AN EMPIRICAL STUDY ON FACULTY PERCEPTIONS AND TEACHING PRACTICES OF WIKIPEDIA

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Abstract

Some faculty members from different universities around the world have begun to use Wikipedia as a teaching tool in recent years. These experiences show, in most cases, very satisfactory results and a substantial improvement in various basic skills, as well as a positive influence on the students' motivation. Nevertheless and despite the growing importance of e-learning methodologies based on the use of the Internet for higher education, the use of Wikipedia as a teaching resource remains scarce among university faculty.

Our investigation tries to identify which are the main factors that determine acceptance or resistance to that use. We approach the decision to use Wikipedia as a teaching tool by analyzing both the individual attributes of faculty members and the characteristics of the environment where they develop their teaching activity. From a specific survey sent to all faculty of the Universitat Oberta de Catalunya (UOC), pioneer and leader in online education in Spain, we have tried to infer the influence of these internal and external elements. The questionnaire was designed to measure different constructs: perceived quality of Wikipedia, teaching practices involving Wikipedia, use experience, perceived usefulness and use of 2.0 tools. Control items were also included for gathering information on gender, age, teaching experience, academic rank, and area of expertise.

Our results reveal that academic rank, teaching experience, age or gender, are not decisive factors in explaining the educational use of Wikipedia. Instead, the decision to use it is closely linked to the perception of Wikipedia's quality, the use of other collaborative learning tools, an active attitude towards web 2.0 applications, and connections with the professional non-academic world. Situational context is also very important, since the use is higher when faculty members have got reference models in their close environment and when they perceive it is positively valued by their colleagues. As far as these attitudes, practices and cultural norms diverge in different scientific disciplines, we have also detected clear differences in the use of Wikipedia among areas of academic expertise. As a consequence, a greater application of Wikipedia both as a teaching resource and as a driver for teaching innovation would require much more active institutional policies and some changes in the dominant academic culture among faculty members.

Keywords: Wikipedia, open resources, faculty perceptions, web 2.0, online collaborative environments

1   WIKIPEDIA AS AN OPEN EDUCATIONAL RESOURCE

The greatest impact the Internet has had on university education is the vast availability of open educational contents - course materials, study guides, collections of exercises, etc. - accessible on the network for everyone and for free. This phenomenon has its roots in what has been called the Open Educational Resources movement, which began in 2001 with the creation of the initiative OpenCourseWare (OCW) at MIT (Massachusetts Institute of Technology).

MIT's initiative has spurred many universities everywhere to start similar projects and thus contribute to the international movement of open educational resources. But in recent years, the emergence of the so-called Web 2.0 has opened up a wide range of new possibilities for the network, hitherto unsuspected directions, which may also end up influencing decisively in learning processes. Among other effects, Web 2.0 initiatives have blurred the traditional boundary between producers and consumers of information.

Wikipedia represents precisely the junction where these two trends converge. On the one side it is a gigantic open repository of knowledge and information - with great potential for use in learning processes at all levels of education - and on the other side, it has become a prime example of collective construction of knowledge, through a virtual platform that facilitates collaboration on an unprecedented scale.

This paper is structured as follows: Section 2 describes previous studies involving the use of Wikipedia in higher education, highlighting the main perceptions and attitudes of faculty. In Section 3 we present our model for the main factors affecting Wikipedia usage. In Section 4 we review the most important findings categorizing them according to the goals described in the previous section. Finally, Section 5 summarizes the most important preliminary conclusions that can be drawn from this study.

2   WIKIPEDIA IN HIGHER EDUCATION

Wikipedia is currently the most important website for general consultation and is contributing positively to learning processes, both inside and outside academia. In the university context, in fact, is one of the most employed resources by students who use it regularly as a reference tool and to carry out different assignments and tasks (see Brox (2012) and Hawkins et al. (2001)). This is due not only to the quality of many of his articles, but to the easy access to its contents, the hypertext structure that facilitates navigation and the abundance of references and sources, according to Alonso et al. (2013) and Jaschick (2007). Based on a representative online survey among 4,400 students from German universities – return rate 40% - Wannemacher and Schulenburg (2012) found that 80% of them use Wikipedia on a regular basis and 60% use it frequently or very frequently.

