T. Hirashima et al. (Eds.) (2011). Proceedings of the 19th International Conference on Computers in Education. Chiang Mai, Thailand: Asia-Pacific Society for Computers in Education

Writing Wikipedia Articles as Course Assignment

Weiqin CHEN[a*] & Rolf Reber[b]
[a]*Department of Information Science and Media Studies, University of Bergen, Norway*
[b]*Department of Biological and Medical Psychology, University of Bergen, Norway*
*weiqin.chen@infomedia.uib.no

Abstract: In this paper, we discuss the implication of assigning students to write Wikipedia articles in a course on motivation and learning. As part of mandatory course assignments, students write an article about a concept that relates to the course topic. This was introduced in a course in information science and the feedback shows that students are highly motivated and they have learned more about the topic that they write about.

Keywords: Motivation, learning, course assignment, Wikipedia

Introduction

Wikipedia is a free online encyclopedia that exists in 262 languages. In some languages, some scientific topics are shallowly or not at all covered. For example, in the Norwegian Wikipedia, most topics in artificial intelligence such as genetic algorithms, neural networks and decision trees are not covered. Writing Wikipedia articles as course assignment consists in letting students create quality-assured Wikipedia articles in Norwegian as part of their course assignments. Course lecturers instruct students to write a Wikipedia article in their language about a topic covered in the course. In a course about cognitive psychology, for instance, students are given a selection of topics that are not or only shallowly covered in the Norwegian Wikipedia, such as – at the time of writing– the terms working memory, availability heuristic, or Capgras syndrome. The student selects one of the terms (or proposes an own term) that is not yet covered in Wikipedia and writes an encyclopedia entry about that topic. The lecturer then corrects the entry and proposes revisions before the article goes online. To make sure that students are not forced to contribute to Wikipedia – which is an encyclopedia based on voluntary contributions – uploading the article to Wikipedia is optional.

Writing quality-assured Wikipedia articles as student assignments pursues three goals: (1) to give students assignments that are meaningful and relevant beyond the course and thus increase student interest in the course content; (2) similarly, the revisions by lecturers are relevant beyond the individual student because the final text will be publicly available. This is predicted to increase the interest of the lecturers in correcting and helping to revise the texts; (3) finally, this scheme benefits society at large that gets quality-assured information about academic topics. This may help increase the scientific literacy of users without science background (see [14] for the case of continuing education) and address the scientific base of socioscientific issues [9]. If successful and copied by others, this scheme may provide Norway with a powerful knowledge base that is free for all. Importantly, the quality assurance could improve the quality of scientific Wikipedia contents to a point that students at all levels and ages could rely on it for their homework. Like the whole Wikipedia project, it is a community of practice (see [10]) where students, together with lecturers, develop quality-proven materials that the lecturers can give other students to read who may later contribute articles on their own.

1. Background

There is to our knowledge little systematic research on how assignments relevant beyond the confines of instruction could increase student motivation and learning. This is mainly because most assignments are thought to improve student learning, but not to benefit society. Where there were exceptions, assessment of student motivation has not been systematic. For example, Buckley [2] discussed a computer science course where students solved programming problems related to problems of everyday life, such as creating a computer-assisted device for a stroke patient in order to enable him to express via a computer voice what he wants to communicate (he could not speak and barely write). Although Buckley reported that delivering the device has been a highly emotional moment for the students involved, he did not systematically assess student motivation for the whole course so that evidence remains anecdotal. Reber [11] had students create a webpage on a topic within language development (e.g., dyslexia) that was uploaded onto an educational website in Switzerland. Although he did assess student motivation systematically and found that creating a webpage was rated as more motivating than the usual activities within a psychology course, it remained unclear whether student motivation was related to potential benefits for the users of the pages. The positive outcomes could also be due to factors like novelty or fascination about creating a webpage.

Despite the lack of direct evidence, there are several lines of research that allow us to predict that writing Wikipedia articles as course assignment will be motivating and will have positive learning outcomes. Creating a Wikipedia article is supposed to be motivating, for at least three reasons. First, the activity of writing a Wikipedia article presumably is deemed to be relevant. Recent research has shown that relevance is one of the most important determinants of interest [1, 8]. Second, students can choose what topic to write about in Wikipedia, provided that the topic has not yet been covered. Indeed, choice has been shown to have positive consequences on motivation [6, 7 &12]. Third, beyond a sense of autonomy through choice, students may get a sense of relatedness through the contribution to a community, adding to the intrinsic motivation of writing a Wikipedia article (e.g., [4]). In addition, writing a Wikipedia article is predicted to have positive learning outcomes because active generation of information results in better learning than passive encoding (see [13] for the classic demonstration).

