users.

In 2008, automatic learning approaches began to be applied, thanks to the contributions of several specialists [22, 33, 39] Subsequently, new detection systems have appeared combining several characteristics such as language, time, or reputation [1], ex post facto characteristics [47] and crowdsourcing [42]. Algorithms have been designed to identify vandals before they strike [15] and many bots use ORES, a web service and machine-learning API.

Despite the intensive study of prevention methods, insufficient research exists on the behaviour of vandals themselves [44]. Given Cobb's work [7] where he explains that 84% of Wikipedia vandals are adolescents, scholars tend to focus on a particular group: university students, who will become the next generation of educators. This paper seeks to understand the relationship between university students and the cultural and educational resource that is Wikipedia. If students, especially student teachers, regularly vandalize Wikipedia, they are wilfully degrading the quality of a resource they might need in their future educational practices. .

Thus, the main goal of this work is to analyse the behaviour of this collective while evaluating this information in light of observations from the experts who maintain Wikipedia.

This work first aims to answer to what extent university students vandalize Wikipedia, while examining any age or gender-based differences between participants.

This study focused on these two variables because, even though they seem to have an influence regarding the use of Wikipedia and even content creation and editing [26], there is a lack of information on how age and gender can affect vandalism.

We also seek to determine both students' and Wikipedia editors' perceptions of why people vandalize. In this case, following [18] we adopt an implicit theories approach in order to assume that people have general conceptions and interpretations towards some phenomena. For instance, in their studies about online trolling, [18] confirmed four common beliefs about online trolls: that they are attention-seeking, vicious, uneducated and lacking in self-esteem.

2. METHODOLOGY

Three instruments were created and validated for this mixed method sequential explanatory design. Items from a questionnaire created by Obregón and González for studying Wikipedia as an educational resource were used to collect quantitative data from students [27]. Head and Eisenberg [13] inspired this questionnaire which was divided into four dimensions with a total of ninety-one items, some directly targeting vandalism (i.e. "*Have you ever vandalized Wikipedia?*")

In its design phase, a panel of experts confirmed content validity. The University of Cantabria carried out a pilot test with all the students enrolled in programs in the educational field ($N = 320$ *y* $n = 73$), allowing us to assess reliability and validity through factor analysis.

The Vice-Rectory of Investigations in charge of the Ethics Committee at University of Cantabria actively participated by granting us the permissions needed and helping us to deliver the questionnaire.

The final version of the questionnaire was sent to all Spanish students enrolled in educational field programs and yielded 967 responses. This allowed us to execute both descriptive and inferential statistics, particularly non-parametric tests (Kruskal-Wallis, Wilcoxon and Mann-Whitney U test), as we were dealing with abnormal distributions.

In mixed method sequential explanatory design, quantitative results help to adjust the qualitative instruments. In this case they helped us to improve the script bot for the focus group (i.e.: "*Why do you think that people vandalize"*) as well as the script for the interview (i.e.: "*According to your experience, who do you think is the kind of person who vandalizes Wikipedia?*") We should remember that in these cases, propositive [19] and emergent samples are pertinent [12, 19].

Following these criteria, we selected six students from five different master's programs in education. After a panel of ten experts improved the content validity of the script, we carried out the focus group.

Finally, an interview with the Wikipedia expert editors was designed, validated by a panel of five experts, and sent by email to the ten most active correctors[1] gathering seven answers. Measures of trustworthiness (truth value, applicability, consistency and neutrality) were applied.

As mentioned by several authors, [4, 38] qualitative analysis can combine several approaches. In our case, even though some references to the quantitative discoveries appeared in the qualitative analysis, the process was mainly inductive, with concepts and categories that emerged as proposed in the analytic induction [35] or even grounded theory [41].

We used computer-assisted qualitative data analysis software (Atlas.ti) to graphically represent all these concepts and categories, focusing on the reasons that, from the students' and editors' perspectives, lead people to vandalize Wikipedia. Hierarchic semantic trees were built. Following the recommendations of several authors [21, 40], we integrated data from students and editors to find overlapping and non-overlapping results.

3. RESULTS

Table 1 shows the percentage of students who admit to vandalizing Wikipedia, including both general results and data arranged by gender/age.

	No		Yes	
	Answers	Percentage	Answer	Percentage
Total	928	95.9 %	39	4.03%
Gender				
Male	180	94.2%	11	5.8 %
Female	748	96.4 %	28	3.6 %
Age				
Under 23	620	94,7%	35	5,3%
24-30	209	98,1%	4	1,9%
31-40	76	100,0%	0	0%
41-50	16	100,0%	0	0%
Over 51	7	100,0%	0	0%

Table 1: Percentages of students who have vandalized Wikipedia

[1]https://xtools.wmflabs.org/adminstats/es.wikipedia.org/2018-02-01, consulted on 10 February 2018.

Even though students do not generally vandalize, we analysed whether a significant difference emerged depending on the groups. After performing the Kolmogorov-Smirnov normality test upon the pertinent part of the questionnaire, results ($p < ,05$) showed that the normality criterion was not met, meaning that we must use non-parametric analysis.

The Mann-Whitney Test revealed that students' tendency not to vandalize ($z=1.353$, $p>,05$) remains stable regardless of gender, with denoting a male subject and signifying a woman.

