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Explaining Teaching Uses of Wikipedia through Faculty Personal and Contextual Features

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Abstract

The aim of this study is to explore which personal and contextual factors affect the use of Wikipedia as a teaching resource in higher education institutions. This research question is approached by investigating faculty perceptions and attitudes in two large Spanish universities. For this purpose, a comprehensive empirical study has been employed, based on an online survey to faculty members and the inclusion of a decision-making model in the analysis.

Data provide evidence that a combination of cultural, social and subjective factors influences the decision to use Wikipedia. This decision is not only associated with lecturers' individual characteristics, but mostly with surrounding influences. Teaching uses are more frequent when academics have close reference models and when they perceive that Wikipedia is being positively valued by their colleagues. The present study provides a creative framework to analyze the main determining factors of Wikipedia usage by faculty. The inclusion of both internal and external factors in the decision process has proved to be a valuable novelty. The study also detects the main factors affecting the negative or reluctant attitude towards Wikipedia and provides some recommendations to overcome these barriers.

Finally, the research widens the scope of previous investigations supplying a new research framework and including, for the first time, a prominent online university in the analysis in order to discard the potential effects of digital and information illiteracy among students and faculty members.

Keywords:

Wikipedia, faculty perceptions, Web 2.0, open educational resources, collaborative knowledge production.

Introduction

The Internet is used more and more for educational purposes. Web 2.0 tools play a prominent role in contemporary students' academic life; They rely heavily on Web-based information for a wide variety of purposes, such as to retrieve information, to coordinate group work, to share files, to handle brief questions or to complete certain academic assignments (Metzger et al. 2003; Hrastinski and Aghaee 2012; Judd and Kennedy 2010; Prasannan et al. 2014). These new habits might challenge conventional educational practices and even higher education institutions as well (Shull and McCann 2010; Bennet et al. 2012; Blikstad-Balas 2015).

The move toward the inclusion of collaborative learning techniques in higher education is also increasingly yielding results. In particular, the use of Wikipedia as a learning resource for higher education is also rapidly growing. The online encyclopedia has become a prime example of the collective construction of knowledge through a virtual platform that facilitates collaboration on an unprecedented scale. As with other initiatives based on the use of the Internet, it blurs the traditional boundary between producers and consumers of information (Burke 2012). And, as a gigantic open repository of knowledge, it may also have great potential for use in learning processes at all levels of education.

There are many recent experiences around the world where Wikipedia is playing an active role in the learning process because faculty members from different universities around the world have begun to use Wikipedia as a teaching tool (Witzleb 2009; Obar and Roth 2011; Roth et al. 2013; Miller 2014). Most of these uses present very satisfactory results and substantial improvement in various skills, as well as a positive influence on student motivation (Lim 2009; Whalley 2012; Konieczny 2014). While improving or creating Wikipedia articles related to their courses, students not only engage in the traditional approach to academic bibliographic research, but also in new forms of collaborative work (Hernandez and Rector 2013). A new compilation of these experiences is included in Aibar and Lerga (2015).

Recent studies have explored faculty perception and use of Wikipedia in the California State University System (Soules 2015) and in a UK business school (Bayliss 2013). In the Californian universities, faculty perceptions of Wikipedia are growing more favorable over time. The use of the encyclopedia is generally recommended for introductory information and some innovative uses are promoted, though negative comments based on its lack of reliability do still exist. The author admits the need for further research about what creates the difference in attitudes among faculty. In the case of the British school, the cautionary attitude in higher education seems to be caused by a lack of understanding of Wikipedia, a negative attitude toward collaborative knowledge produced outside academia and the perceived detrimental effects of the use of Web 2.0 applications not included in the university suite.

Since student attitudes usually appear to be influenced by the teaching approaches of lecturers (Margaryan et al. 2011), we are interested in gaining an in-depth understanding of what creates the difference in attitudes among faculty regarding Wikipedia usage. The main aim of our investigation is to explore this issue in a different context and through a new approach. We want to identify the main factors that determine university faculty's acceptance of, or resistance to, Wikipedia as a resource that may help students reach their learning

objectives. In order to do it, we not only analyze the individual attributes of lecturers but also the characteristics of the environment where they undertake their teaching activity.

And, because students need appropriate information-seeking skills to make the most of online resources, we focus our investigation on an online university to discard the potential effect of digital and information illiteracy among students. As a consequence, we have conducted an investigation of all faculty members of the Universitat Oberta de Catalunya (UOC) in order to uncover the perceptions of, attitudes toward, and real usage of an open collaborative environment such as Wikipedia. UOC is a 100% online publicly funded university, physically located in Barcelona (Spain), which offers official university training to 60,000 students. Its educational model is based on personalized and asynchronous teaching through an intensive use of IT.