2. Pilot Study

We conducted a pilot study to see what students get out of writing a Wikipedia article, compared to a usual assignment, such as a class presentation.

2.1 Participants and procedure

We received completed questionnaires from 26 students at a Norwegian and a German university. Of the 14 Norwegian students, 10 were first year master students in Information Science who took advanced topics in Artificial Intelligence (nine male and one female); five students were undergraduate students in clinical psychology who took a course in cognitive psychology (four female and one male). The German students were master students who attended a social cognition course (ten female and two male students). In these courses, they were asked to write a Wikipedia article about a self-chosen topic within the topic of the

course (Artificial Intelligence or psychology, respectively) in their native languages. After having written the article, they were asked to reflect about such an assignment.

"Please describe in your own words how you experienced the Wikipedia-article assignment. Discuss advantages and disadvantages of this assignment, maybe by comparing it to other forms of assignment. Please think about this comparison on several dimensions, such as learning, motivation, exam relevance, depth and breadth of knowledge acquisition, relevance outside the studies, or workload."

We analyzed the reflections from students. In addition, we assess the quality of the Wikipedia article with regard to both correctness, with regard to both correctness, as assessed by expert reviewers, and comprehensibility, as judged by lay reviewers representative for the readership of Wikipedia.

2.2 Data analysis and findings

In the course assignment, the students have written nine new Wikipedia articles and improved on four existing articles in the Artificial Intelligence course (some students edited more than one article); seven new articles from the Norwegian psychology students (two did not answer the questionnaire); and 11 new articles from 14 German psychology students (some worked in groups; two students did not answer the questionnaire). The comprehensibility and readership have been assessed and feedback was given by the lecturer of the course. After these articles were uploaded to Wikipedia, about half of them have been worked upon by other contributors.

In order to get a more quantitative picture of the reflections, we let two independent judges analyze the written reflections on ten dimensions: Good task; Interest in the topic; Motivation; Relevance for society; Relevance for the exam; Learning outcome; Breadth of knowledge; Depth of knowledge; Difficulty; Workload.

For all dimensions, there were three degrees of scores and one option for "not mentioned". For the first eight dimensions, the labels were "little", "neutral", and "much". For difficulty, the labels were "very difficult", "neutral", and "easy"; and for workload, "much", "neutral", and "little", in order to retain the left-to-right order of negative to positive.

Interrater-agreement was relatively low, which had mainly to do with disagreement about whether a dimension was mentioned or not. About half of the students did not reflect on dimensions like interest, relevance for exam, breadth of knowledge, depth of knowledge, difficulty, or workload, with higher response rate for the other dimensions, which were good task, motivation, relevance for society, and learning outcome. However, the average scores of the two raters were about the same, independent of whether we considered all responses or only those where both judges agreed that they had been answered (in this case, interrater-agreement was more than 88% on average for the most frequently mentioned dimensions, but only 68% on average for the less mentioned dimensions). We provide the average scores given by the two raters:

Good task	2.98	Learning outcome	2.70
Interest in the topic	2.79	Breadth of knowledge	2.40
Motivation	2.85	Depth of knowledge	2.53
Relevance for society	2.80	Difficulty	1.91
Relevance for the exam	1.98	Workload	1.81

These scores show that students found that this was a good, interesting and motivating assignment that yielded positive learning outcomes. They were less convinced about

breadth and depth of knowledge that was addressed by the assignment, and they were neutral about the relevance to the exam, the difficulty and the workload, the latter compared to other assignments.

From the reflection essay, all students think that such assignment is "good", and most responded that it was "interesting" or "motivating". Some of them were so motivated that they started writing and improving on several articles. A majority of students found the assignment meaningful to general public. To be able to contribute to Wikipedia made them feel that they are making important contribution to the society which gives them "*extra motivation*" to make a good article. In the meantime it is "*a little scary*" because not only the lecturer and fellow students can read what they have written, but also the general public. They have to put much effort in writing the article so that the general public can read and understand.