We also carried out a Kruskall-Wallis test for k independent samples to discover any difference among age groups. The results ($X^2(1) = 9,550$, $p < ,05$) showed that there is, at least, a difference between two of the groups, meaning that further tests were needed to specify this difference. Thus, we carried out another Mann-Whitney to compare the different age groups.

	Age	Asymp. Sig
Under 23	24-30	,034
	31-40	,039
	41-50	,343
	Over 51	,530
24-30	31-40	,230
	41-50	,581
	Over 51	,715
31-40	41-50	1
41-50	Over 51	1

Table 2: Mann-Whitney test to compare the different age groups

Results show that there is a meaningful difference between students under 23 (5.3 % of them vandalize) and both students from 24 to 30 (1.9 %) and from 31 to 40 (0%). The rest of the groups do not show differences, probably due to the sample size.

Regarding qualitative data, the focus group with the students helped us to explore in more detail the reasons why they think people may vandalize.

Students mentioned that boredom could lead some users to vandalize (S2: "There are people with nothing to do and they just want to show off"; S1: "There are people with a lot of free time.") They also shared that having fun and making

people laugh could be another motivation (S5: "If it is as a joke, I would do it.")

Ideology was also considered as a possible reason to vandalize (S4: "I guess ideology… like, these countries that have been impoverished by the FMI would have reasons to write against them"; S4: "Ideology is the first reason.")

We carried out the same analysis with the content from the Wikipedia editors' interviews. They commented that pride might be behind much of the editing (E2: "They are proud that their vandalism is unnoticed, that it's read by people. Still, this editing has to do not only with the pride of maintaining their content, but also with the satisfaction of 'hacking' the system"; E6: "Their need to manage to bypass the security of the system.").

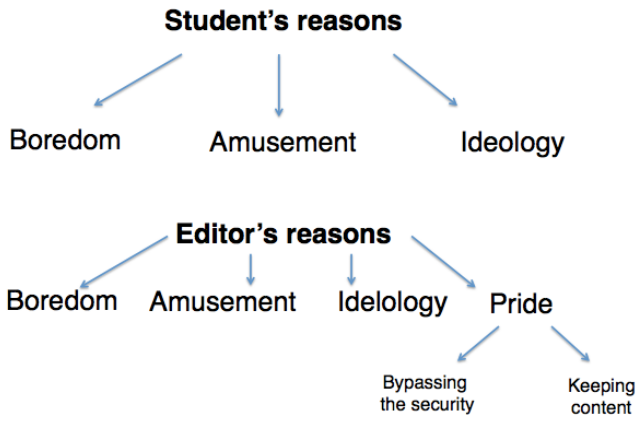

Figure 1: Semantic networks with student's and editor's reasons

Occasionally a vandalizer's pride pushes them to take revenge for actions committed by other users (E6: "If an administrator deletes a comment, he/she would perceive it as a humiliation"; E5: "Frequently users annoyed with Wikipedia for any given reason-they were banned, their articles were deleted, etc.- take revenge.")

For students, boredom (E3: "also the ones that are bored"; E4: "the most common case that I find is bored students"), the intention of making people laugh (E3: "the typical joker"; E1: "Students making pranks… this is as old as time") and ideological reasons (E2: "it is very common during electoral season), might be behind vandalism.

The following chart summarizes all the categories that emerged in our analysis, both the shared ones (green), and the ones only identified in the interviews with the editors (orange).

Category	Subcategory
Boredom	
Amusement	
Ideology	
Pride	Keeping content
	Bypassing the security

Table 3: Categories that emerged regarding the reasons that lead people to vandalize, from students' and editors' perspectives. Shared ones in green, and the ones only identified by editors in orange.

While both groups referred to boredom, fun and ideological motivations, editors add vanity as a possible cause for vandalism. An online vandal's ego can motivate them to prove themselves by hacking system security or to preserve their particular content, oftentimes as revenge upon other editors who have altered it.

4. DISCUSSION AND CONCLUSIONS

The analysis shown in the results section allowed us to answer the three research questions we proposed in this paper.

Our descriptive work revealed that students generally do not vandalize Wikipedia (only 4.03% do.) Also, though instances of vandalism are slightly higher among men than women (5.8% vs. 3.6%), this difference is not significant. Students under 23 are the group likeliest to vandalize (5.3 %). In fact, their level of vandalism is significantly higher than the groups of students from 24 to 30 (1.9 %) and from 31 to 40 (0%). This information allows us to say that vandalism is not common in university students enrolled in programs in the educational field, and that probably this trend is shared by the rest of university students, as mentioned by [7].

Qualitative results showed that students and editors agree that boredom, amusement and ideology comprise the primary reasons why people vandalize. Editors added the notion of pride, both in being able to hack a system's security and in preserving one's own content. Most of the constructs that emerged from our study can be linked to those pointed out in [18] implicit theories approach to studying online trolling. For instance, boredom ranks close to, potentially even behind, seeking conflict-attention, and amusement appeared as a category *per se* in their model. Similarly, several authors mention trolling as a source of entertainment for the troll and those around them [43]. Also the idea of pride might be associated with the implicit assumption of low self-confidence or, as pointed by other authors, with the fact that these actions can turn into a status-enhancing activity [6].

Although our study has several limitations, mainly regarding sample size, we think that it constitutes a valid initial attempt at understanding university students in the educational field and their relationship to vandalism in Wikipedia. We expect that the mixed approach that we have used, as well as the inclusion of the editors' perspective, have provided useful insight on the matter. Further study regarding other demographics is needed.

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