We have also included another traditional bricks-and-mortar university in the analysis, the Pompeu Fabra University (UPF), merely to figure out whether, in the context of the same national higher education system, some evidence could emerge of different drivers and behaviors among faculty. UPF is the most recently created public university in Barcelona and offers a degree portfolio comparable to that of the UOC to about 12,000 students. Its learning model is completely based on a face-to-face methodology.

Literature review

The proliferation of digital learning techniques and tools, beyond the classroom and away from the teacher, is opening new territories for education and inducing a different kind of relationship between the teachers, the students and what is being learned (Beetham and Sharpe 2013). Despite the online encyclopedia being a relatively new source of knowledge, Wikipedia is gaining momentum in this process due to the increasing number of successful experiences. However, research about the learning use of this resource in higher education is still scarce. The empirical studies on faculty perceptions and uses of Wikipedia in learning environments are unfortunately few and very limited in scope. Most of the previous research in this area has been focused on their use among students or on interviews with faculty members, in order to identify the kind of barriers that exist to the educational use of Wikipedia.

Wikipedia is currently the most important Internet site for general consultation (Anderson et al. 2016) and has been praised as a potential contributor to learning processes, both inside and outside academia (Leaver 2009; Judd and Kennedy 2011; Rajagopalan et al. 2011; Mahmud and Wong 2013). The use of Wikipedia has been increasingly making its way into university classrooms. In the university context, it is one of the resources most employed by students, who use it regularly to carry out different assignments and tasks (Wanemacher and Schulenburg 2010; Brox 2012). Among other reasons, they use it because of the perceived quality of many of its articles, the accessibility of its content, its hypertextual structure which facilitates browsing, and the abundance of references and sources of information (Jaschick 2007; Alonso and García 2013). As Blikstad-Balas points out (2015), using Wikipedia has become a common literacy practice not only due to enjoyment but also because this usage would fit so well with the other literacy practices in academia. The open online encyclopedia

might be rather new but the need for quick and easily accessible information that can be reproduced is not.

Nevertheless, despite such widespread and intensive use among students, university faculty do not seem so positive and, although it is rapidly growing, the number of lecturers who use Wikipedia for teaching purposes still represent a small minority. This negative or skeptical attitude among university faculty could be partially explained by their lack of information and poor understanding of Wikipedia's editing processes and policies. Though knowledge of Wikipedia is nearly universal, the understanding of how it operates as a user-generated information provision venue is certainly not (Flanagin and Metzger 2011).

In searching for the major barriers to Wikipedia usage as a teaching tool, An and Williams (2010) have identified the lack of institutional technical support for faculty and the time needed to learn and manage new tools. Roth et al. (2013) have highlighted the difficulty of defining and grading assignments and the additional time invested in learning Wikipedia customs and technology as well as in guiding students through community conflicts and editing skills.

Moreover, searching relevance does not necessarily mean that the content is considered trustworthy. Although lecturers use the online encyclopedia intensively, across different subjects, grade levels or community types, the user-generated and crowd-sourced content process sometimes calls the quality and reliability of its information into question (Purcell et al. 2013). Dooley (2010) has shown that a negative attitude toward Wikipedia is usually based on a perception of inaccuracy in terms of its content and also on its potential for discouraging students from using other more reliable sources of information. Given that much of the content in Wikipedia is provided by anonymous individuals with unknown degrees of expertise, there is a great deal of concern regarding its credibility, particularly compared with more conventional sources. Following this line, Flanagin and Metzger (2011) state that the perceptions of credibility of most adults and young people are still strongly anchored to the idea of expert-generated content. As a consequence, teachers often disallow Wikipedia as a formal source on assignments.

Certain website attributes could also negatively affect academics' perception of the credibility of information presented in an online article. In particular, Wikipedia could have inferior brand equity to other information sources because it has a relatively short history and much negative media publicity surrounds the encyclopedia, so that it has produced a lower level of awareness and reputation (Kubiszewski et al. 2011). In fact, the academic acceptance is currently one of the main challenges that Wikipedia faces in becoming a venue for the public communication of science, despite the advantages of the online encyclopedia over open access journals in cost and timelines (Xiao and Askin 2012, 2014).

Coming from a different perspective, HL Chen (2010) has identified academic disciplines as a key factor in explaining attitudes toward Wikipedia with scholars from STEM fields showing a more positive perception than their colleagues in social sciences and humanities. In this study, Chen also claims that age correlates with more negatives views and that faculty who frequently use other online resources are more skeptical of Wikipedia. Other studies also show that such a widespread negative and skeptical opinion of the free encyclopedia makes many

lecturers ban its use in the classroom or discourage their students from browsing it, mainly due to concerns about the reliability and accuracy of its content (Waters 2007; Mahere 2009; Dooley 2010; Judd and Kennedy 2010; Moran 2011; Azer 2015).