But despite students' broad and intensive use, the attitude of university faculty does not seem so positive. In general, academics perceive Wikipedia with scepticism. It is known that many academics believe, for example, it is illegitimate to cite Wikipedia as a source, because their articles do not have a clear and identifiable authorship, and therefore it is difficult to verify their content (Engel et al. (1995). Unfortunately, empirical studies on faculty perceptions and uses of Wikipedia in learning environments are few and quite limited in scope.

Based on a survey to 14 university instructors, An and Williams (2010) identified both educational benefits and major barriers of using 2.0 tools. Among benefits they mention fostering of interaction, communication and collaboration among students, improving of writing and technological skills, the ease of use and flexibility and a new role for teachers as facilitators of learning rather than distributors of knowledge. The major barriers are a perceived uneasiness with openness among some students, the lack of institutional technical support for faculty and the time needed to learn and manage new tools.

Dooley (2012) notes that faculty negative attitude towards Wikipedia is usually based on a perception of inaccuracy in its content and also on its potential for discouraging students from using other more reliable sources of information. Her survey - with 105 respondents- shows that only 7% use Wikipedia frequently for teaching or research tasks. In a similar vein, another study (Chen (2010) identifies credibility as university faculty main concern on Wikipedia and highlights academic disciplines as a key factor in explaining attitudes towards Wikipedia. This study also shows that age correlates with more negatives views and that faculty who frequently use other online resources are more sceptical on Wikipedia.

In a qualitative study based on five interviews (Bayliss 2013), the author proposes two main causes of the cautionary and cynical attitude towards Wikipedia: first, the lack of knowledge and poor understating of Wikipedia editing processes and policies by academics and second, a negative attitude toward collaborative knowledge production when occurring outside academia. Along the same line, Knight and Pryke (2012), after a survey to 133 faculty, state that the main reasons for academics to distrust Wikipedia is its obvious departure from "conventional models of scholarship". They mention the no-need of accreditation for contributors, the possibility of anonymous editing, the absence of formal pre-publication peer review, and the blurred authorship of entries. Most faculty members tend to favour a 'low-stakes' use by students – as initial scoping of an issue - over more high-stakes – as citing facts or as serious source of knowledge and references.

Other possible explanations of the negative attitude towards Wikipedia have to do with its particular way to produce and assess knowledge content – a paradigmatic instance of so-called *commons-based peer production* (Benkler, 2006). Beyond specific accuracy and credibility concerns, a more fundamental conflict on epistemological and power grounds is detected by several authors (see Black 2008, Chen 2010 and Eijkman 2010). Based on a survey with 99 respondents, Eijkman's study (2010) shows that a majority of academics show "a blend of relatively cautious acceptance and/or gentle discouragement" towards Wikipedia. Surprisingly the study finds a slight negative correlation between knowledge of Wikipedia and favourable views of it, and a that 'soft-science' academics – allegedly more prone to a social constructivist view of knowledge – show a more negative attitude than their 'hard-science' fellows. His main point is nevertheless that Wikipedia has become for faculty members a symbol of opposition to the traditional power-knowledge arrangements in academia.

3   FACTORS AFFECTING WIKIPEDIA USAGE AS A TEACHING TOOL

In order to analyse the teaching usage of Wikipedia we have mainly drawn on previous scholarship on consumer behaviour. This strand of research tries to describe the processes by which individuals or groups select and use particular goods and services. The decision to use a service is usually explained as a composite of individual differences and the impact of environmental influences. There are different models trying to explain user behaviour (Engel et al. 1995, Kotler 2000, Hawking et al. 2001) but most of them classify influencing factors according to social, cultural, personal and psychological categories.

In this paper, we analyse the use of Wikipedia by academics as a decision-making process involving the selection and use of a specific informational instrument or service. We claim that this decision process is based both on internal and external factors. Internal elements are those having to do with personal processes and with the psychological features 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.

