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Knowledge construction and knowledge sharing: a Wiki-based approach

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Abstract

The present research, based on constructivist learning paradigms, describes the outcomes of a project which complies with real life projection into the professional world: a Wiki-based approach is devised to construct knowledge, manage own learning and develop communication and linguistic skills in English. The paper aims to analyze the process and product of students' contribution to group work. A qualitative analysis reveals the students' positive and negative feedback. The study complies with the shift of current learning paradigms in the focus of learning: from gaining knowledge to producing knowledge

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Keywords: Wiki; Construction of knowledge; Writing; Collaborative work; Active learning; Life-long learning; Communication skills; Linguistic skills.

1. Contextual Framework

In a university context, the philosophy behind European Higher Education has caused a profound modification of educational models introducing new methodologies aiming at students' life-long learning for either personal or professional purposes. Apart from generic skills such as demonstrating knowledge and understanding concepts of the discipline, accessing, evaluating and generating scientific information, students must be able to communicate effectively in the international labour market; this is a major complementary challenge for university degrees which aims to achieve, among others:

a) Construction of knowledge through active learning, which entails construction instead of instruction, and learner-centered instead of teacher-centered instruction. The teacher becomes a facilitator of knowledge and the outcome is life-long learning. Rather than passively receiving knowledge from the instructor, active learners need to do activities to construct knowledge (Devey, 1916 in Kasemvilas & Olfman, 2009) and manage their own learning. Construction of knowledge requires an active attitude on the part of the learner exploring possibilities, inventing alternative solutions, collaborating with other students, trying out ideas and hypotheses, revising their thinking, and finally presenting the best solution they can derive (O'Loughlin, 1992; Cole, 2009).

b) Integration of students in group work, a fundamental requirement for their later employability, as recruiters often value as a must, the candidate's experience working in group settings, and identify team work as one of the core transferable skills valued by employers in the workplace (Elgort, Smith & Toland, 2008). Educational approaches have traditionally paid more attention to individual work than to group work; however, group work is

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today considered more effective for promoting student learning and retention than traditional teacher centered methodology (Montero-Fleta & Pérez-Sabater, 2009).

Davies (2009), in his article on group assessment based on scholarly research, justifies group work on the grounds of promoting the construction of knowledge and enhancement of problem-based learning among students and highlights the advantages attributed to group work: 'deep' as opposed to 'surface' learning, active as opposed to passive learning, experiential learning, collaborative and cooperative learning.

c) Proficiency in the use of new technologies. The basics of new technologies should not present a problem for most university students as they belong to the Millennium and are "digital natives" (Prensky, 2001), native speakers of the digital language of computers, video games and the Internet. However, they are not so used to finding recent Web 2.0 technologies integrated in their studies.

d) Acquisition of linguistic and communication skills, the ability to get a message across to others clearly and unambiguously. These skills are critical for professional success.

The present research takes these factors into account and provides a new insight of using Wiki webpages to enhance writing skills in an academic setting in order to support students' engagement, collaboration, interaction, communication and knowledge construction to reach class learning objectives. The existing interest in wikis in the library and information field (Elgort, 2007, Chawner & Lewis, 2006, Frumkin, 2005), the technical area of specialization of our students, was another reason for incorporating this technology in our course. As part of an ongoing study on the use of the Web 2.0 in educational environments, the paper aims to analyze the process and product of students' contribution to group work: the degree of collaboration, production and involvement to construct knowledge that would benefit from using Wikis..

In previous studies, Montero-Fleta & Pérez-Sabater (2010) observed the effect of the implementation of blogs to improve writing, students' motivation, and knowledge retention compared with traditional methods. Results showed that writing for a purpose encouraged them to produce language more fluently and be more concerned with correctness. Students' motivations increased significantly. This led us to consider blogs as a potential tool for the development of linguistic skills. While blogs have been considered a better communication tool for disseminating information to people and for enabling feedback while keeping the original text intact (Parker & Chao, 2007), Wikis seem to be better when information is intended to be modified and enhanced as part of a collaborative effort. The present research study contributes to this area of inquiry by examining the results of a pilot study which incorporates Wiki websites in an English writing course.

2. Literature review

Recent research has shown that computer-mediated communication activities can help to promote learner autonomy, promote cooperative learning and serve as an educational tool in language courses (Sun, 2009). The development of Web 2.0 technologies has greatly contributed to prompt constructivist learning mechanisms such as collaborative online writing (Kasemvilas & Olfman, 2009). But in spite of the important effect on current learning styles of the Web 2.0, its incorporation in the language classroom to develop collaborative authoring is still in need of research (Androutsopoulos & Beißwenger, 2008).