As Knight and Pryke point out (2012), deviation from conventional models of scholarship is not always welcome. A negative attitude toward collaborative knowledge production when it occurs outside academia could be one of the main barriers to Wikipedia usage (Bayliss 2013). A certain conflict between standard academic and scientific procedures for knowledge building, and the open collaborative model of peer production (Benkler 2006) on which Wikipedia rests, is something not to be dismissed (Aibar et al. 2015).

For many faculty members, Wikipedia has become a symbol of threatening the traditional power-knowledge arrangements in academia (SL Chen 2010; Eijkman 2010). Some authors even advocate the use of the Wikipedia model as a way of changing the methods by which academic knowledge is both created and disseminated, particularly in issues like peer review procedures and the publication system, which have come under severe criticism in the last years (Black 2008; Nielsen 2011).

Research design

The aim of this research is to identify the main factors determining faculty use of Wikipedia as a learning resource in universities. We approach this research question by investigating university faculty perceptions of, and attitudes toward, Wikipedia, using a comprehensive empirical study of all teaching staff in two large Spanish universities. We aim to discover the relationships between these perceptions and several faculty characteristics in order to establish the extent to which skeptical attitudes are related to disciplinary, generational or other group factors. Furthermore, we want to see if these attitudes are connected to a deeper conflict between standard scientific or academic epistemological principles and the specific features of the peer-to-peer culture of Wikipedia.

We analyze the use of Wikipedia by academics as a decision-making process involving the selection and use of a specific information tool. In particular, we focus on the use of Wikipedia to build teaching materials or to design learning activities. In order to frame our analysis, we have mainly drawn on previous scholarship on consumer behavior. This strand of research tries to describe the processes by which individuals or groups select and use particular goods and services. Recent studies have already applied this innovative methodology in the context of e-learning and higher education institutions (Esteban et al. 2014; Rodríguez-Ardura and Meseguer-Artola 2014; Meseguer-Artola et al. 2015).

The decision to use a service is usually explained as a composite of individual features and the impact of different environmental influences. There are various models that try to explain user behavior this way (Engel et al. 1995; Kotler 2000; Hawkins et al. 2001), but most of them classify influencing factors according to social, cultural, personal and psychological categories.

We also assume that this decision process is based both on internal and external factors. Internal elements are those having to do with personal features and with the subjective perceptions of individual faculty members. External elements are those involved in the

interactions with other academic colleagues and with the institutional settings in which they work. Thus, we have grouped all these potential influencing factors into four main categories: institutional, social, personal and subjective.

Wikipedia's use and perceived quality have already been considered as deeply influenced by the institutional framework in which faculty work, and by the different academic cultures and subcultures – mainly scientific disciplines or knowledge areas – to which they belong (SL Chen 2010). These institutional factors are usually connected to the prevailing attitudes, norms, values and social habits in those contexts. Thus, cultural differences between universities or among academic disciplines can affect how faculty behaves toward Wikipedia. For example, in principle we could think that faculty members of a virtual university would be more prone to the use of open resources and collaborative teaching technologies than those at a traditional bricks-and-mortar university. But since lecturers are also active members of broader scientific communities, it remains to be seen to what extent institutional affiliation is more important than membership to a specific knowledge area or research field. As online culture reflects the offline culture in which it is embedded, disparities in the perceptions of the online encyclopedia among members of different higher education systems could also be the consequence of larger divergences coming from the collectivistic or individualistic prevailing culture (Jackson and Wang 2013).

Different social factors may also have an impact on the behavior of academics. Faculty members hold different positions and play different roles in universities, depending on the groups, schools, departments or categories to which they belong. These kinds of factors could surely have an impact on their perceptions, behavior and decisions, as happens in many other institutional settings. But since academic institutions are a social milieu where the formal and informal opinions of peers are a basic element of career progression and promotion, the influence of colleagues as a reference group is also likely to be a very relevant issue. We understand reference groups as those including people with whom individuals compare themselves and who therefore may have a decisive influence on shaping their attitude and behavior. Since (in the context of academia) colleagues often become role models (Bercovitz and Feldman 2008), the decision process to use Wikipedia in teaching matters could be heavily affected by proximity to faculty who happen to be seen as leaders in learning methods.

Personal factors can also affect faculty behavior and perceptions. In this category, we include certain characteristics associated with individual features, past experience and professional status. Specifically, we have paid attention to age, gender, teaching experience, academic rank and the involvement in professional activities outside academia – especially important in our study since almost one third of the universe we have surveyed is composed of part-time faculty whose main source of employment is outside the university.

Finally, our analysis also considers motivation, perceptions and the specific beliefs and attitudes of faculty members toward Wikipedia as potential factors affecting their decision to use it as a teaching tool. The literature on consumer behavior shows that these subjective factors have an important role in shaping users' decisions, so it seems very suitable to analyze their influence in the university context. Since motives are internal forces that orient people toward a goal or a need, both the intention to use and the actual use of Wikipedia would be

greater when faculty members perceive this information resource as useful and appropriate for solving their problems and fulfilling their needs.