We have grouped all these potential influencing factors in four main categories: institutional, social, personal and psychological.

The usage and quality perception of Wikipedia could be deeply influenced both by the institutional framework where faculty work and by the different academic cultures and subcultures – mainly knowledge disciplines or areas – to which they belong. These institutional factors are usually connected with the prevailing attitudes, norms, values and social habits in those contexts. Thus, cultural differences between universities or among academic disciplines can affect the behaviour of faculty regarding Wikipedia. For example, as UOC is an online university, its faculty could be more prone to the usage of open resources and collaborative teaching technologies. But since university faculty are also active members of broader scientific communities, it remains to be seen to what extent institutional affiliation is more important than membership of a specific knowledge area or research field.

Different social factors may also have an impact on academics' behaviour. Faculty members hold different status and play different roles in universities, depending on the groups, schools, departments or categories to which they belong. This kind of factors may surely have an impact on their perceptions, behaviours and decisions as it certainly happens in many other institutional settings. But being science and academic life a social milieu where the formal and informal opinion of peers is a basic element for status and career progression, the influence of colleagues as a reference group is likely to be a very relevant issue. Reference groups include people that individuals compare themselves with and therefore may have a decisive influence in shaping their attitude and behaviour. Since in the context of academia colleagues often become role *models*, the decision process to use Wikipedia in teaching matters could be heavily affected by the proximity to faculty who happen to be seen as leaders in learning methods.

Personal factors can also affect faculty behaviour and perceptions. In this category we include certain characteristics associated with individuals' features, past experiences and professional status. In particular, we have paid special attention to age, gender, teaching experience, academic rank and contact with the business sector – especially important in our study since almost one third of the universe we have surveyed is composed of part-time faculty having their main employment outside the university.

Finally, our analysis also considers motivations, perceptions and the specific beliefs and attitudes of faculty members towards Wikipedia, as potential factors affecting their decision to use it as a teaching tool. The literature on consumer behaviour (see for example Hawking et al. 2001) shows that these, often called, *psychological factors* have an important role in shaping users' decisions, so it seems very suitable to analyse their influence in the university context of our study. As motives are internal forces that orient people towards a goal or a need, both the intention and the actual use of Wikipedia would be greater when faculty members perceive this informational resource as useful and appropriate for solving their problems and necessities.

4   AIMS AND RESEARCH DESIGN

In the context of the Wiki4he project, we are undertaking an investigation (http://oer.uoc.edu/wiki4HE/about/) in order to systematically analyze, using a comprehensive empirical study, the perception and attitudes of university faculty from different scholarly areas towards Wikipedia. The study aims to investigate relationships between these perceptions and several faculty characteristics to establish the extent to which the sceptical attitudes are related to disciplinary or generational factors on the one hand, or to an implicit conflict between the standard scientific or academic epistemological stands and the specific peer-to-peer culture of Wikipedia (as a paradigmatic example of content production in a collaborative open network), on the other.

The Universitat Oberta de Catalunya (http://www.uoc.edu), launched in 1994, is a pure virtual online university, physically located in Barcelona, that provides official university training and degrees. Its educational model is based on personalized attention for students and an intensive use of IT. At present the university is providing higher education to more than 60,000 students, by means of a hierarchical structure composed of (approximately) 250 full-time teachers and almost 2,000 part-time associate teachers – some of them also teaching in other non-virtual universities and all of them being considered as faculty members in this study. As a pioneering university, UOC provides all community members with a Virtual Campus where all teaching activities are carried on, including the use of web 2.0 tools such as blogs or wikis. As the central part of this study, we have launched an online survey to all faculty members of the Universitat Oberta de Catalunya in order to know perceptions, attitudes and real usage of an open collaborative environment such as Wikipedia.