Other advantages of such assignment include:

- Students learned the internal structure of Wikipedia
- Students learned the social skills, knowledge and manners necessary to be accepted in a community
  "…the Wiki community, which requires some level of social skill and general knowledge for the students in order to behave properly, in the particular manner that the community accepts." (student 5)
- Students learned to write articles about scientific topics for general public
  "Dialog between Wikipedia editor and me was very good and it gave me motivation to make a better and more understandable content" (student 1)
- Closely related to what they have learned in the course and they need to have a good knowledge about the topic in order to write the article.
  "The assignment to post an article on Wikipedia was very interesting and fun. I like to believe that I got a lot out of it. I had to actually understand what I was posting to it. Even if I was just looking at other Wikipedia pages in other languages I felt I had to understand the algorithms and terms in order to post them to my article." (student 11)
  "I think the assignment has really enhanced my understanding of this topic, how the algorithm should be implemented…It will help me in the oral exam to explain the topic because I had to explain it to a third person in the assignment." (student 1)

Three students found such assignment post higher workload than standard assignments. Some of them found it difficult to decide on a suitable translation of the terms in English to their native languages. One student translated from the English version to his native language. He reported that he learned much about the topic during the translation. Another student found the assignment extra challenging because the topics he wrote about did not exist in the English version of the Wikipedia. He had to read many original scientific publications.

Two students pointed out the possible problem with such kind of assignment -- it becomes harder to repeat over time. When all topics in a course are covered with a relative high quality article, then there is less space for improvement.

3. Conclusion and Future Work

In this paper we present a pilot study on motivation and learning effects of writing Wikipedia articles as a course assignment. The feedback shows that students are highly motivated and they have learned much about the topic that they wrote about.

This research aims to contribute to the knowledge on the motivational and learning effects of assignments that are relevant for contexts outside the current educational setting. Other creations for uploading to the worldwide web, such as creating educational movies that students upload to the online platform Youtube.com, are predicted to show the same effects: They are supposed to increase student and teacher motivation and to benefit society at large by providing a comprehensive knowledge base of high quality.

We are currently planning an experimental study. We will compare the Wikipedia article assignment with a class presentation (or some other writing assignment) about different topics. Dependent variables are motivation, interest, control, duration of rereading the contents after the assignment, retention of the contents, and their understanding (see Reber et al., 2009, for the measurement of some of these variables). In addition, we plan to conduct a survey study about the experience and motivation of lecturers. One of the problems of introducing teaching innovations is that teachers have to understand the methods and be able to handle the problems the students' experience. We therefore use a stepwise procedure for assessing the role of the teachers and their motivation through formative evaluations [5].

Acknowledgements

This project is funded by the Utdanning 2020 programme in the Norwegian Research Council. We thank Helene Reich and David Reber for scoring the responses and all the participants for their invaluable effort and feedback.

References

[1] Assor, A., Kaplan, H., & Roth, G. (2002). Choice is good but relevance is excellent: Autonomy affecting teacher behaviors that predict students' engagement in learning. *British Journal of Educational Psychology, 72*, 261–278.

[2] Buckley, M. (2009). Computing as social science. *Communications of the ACM, 52*(4), 29-30.

[3] Chen, W., & Reber, R. (2010). *Example choice and ExampleWIki.* Paper presented at the ICCE2011, Kuala Lumpur, Malaysia.

[4] Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum Press.

[5] Edelson, D. C., Gordin, D. N., & Pea, R. D. (1999). Addressing the challenges of inquiry-based learning through technology and curriculum design. *Journal of the Learning Sciences, 8*, 391-450.

[6] Flowerday, T., & Schraw, G. (2003). Effect of choice on cognitive and affective engagement. *Journal of Educational Research, 96*, 207–215.

[7] Flowerday, T., Schraw, G., & Stevens, J. (2004). The role of choice and interest in reader engagement. *Journal of Experimental Education, 72*, 93-114.

[8] Hulleman, C. S., & Harackiewicz, J. M. (2009). Promoting interest and performance in high school science classes. *Science, 326*, 1410-1412.

[9] Kolstø, S. D. (2001). Scientific literacy for citizenship: Tools for dealing with the science dimension of controversial socioscientific issues. *Science Education, 85*, 291-310.

[10] Lave, J., & Wenger, E. (1991). *Situated learning. Legitimate peripheral participation*. Cambridge, UK: Cambridge University Press.

[11] Reber, R. (2005). Assessing motivational factors in educational technology: the case of building a web site as course assignment. *British Journal of Educational Technology, 36*, 93–95.

[12] Reber, R., Hetland, H., Chen, W., Norman, E., & Kobbeltvedt, T. (2009). Effects of example choice on interest, control, and learning. *Journal of the Learning Sciences, 18*, 509-548.

[13] Slamecka, N. J., & Graf, P. (1978). The generation effect: delineation of a phenomenon. *Journal of Experimental Psychology: Human Learning & Memory, 4*, 592-604.

[14] Stadler, M. (2008). *Naturwissenschaften in der Erwachsenenbildung – was, wie und wozu vermitteln? [Conveying natural science knowledge in continuing education: What, how, and why?]* Zeitschrift für Weiterbildungsforschung.