Our online survey was conducted among all faculty members of the Universitat Oberta de Catalunya (UOC) and Pompeu Fabra University (UPF). Both well-known and large universities integrated into the Spanish higher education system. The collection of data was anonymized, the online survey followed the ethic protocols of the host university (Universitat Oberta de Catalunya) and the research adhered to its code for good scientific practices. Respondents received clear information about the goal of the questionnaire and the researcher in charge of the research project without providing them any kind of incentives. In the context of Wikipedia analyses among faculty, the questionnaire-based survey method was previously adopted in some studies, such as Eijkman (2010), Chen, H-L (2010) and Xiao and Askin (2014).

The questionnaire was organized into two different parts. The first part collected information about gender, age, area of expertise, PhDs, years of experience in university teaching and academic position, a set of variables that we use in our model as control items for characterization purposes. The second part consisted of 41 questions and it was aimed at gathering information about perceptions, practices and other aspects that could affect the use of Wikipedia for teaching purposes in higher education. These questions had to be answered via a 5-point Likert scale. Depending on the nature of the questions, this scale referred to the level of agreement or disagreement with a statement (1 = "Strongly disagree" and 5 = "Strongly agree") or to the frequency of certain actions (1 = "Never" and 5 = "Very often").

To design the questionnaire, an exploratory qualitative study involving twelve interviews with faculty members, two from each of the six main schools at the UOC, was also carried out. Answers, comments and suggestions collected using this method helped to improve the survey questionnaire until the final version was reached.

The survey was available online to all faculty members at all ranks, for a period of three weeks, and the response was at their convenience. During this period, we sent two follow-up messages to all faculty members through their corresponding director of department, kindly requesting participation in the survey.

Results and discussion

Although the sampling was not originally designed to ensure statistical representativeness according to population characteristics, the responses we obtained show that the sample is in fact fully representative of the population, according to their socio-demographic attributes. In table 1 we show the distribution of the respondents and the population, according to their affiliation and occupation. We also present the main characteristics of the respondents versus the population. According to the results displayed in this table, respondents at each university are representative of the entire faculty. Hence, the characteristics of the respondents versus those of the non-respondents can be considered the same.

TABLE 1 HERE

We received 913 valid responses from a universe of 3,639 individuals. To our knowledge, this is the largest number of responses ever gathered from university faculty members regarding

Wikipedia. Although the rate of response is just 25%, the sample associated to this rate performs a sampling error of $\pm 2.81\%$ for overall data in the case of maximum uncertainty ($p=q=0.5$) and at a confidence level of 95% (see Table 2). In the context of field research, this result is highly accepted according to sampling literature.

TABLE 2 HERE

The potential risk of adverse selection due to the presence of technophobes is avoided since most of the faculty members belong to an online university and, thus, they all make an intensive use of digital technologies. In the case of the bricks-and-mortar university, in so far as there is no evidence of bias in the sample according to individual features, this risk has also been prevented.

We begin our analysis by describing the main variables used in the study. Table 3 shows the name and description of every variable, as well as the range of values for each one.

TABLE 3 HERE

Since the survey was conducted in two different universities with a very heterogeneous combination of full-time and part-time lecturers, we carry out a preliminary analysis of variance to test if the differences in the educational use of Wikipedia (USE) were associated with the personal and professional characteristics of faculty, including their affiliation to a specific area of expertise. We focus on the variable USE because it embraces the usage of the online encyclopedia in the teaching process, precisely the main target of our investigation.

The results are shown in Table 4. On the one hand, gender and academic discipline seem to be the key factors in the decision to use it. Thus, the mean value of the male group is much higher, and lecturers belonging to STEM disciplines are also the most active in their use of Wikipedia for educational purposes when compared to the other areas of expertise. This is also the case for the part-time lecturers when compared to the rest of faculty members. On the other hand, being a registered user of Wikipedia clearly makes a difference: registered users make more educational use of Wikipedia.

TABLE 4 HERE

However, the disparities among groups are not statistically significant in the case of age, experience, academic rank or university. The lack of significant influence of these personal attributes confirms that differences in attitudes among faculty arise from a more complex process (Purcell et al. 2013; Soules 2015). In addition, belonging to an online university does not seem to encourage a more active use of Wikipedia as a teaching tool.

The findings seem to confirm that academic disciplines are a key factor for explaining faculty attitudes toward Wikipedia regarding teaching (HL Chen 2010). However, these results invite us to explore in more detail the connection between differences in gender and academic disciplines. In Spain, there is a much lower presence of women in engineering fields (14.6%, versus 42.5% across all academic disciplines) so that the real influence of gender could have been overstated in our results. Furthermore, as the higher propensity for Wikipedia usage among part-time lecturers could also be the result of full-time faculty members being more

embedded in the traditional academic culture, the influence of contextual elements on the decision to use has to be more deeply investigated.