As shown in Table 1, from a universe of 2,128 individuals we got 800 valid responses. For a confidence level of 95%, and the assumption of maximum uncertainty ($p = q = 0.5$), the margin of error is 2.74%. The questionnaire was designed to measure different factors, mainly: perceived quality of Wikipedia, teaching practices involving Wikipedia, usage experience,

perceived usefulness and use of 2.0 tools. Control items were also included for characterization purposes.

The questionnaire was organized in two parts. The first part aimed at collecting data on: gender, age, area of expertise, PhD degree, years of experience in university teaching, academic rank and Wikipedia registered membership.

The second part, with 41 questions, aimed at gathering information on the different aspects that can affect the (teaching) use of Wikipedia 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").

Table 1. Technical information on the questionnaire

Study universe	**Faculty members of the Open University of Catalonia**
Study universe size	**2,128**
Method	**Online survey sent to the universe, with no quota groups**
Sample size	**800**
Sampling error	**±2.74% for overall data in the case of maximum uncertainty (p=q=0.5). Confidence level 95%.**
Resulting sample	**Not weighted**
Date of launching	**November 19th, 2012**
Data collection	**From November 19th to December 3rd, 2012**

In order to design the final version of the questionnaire an exploratory qualitative study was carried out involving twelve interviews to faculty members – selecting two from each of the six main schools at our university. Comments and suggestions were collected this way and helped to improve the survey until it reached its final form. These interviews were conducted between October 12th and 16th 2012.

5 FINDINGS

We begin by describing the main variables used in the study. Table 2 shows the name and description of each variable.

Table 2. Variables used in the analysis

Name	Description	Values
USEa	Teacher uses Wikipedia to write learning materials and/or to elaborate	This variable results from the sum of two initial variables. Values range from 2 to

	learning activities	10.
OUTb	Articles in Wikipedia are reliable and/or updated and/or complete, and/or the edition process in Wikipedia is reliable	This variable results from the sum of four initial variables. Values range from 4 to 20.
PERF2	Teacher contributes to blogs	This is an original variable from the questionnaire. Values range from 1 to 5.
IMG1	Wikipedia is well considered among colleagues	This is an original variable from the questionnaire. Values range from 1 to 5.
IMG3	Colleagues do use Wikipedia	This is an original variable from the questionnaire. Values range from 1 to 5.
EXP5	Teacher uses wikis to work with the students	This is an original variable from the questionnaire. Values range from 1 to 5.
VIS1	Learning activities with Wikipedia improve visibility	This is an original variable from the questionnaire. Values range from 1 to 5.
UserWiki	Teacher is a registered user in Wikipedia	This is an original variable from the questionnaire. Values are: 1=Registered user / 0=Non-registered user.
Gender	Male/Female	This is an original variable from the questionnaire. Values are: 1=Male / 0=Female
Domain	Area of expertise	This is an original variable from the questionnaire. Values are: 1=Arts & Humanities / 2=Sciences / 3=Health sciences/ 4= Engineering / 5=Law / 6=Social Sciences
Profile	UOC academic rank	This a variable derived from other variables in the questionnaire. Values are: 1=UOC full professor / 2=Other
PhD	Teacher holds a PhD	This is an original variable from the questionnaire. Values are: 1=Holds a PhD / 0=Does not hold a PhD
Experience	Years of academic experience	This a variable derived from other variables in the questionnaire. Values are: 1=less than five years / 0=five or more than five years
Age	Age	This a variable derived from other variables in the questionnaire. Values are: 1=less than 40 years old / 2=between 40 and 49 years old / 3=50 or more

Since the survey was conducted in an online university that provides higher education and training by means of a very heterogeneous combination of full-time and part-time associate professors, we conducted an analysis of variance (ANOVA) to test if differences in the educational use of Wikipedia (USEa) were associated with personal and professional characteristics of faculty, including their declared affiliation to broad knowledge fields or areas of expertise.

The results are shown in Table 3. Only in the case of gender and area of expertise the differences among groups are statistically significant, at a level of confidence of 95%. However, this is not the case for differences in age, experience, or academic rank. The mean value of the male group is higher (4.14 versus 3.65) and this is also the case of engineering (4.40) compared to the other areas of expertise (3.85).