For confirmatory purposes, we performed multiple linear regression analyses on the whole sample in order to model the relationship between the intensity of Wikipedia use in teaching and a set of explanatory variables (Table 5).

These variables encompass the different social, cultural and subjective factors that could affect the decision process, as discussed above. The model also includes those variables that have already shown significant differences in the analysis of variance, in order to control the moderator effect of these personal factors, as well as the UPF dummy, to control the fix effect of this university (Model 1).

TABLE 5 HERE

Despite differences in learning methodologies between both universities, the model is not affected by the institutional affiliation of lecturers, and therefore the university variable is eliminated from the linear regression (Model 2). Among the personal variables, gender and area of expertise are not significant, thereby confirming that this kind of personal factors is not relevant to the decision to use it or not, once we consider the other elements. Hence, a new regression analysis is conducted (Model 3) in which these variables are eliminated from the model. Finally, we proceed to estimate a new regression analysis (Model 4) eliminating the peer perception variable because it is not statistically significant at the 5% level. As expected, the intensity in the educational use of Wikipedia is associated positively not only with the specific characteristics of faculty members but also with surrounding influences.

The R² of Model 4 shows that just 44.80% of the variability of the dependent variable can be explained with the independent variables in the model. So, although the final model is globally significant ($F=78.224$, with a P-value of 0.000), we have to consider that some relevant variables may be omitted from the model. However, the model validates the finding that the decision to use Wikipedia definitively does not depend on gender or academic discipline.

Finally, the Durbin-Watson statistic (2.024) indicates that there are no AR(1) autocorrelation problems in the model. Regarding the instruments to measure the reliability and validity of the model we focus on multicollinearity analysis. The variance inflation factors for all variables are below the upper bound of 10 (see Table 6). These results show that the model is not affected by multicollinearity problems, confirming that different variables are measuring different facts.

TABLE 6 HERE

Not surprisingly, the results confirm that those lecturers with registered membership in Wikipedia are more prone to employ it for educational purposes in their teaching activities. However, both variables do not measure the same issue. Although being a registered user of Wikipedia is connected with the propensity of faculty members to edit articles in the free encyclopedia, the dependent variable strictly refers to the effective use of Wikipedia to design teaching materials or to elaborate learning activities in the classroom.

Likewise, academics that are more familiar with the use of Web 2.0 tools – mainly blogs and wikis – are also more likely to use Wikipedia for teaching purposes. Moreover, educational usage is higher among lecturers who also regularly use Wikipedia as a tool for academic consultation.

Nevertheless, the decision to use it is mainly affected by factors considered to be subjective (such as individual perceptions of quality and usefulness) or social (such as those involving reference models). On the one hand, perceptions of quality and usefulness seem to be deeply decisive. On the other, reference groups are also strong determinants for the usage decision. Academic colleagues act as a decisive environmental influence promoting or discouraging Wikipedia use as a teaching tool. Interestingly, a positive opinion and experience of collaborative knowledge production using Web 2.0 applications are not sufficient because collaborative knowledge production is distrusted when it occurs outside the traditional bounds of academia (Bayliss 2013). If information from Wikipedia were to appear in a sufficiently legitimate context and with an established and accepted reputation, it would probably improve the general perception of quality (Flanagin and Metzger 2011). Kubiszewski et al. (2011) confirm that one of the most significant influences on perceptions of an online article's credibility is the subject's belief about the identity of the encyclopedia presenting the information.

This obstacle to the educational use of Wikipedia is closely connected with the challenge of adapting well-established academic systems to accommodate Open Access models. In our study, the results confirm that the concerns about the lack of stability or authorial control, the edition by non-experts or the lack of recognition by the academic community account for the academic researchers' negative perceptions of Wikipedia publishing, as Xiao and Askin (2014) pointed out in the context of several top world universities. The authors also stated that increased familiarity with these models removes reluctant attitudes and it is associated with more positive opinions. Significantly, the interviews in our exploratory study gave us some sort of preliminary evidence that most faculty members do not actually know Wikipedia's specific editing system very well and often make wrong assumptions about it. This could influence their credibility on the free encyclopedia and their subjective perceptions on the quality of its contents.

From our interviews, we also detect that most faculty members do not talk much about their use of Wikipedia to their colleagues, nor do they mention it in their teaching activities with students. Wikipedia is probably not coming out much in daily discussion among lecturers. In fact, there is some contradiction between the overall declared and widespread use of Wikipedia as an information source in our survey and the perception of what other colleagues do; most faculty members believe that their colleagues are not using it as a source of information, and even less so as a teaching resource. As a consequence, this situation might hinder the progression of Wikipedia's use for educational purposes.

This circumstance could be critical because some lecturers might think that their colleagues' perception of Wikipedia's quality and utility is worse than it really is; The need to make educational usage more apparent is compelling because, as Dlouhy and Dlouha (2012) have

indicated, higher education is often built on tradition and rather conservative principles, which encourage the view that the use of Wikipedia is incompatible with academic discourse.

The restraining influence of this prevailing culture in academia can be partially confirmed analyzing the conduct of those part-time lecturers whose main employment is outside the university. Although it is barely significant in Model 4 ($p=0.059$), a more favorable disposition to use Wikipedia by this group is revealed, probably upheld by a less adverse attitude towards the online encyclopedia, confirming the results depicted in Table 4.

Consequently, despite academic rank is not decisive in the educational use of Wikipedia, academic status could play a part. Part-time lecturers with professional experience are less embedded in academic culture and more likely to perceive in a positive way the use of Wikipedia in the classroom. In these cases, the weight of customary academic practices seems to be less intimidating.

TABLE 7 HERE

Finally, although the dummy variable for UPF's faculty was not statistically significant, we were able to infer differences among these influences between both universities using an analysis of variance (Table 7). Results show that expertise in the use of Web 2.0 tools, professional links with the business sector and the perception of utility are higher in the online university. All these factors seem to encourage the use of Wikipedia for educational purposes. In the absence of these stimuli, members of traditional universities require greater confidence in the quality of Wikipedia before adopting its use in teaching.

The complexity of determining credible sources and information accurately in the online environment is higher compared to the conventional sources. In the case of Wikipedia, credibility judgments can be made simultaneously at the web site level, at the content level or regarding specific information about the authors (Metzger and Flanagin 2013). This growing complexity would explain the tendency of lecturers to recognize as credible sources of information mainly those characterized by observable and verifiable credentials, and authored by people with specific qualifications, experience or training. In addition to credibility concerns, some lectures think that the proliferation of information sources and the use of external applications may lead students into confusion and eventually hamper learning processes. Therefore, they prefer to use their university's own suite of Web 2.0 applications (Bayliss 2013).

Conclusions

The aim of this study is to explore which factors affect the use of Wikipedia as a teaching resource in higher education institutions. In particular, we add to the reviewed literature two novelties. First, the inclusion of a leading online university in the analysis. Second, the selection

of a decision-making process approach to examine reluctant, cautionary or proactive attitudes of lecturers toward the use of the online encyclopedia for educational purposes.

Our research findings suggest that a combination of cultural, social and subjective factors influences the decision to use Wikipedia in the learning process. This usage is not only associated with faculty members' basic individual characteristics, but mostly with environmental influences.

Thus, we largely corroborate that personal factors such as academic rank, teaching experience, age or gender do not seem to be very decisive. Instead, the decision to use Wikipedia seems to be largely linked to the experience of lecturers in the use of other resources for collaborative knowledge production and also to subjective factors, such as the perception of Wikipedia's quality and utility or an active attitude toward social media applications.

Furthermore, the institutional milieu also plays a significant role, since use is more frequent when faculty members have role models in their close environment who also use it frequently and when they perceive Wikipedia as being valued positively by their colleagues. In practice, this external influence could work as a network of innovation, since the dissemination of best practices among faculty might encourage the use of the online encyclopedia as a source of educational innovation. This positive contextual influence would be even more important in the case of bricks-and-mortar universities and when the communication among lecturers is scarce. All in all, the findings suggest that Wikipedia's current limited use in teaching among university faculty is probably linked to a slow and rather informal dissemination process, mainly fueled by direct contact and proximity with other faculty who have already used it with satisfactory results.

Our investigation also reinforces the widespread idea that the concern about source reliability is the main barrier for using Wikipedia in classrooms. The online encyclopedia has to meet the reluctant attitudes of lecturers emerging from their apprehension about the accuracy and reliability of a crowd-sourced and user-generated process, developed and sustained beyond the walls of academia. In fact, faculty with professional experience outside university and hence less embedded in academic culture are more inclined to use Wikipedia for educational purposes.

Since credibility is mainly a function of trustworthiness and competence (Rieh and Danielson 2007), the weak understanding of the collaborative edition and revision processes in the online encyclopedia could also be limiting the scope of Wikipedia's dissemination among university faculty. In fact, this study verifies that the more experiences with Wikipedia publishing the faculty members have, the more positive their attitudes are (Xiao and Askin 2014).

Since scholarly communication is a critical issue for academic life, the influence of a latent conflict between standard procedures for knowledge creation and dissemination, and the open collaborative model of peer production is something not to be dismissed. Promoting faculty participation in Wikipedia by stressing, not only its educational benefits for students but also its role as a useful tool for the public communication of science, could be valuable to narrow this existent gap.