Table 3. ANOVA analysis on characterization variables

Variable	F statistic	P-value
Gender	12.547	0.000
Domain	3.674	0.003
Profile	0.359	0.549
Experience	0.081	0.776
Age	0.416	0.660

For confirmatory purposes, a multiple linear regression analysis has been carried out on the whole sample for modelling the relationship between the intensity in Wikipedia teaching use and a set of variables. These variables encompass the different social, cultural and psychological factors that could affect the decision process, as discussed in the previous section. The model also includes those variables that have already shown significant differences in the ANOVA analysis in order to control the effect of these personal factors. Since the variable Domain is a qualitative non-ordinal variable, we have transformed it into a dichotomic variable. We also include in the model a new variable (Engin) that takes value 1 when the individual belongs to the engineering area of expertise and 0 in the opposite case.

It is noticeable that all parameters are statistically significant (P-value < 0.05), except in the case of the control variables, Gender and Engin (see Table 4). Hence, a new regression analysis was conducted where these two variables were eliminated from the model. As expected, regression results, in Table 5, show that the intensity in the educational use of Wikipedia is positively associated not only with specific characteristics of faculty members but also with environmental influences.

The R^2 of the model shows that just 36.10% of the variability of the dependent variable can be explained with the independent variables in the model. Hence, although the model is globally significant (F=53.958, with a P-value of 0.000), we have to take into account that some relevant variables may be omitted in the model.

Table 4. Regression analysis with characterization variables

Model	Coefficients		Standarized Coefficients		
	B	St. Error	Beta	t	P-value
(Constant)	-0.761	0.297		-2.565	0.011
OUTb	0.092	0.024	0.142	3.790	0.000
PERF2	0.260	0.050	0.175	5.231	0.000
IMG1	0.167	0.082	0.085	2.029	0.043
IMG3	0.272	0.075	0.142	3.632	0.000
EXP5	0.208	0.049	0.144	4.245	0.000
VIS1	0.346	0.076	0.162	4.530	0.000
UserWiki	0.787	0.178	0.144	4.431	0.000
Gender	0.123	0.124	0.032	0.992	0.322
Engin	0.093	0.171	0.018	0.544	0.587

a. Dependent variable: USEa

Table 5. Regression analysis without characterization variables

Model	Coefficients		Standarized Coefficients		
	B	St. Error	Beta	t	P-value
(Constant)	-0.720	0.294		-2.452	0.014
OUTb	0.093	0.024	0.143	3.823	0.000
PERF2	0.258	0.050	0.174	5.203	0.000
IMG1	0.182	0.081	0.093	2.248	0.025
IMG3	0.274	0.075	0.143	3.668	0.000
EXP5	0.207	0.049	0.144	4.240	0.000
VIS1	0.344	0.076	0.161	4.528	0.000
UserWiki	0.802	0.177	0.147	4.526	0.000

Dependent variable: USEa

Not surprisingly, those teachers with registered membership in Wikipedia are more prone to employ it for educational purposes in their teaching activities. In the same way, academics whore 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.

Nevertheless, the decision of use is mainly affected by factors considered as psychological (such as individual perceptions of quality and usefulness), social (such as those involving the presence of role models) and cultural (such as colleagues' perception of quality). On one side, the perceptions of quality and usefulness seem to be quite decisive. On the other, the reference groups are also strong determinants for the usage decision. Academic colleagues seem to act as *role models* promoting o discouraging Wikipedia use as a teaching tool. We can speculate that the current limited teaching use of Wikipedia among university faculty is probably linked to a slow and rather informal dissemination process, mainly fuelled by direct contact and proximity with other faculty who have already use it with satisfactory results. Besides, a poor understanding of the edition and revision processes in Wikipedia and a negative attitude towards its particular way of openly sharing and producing knowledge – strikingly different from the usual academic and scientific model - could be limiting the scope of Wikipedia diffusion at universities.