Therefore, a greater application of Wikipedia, both as a teaching resource and a driver of learning innovation, would require much more active institutional support and probably some changes in the incumbent academic culture among faculty members. Some recommendations could be made to improve perceptions and attitudes. Firstly, a better understanding of Wikipedia, its policies, procedures and editing mechanisms, is essential. Secondly, it would also be necessary to directly stimulate Wikipedia usage by promoting the diffusion of best educational practices, encouraging active contributions among students and faculty, and granting greater recognition to the teaching innovations involved. Finally, it would also be helpful to encourage the use of online collaborative tools for teaching and open knowledge repositories for publishing academic output and resources. Further research should be carried out to validate these results in other universities and also to investigate how the mutual interaction between internal and external factors is affecting the decision to use Wikipedia as an educational resource.

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TABLES

Table 1.- Distribution of sample and population

Variable	Part-time lecturers			Full-time lecturers		
	Sample	Population	Statistic	Sample	Population	Statistic
Gender						
Male	0.580	0.545	t-Stat.=	0.532	0.529	t-Stat.=
Female	0.420	0.455	1.881 (p-value= 0.060)	0.468	0.471	0.069 (p-value= 0.945)
PhD Degree	0.370	0.386	t-Stat.= 0.927 (p-value= 0.354)	0.740	0.783	t-Stat.= 1.221 (p-value= 0.224)
Age	42.210	41.624	t-Stat.= 1.931 (p-value= 0.054)	41.970	42.857	t-Stat.= 1.524 (p-value= 0.130)
Scientific Disciplines						
Arts & Humanities	0.207	0.147	$r^* = 0.945$	0.213	0.179	$r^* = 0.977$
Law Studies	0.123	0.168		0.092	0.133	
Engineering	0.210	0.184		0.191	0.232	
Health	0.078	0.063		0.035	0.042	
Social Sciences	0.382	0.438		0.467	0.414	

* r represents the correlation coefficient

Table 2. Technical information on the questionnaire

Study universe	Faculty members of the Open University of Catalonia (UOC) and Universitat Pompeu Fabra (UPF)
Study universe size	3,639
Method	Online survey sent to the universe, with no quota groups
Sample size	913
Sampling error	$\pm 2.81\%$ for overall data in the case of maximum uncertainty ($p=q=0.5$). Confidence level 95%.
Resulting sample	Not weighted
Date of launching	November 19, 2012 (UOC) and April 29, 2013 (UPF)
Data collection	From November 19 to December 3, 2012 (UOC) and from April 29, 2013 to May 16, 2013 (UPF)

Table 3. Variables used in the analysis

Name	Description	Range of values
USE	This variable is the sum of the questionnaire variables: <i>Use of Wikipedia to design teaching materials</i> and <i>Use of Wikipedia to elaborate learning activities</i>	2 to 10
Quality	This variable is the sum of the questionnaire variables: <i>Articles in Wikipedia are seen as reliable</i> , <i>Articles in Wikipedia are seen as updated</i> , <i>Articles in Wikipedia are seen as complete</i> and <i>The edition process in Wikipedia is seen reliable</i>	4 to 20
Profile_2.0	Original variable from the questionnaire: <i>Contribution to blogs</i>	1 to 5
Peers_perception	Original variable from the questionnaire: <i>Wikipedia is well-regarded by colleagues</i>	1 to 5
Use_by_colleagues	Original variable from the questionnaire: <i>Colleagues do use Wikipedia</i>	1 to 5
Web2.0_expertise	Original variable from the questionnaire: <i>Use of wikis in teaching</i>	1 to 5
Utility_perception	Original variable from the questionnaire: <i>Learning activities with Wikipedia improve visibility for students' work</i>	1 to 5
User_Wiki	Original variable from the questionnaire: <i>Being a registered user in Wikipedia</i>	1=Registered user / 0=Non-registered user
Gender	Original variable from the questionnaire: <i>Male/Female</i>	1=Male / 0=Female
Engineering	This variable is a recodification of the questionnaire variable: <i>Knowledge Area</i>	1=Engineering / 0= Other
Arts and Humanities	This variable is a recodification of the questionnaire variable: <i>Knowledge Area</i>	1=Arts and Humanities / 0= Other
Sciences	This variable is a recodification of the questionnaire variable: <i>Knowledge Area</i>	1=Sciences / 0= Other
Health	This variable is a recodification of the questionnaire variable: <i>Knowledge Area</i>	1=Health / 0= Other
Social Sciences	This variable is a recodification of the questionnaire variable: <i>Knowledge Area</i>	1=Social Sciences / 0= Other
Law Studies	This variable is a recodification of the questionnaire variable: <i>Knowledge Area</i>	1=Law Studies / 0= Other
Non-academic_sector	Original variable from the questionnaire: <i>Part-time associate professors also working in non-academic sector</i>	1=Part-time associate teachers / 0= Other
UPF_Faculty	Original variable from the questionnaire: <i>Belonging to Universitat Pompeu Fabra's Faculty</i>	1=UPF Faculty / 0=UOC
PhD Degree	Original variable from the questionnaire: <i>Holding a PhD degree</i>	1=Holds a PhD / 0=Does not hold a PhD
Academic_Experience	This variable is a recodification of the questionnaire variable: <i>Years of academic teaching experience</i>	1=less than ten years / 0=five or more than ten years
Age	This variable is a recodification of the questionnaire variable: <i>Lecturer's Age</i>	1=less than 40 years old / 0=more than 40 years old

Passive_use	Original variable from the questionnaire: <i>Consulting Wikipedia about topics from their own academic discipline</i>	1=Teacher uses Wikipedia / 0=Teacher does not use Wikipedia
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Table 4. Analysis of Variance on control variables

Variable	Mean Value	F-statistic	P-value
Women		18.152	0.000*
Yes	3.62		
No	4.17		
Engineering		15.562	0.000*
Yes	4.53		
No	3.83		
Arts and Humanities		0.002	0.961
Yes	3.94		
No	3.94		
Sciences		1.822	0.177
Yes	4.28		
No	3.92		
Health		0.370	0.543
Yes	3.81		
No	3.95		
Social Sciences		0.892	0.345
Yes	3.87		
No	3.99		
Law Studies		13.579	0.000*
Yes	3.27		
No	4.02		
PhD Degree		1.760	0.185
Yes	3.85		
No	4.02		
UPF Faculty		0.061	0.804
Yes	3.98		
No	3.93		

Age (Younger than 40)		0.637	0.425
Yes	4.00		
No	3.90		
Academic Experience (less than 10 years)		0.405	0.525
Yes	4.00		
No	3.91		
Non-academic sector		7.527	0.006*
Yes	4.10		
No	3.75		

* Statistical significance at the 5% level.

Table 5. Regression analyses of different scenarios to explain the intensity of Wikipedia use

Variable	Model 1	Model 2	Model 3	Model 4
(Constant)	-0.926 [*] (0.001)	-0.895 [*] (0.001)	-0.911 [*] (0.000)	-0.923 [*] (0.000)
User_Wiki	0.614 [*] (0.000)	0.622 [*] (0.000)	0.632 [*] (0.000)	0.634 [*] (0.000)
Women	-0.045 (0.685)	-0.050 (0.652)	-----	-----
Engineering	0.139 (0.358)	0.130 (0.389)	-----	-----
Law Studies	0.083 (0.630)	0.071 (0.679)	-----	-----
Non-academic sector	0.206 (0.056)	0.188 (0.077)	0.185 (0.081)	0.198 (0.059)
Quality	0.044 [*] (0.049)	0.047 [*] (0.035)	0.047 [*] (0.035)	0.050 [*] (0.021)
Profile_2.0	0.191 [*] (0.000)	0.188 [*] (0.000)	0.186 [*] (0.000)	0.187 [*] (0.000)
Peers_Perception	0.052 (0.461)	0.049 (0.491)	0.059 (0.395)	-----
Use_by_colleagues	0.169 [*] (0.010)	0.172 [*] (0.009)	0.173 [*] (0.008)	0.197 [*] (0.001)
Web2.0_expertise	0.163 [*] (0.000)	0.159 [*] (0.000)	0.159 [*] (0.000)	0.160 [*] (0.000)
Utility_Percepcion	0.334 [*] (0.000)	0.327 [*] (0.000)	0.324 [*] (0.000)	0.330 [*] (0.000)
Passive_use	0.549 [*] (0.000)	0.551 [*] (0.000)	0.554 [*] (0.000)	0.559 [*] (0.000)
UPF	0.176 (0.295)	-----	-----	-----

N	913	913	913	913
Adj.-R2	0.447	0.447	0.448	0.448
Durbin-Watson	2.020	2.018	2.020	2.024
F	48.185	52.102	69.486	78.224
p-value	0.000	0.000	0.000	0.000

* Statistical significance at the 5% level.

Each cell shows the value of Beta coefficient (p-values between brackets)

Table 6. Multicollinearity analysis of the independent variables

Variable	Variance-Inflation Factor
User_Wiki	1.123
Non-academic sector	1.060
Quality	1.591
Profile_2.0	1.202
Use_by_colleagues	1.284
Web2.0_expertise	1.256
Utility_Percepcion	1.327
Passive_use	1.577

Table 7.- Differences in the mean values of the independent variables according to the university affiliation

Variable	Mean Value (UPF)	Mean Value (UOC)	F-statistic	P-value
User_Wiki	0.14	0.14	0.031	0.861
Non-academic sector	0.28	0.57	34.840	0.000*
Quality	13.31	12.54	6.450	0.011*
Profile_2.0	1.96	2.32	7.568	0.006*
Peer_Perception	2.39	2.49	0.913	0.340
Use_by_colleagues	2.98	2.88	1.019	0.313
Web2.0_expertise	2.04	2.55	14.073	0.000*
Utility_Percepcion	2.75	2.97	5.166	0.023*
Passive_use	3.18	2.98	2.914	0.088

* Statistical significance at the 5% level.