To confirm the presence of this specific trend in academic culture, we have included in the model a new variable (PROF) that identifies part-time associate professors who have got their main job outside the university. This variable takes value 1 when a faculty member is also working outside the university (0 in the opposite case). Regression results in Table 6 show that the educational use of Wikipedia is higher among this group. In any case, the critical attitude towards Wikipedia is not associated with academic rank, since faculty members with a PhD degree are not those showing less Wikipedia usage. Hence, an adverse attitude towards Wikipedia seems to be more associated with external influences than with faculty qualification, age or academic experience (see Table 6). By introducing these two new variables in the model, goodness of fit R^2 increases up to 36.90% and the statistical significance of all coefficients (with associated P-values lower than 0.05) confirms the hypothesis.

Table 6. Regression analysis with academic rank and PhD variables

Model	Coefficients		Standarized Coefficients		
	B	St. Error	Beta	t	P-value
(Constant)	-1.072	0.318		-3.374	0.001
OUTb	0.092	0.024	0.142	3.806	0.000
PERF2	0.257	0.049	0.174	5.202	0.000
IMG1	0.183	0.081	0.093	2.264	0.024
IMG3	0.275	0.074	0.144	3.696	0.000
EXP5	0.203	0.049	0.141	4.161	0.000
VIS1	0.343	0.076	0.161	4.537	0.000
UserWiki	0.788	0.177	0.144	4.465	0.000
Prof	0.375	0.145	0.098	2.594	0.010
PhD	0.361	0.144	0.094	2.511	0.012

Dependent variable: USEa

The model is globally significant (F=43.299, with a P-value of 0.000). The Durbin-Watson statistic (2.073) indicates that there are not AR(1) autocorrelation problems in the model (dL=1.8498 and dU=1.9019). With respect to multicollinearity, we obtain Variance Inflation Factors (VIF) for all variables that are below the upper bound of 10 (see Table 7). These results show that we do not have multicollinearity problems.

Table 7. Multicollinearity analysis

Variable	VIF
OUTb	1.476
PERF2	1.176
IMG1	1.794
IMG3	1.601
EXP5	1.212
VIS1	1.333
UserWiki	1.105
Prof	1.502
PhD	1.495

6 DISCUSSION

The aim of this research was to explore the factors affecting the use of Wikipedia as a teaching tool in Higher Education institutions. The selection of a decision-making process approach

seems to be appropriate since our analysis provides evidence that a combination of cultural, social and psychological factors is certainly relevant.

Our research findings show that the educational usage of Wikipedia is more associated with *environmental influences* than with faculty basic individual characteristics. Thus, factors such as academic rank, teaching experience, age or gender, do not seem to be enough relevant. Instead, the decision to use it seems to be partially inspired by the perception of Wikipedia's quality, the use of other collaborative learning tools, an active attitude towards web 2.0 applications, and connections with the professional non-academic world.

Situational context is also very important, since the use is higher when faculty members have *role models* in their close environment and when they perceive Wikipedia is positively valued by their colleagues. In practice, this external influence could work as a network of innovation, since the sharing of relevant and useful information and the dissemination of good practices among faculty might encourage the use of Wikipedia as a source of educational innovation.

Some of the attitudes, practices and habits explored in our survey seem to diverge for different scientific disciplines, since we have also detected clear variations in the use of Wikipedia across areas of academic expertise. The sceptical view some faculty members show on the free, collaborative and open sharing nature of knowledge and their apprehension about Wikipedia's quality are also restricting its educational use.

A greater application of Wikipedia, both as a teaching resource and as a driver for teaching innovation, would require both much more active institutional policies and some changes in the incumbent academic culture among faculty members –something much more difficult. Some recommendations could be made to improve perceptions and attitudes. First, it is essential to increase the understanding of Wikipedia, its policies and procedures. Second, it would be also necessary to directly stimulate Wikipedia usage by (a) promoting active contribution among both students and faculty and (b) granting greater recognition to teaching innovations involving it. Finally, it would also be helpful to encourage the use of (a) online collaborative tools for teaching and (b) open knowledge repositories for publishing academic outputs and resources.

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