We are not going to review the characteristics of Wiki technology here because of the vast amount of literature on it but will refer to its applications. Wikis comply with the three elements described by Tinto (2003) necessary to foster learning: mutual engagement, shared repertoire and joint enterprise. The collaborative work carried out in a learning community develops a common ground of knowledge, putting into practice authentic task, knowledge development and research or reflection (Montero-Fleta, Watts & García-Carbonell, 2007). The effectiveness of Wikis for collaborative learning and writing has been discussed in some recent studies (Bold, 2006; de Pedro et al., 2006; Leung & Chu, 2009, Lund, 2008). Recent work on Wikis has focused on co-writing of students in primary and secondary schools (see Mak & Coniam, 2008), the linguistic characteristics of Wikis' interactions (see Kuteeva, 2011), genre analysis of collaborative authoring environments (see Emigh & Herring, 2005) or academic pilot studies (see Anson & Miller-Cochran, 2009).

The most common pedagogical application of Wikis is supporting writing instruction: “Wikis stimulate writing, provide a low-cost but effective communication and collaboration tool, promote the close reading, revision, and tracking of preliminary work” (Lamb, 2004: 38). The advantages of reflection, reviewing, publication, and of observing cumulative written results are maximized as they unfold (Fountain, 2005). Wikis can be used by a team for joint writing where students engage actively exchanging ideas (Parker & Chao, 2007) and can involve learners in their own construction of knowledge (Boulos, Maramba & Wheeler, 2006). Introducing these Web 2.0 tools in the learning process has an added value in our days, as distributed content management tools are likely to be part of professional practice in information work in the future (Chawner & Lewis, 2006; Frumkin, 2005).

But using a Wiki in education is not a guarantee that individuals will work together as a group (Elgort, 2008). Its effectiveness, though, is heavily dependent on how it is used (Warschauer, 1996). The incorporation of Wikis in academic settings requires careful planning with consideration given to sound pedagogy (Leung & Chu, 2010). The use of technology alone does not improve achievement and motivation among pupils; it also necessitates a methodology which is pedagogically sound and leads to effective learning, real life communication and projection into the professional world. But the design of the pedagogy for a group writing class entails many choices for its successful implementation and it is not clear from the literature which choices to take (Kasemvilas & Olfman, 2009).

3. Purpose of the study

Considering the research gap, the purpose of this study was to examine the process and product of Wiki interactions and student involvement in a collaborative writing project in a university environment. Our research aimed at confirming the following hypotheses:

1. A Wiki-based approach will engage students in collaborative construction of knowledge enhancing process and product.
2. Students with a higher level of English make richer contributions in the Wiki.
3. Digital natives have no problems in using new technologies proficiently.

4. Methodology

4.1. Sample

This pilot study was run with 32 Spanish students of English in a university degree of Library and Information Management over the course of a semester. The average age of the students was 23.6 and their level of English was supposed to be intermediate (B1 on the Common European Framework of Reference for Languages) but there was a wide range of language proficiency levels. They were experienced in the use of new technologies. The teams were formed using the results of a diagnostic test (source: Oxford Placement Tests) so that groups would have a heterogeneous linguistic level. In this way it was also possible for the students in cooperative teams to learn from one another (Montero-Fleta, Pérez-Sabater & Rising, 2011).

4.2. Study design

Each group was assigned one grammar topic from the course syllabus for the project. Teams delved into the theoretical content connected to the grammatical topic assigned, and designed practical exercises to illustrate the grammar and applied specific vocabulary to the field of Library and Information Management. A graphic presentation was also designed. The team was responsible for all of its members reaching competence in the topic. Students working in groups were required to use the Wiki to develop the project. The project, thus, meets the requirements suggested by Jonassen (1991) to constructivist learning, as it is active, constructive, reflective, authentic, challenging, cooperative and conversational and, what is more, allows learners to participate in collaboratively building resources (Parker & Chao, 2007).

Each team was also required to report on the content of the Wiki pages elaborated by other groups, paying attention to content and clarity, appropriate vocabulary, grammar, layout, design and references. The teacher was a

facilitator of the activity, controlled the process flexibly, was most concerned with reaching a total implication of every student, avoiding free riders (i.e. group members who contribute less or nothing, but benefit from the overall grade acquired from the hard work of their peers) or sucker effect (i.e. capable students reducing their input into a project when they experience others' free-riding following Davies, 2009). The teacher also assessed the final product and was always available for clarifications, both on specific content and problems associated with technology. Groups discussed the required task in class, divided the work to be performed among group members and went online in their own time. Learning was not switched off but was continuous, as Holtman (2009) suggested. The activity ran for a month, after which the Wikis were closed for any further modification. Then, a period of reflection was established to share and review contents and, finally, oral group presentations were delivered to show the materials collaboratively produced and to assess groups.

PoliformaT, the university support platform for teaching, was used to host the activity. PoliformaT is based on the Sakai Project, an online Collaboration and Learning Environment founded in the University of Michigan and Indiana University. PoliformaT tools have several options for teacher-learner communications which form the core of Sakai to support face to face and online learning: e.g. announcements, resources, forums, calendar, timetable, exams, management, chat room or Wiki, among others. The PoliformaT Wiki website keeps record of the number of contributions over a period of time, thus showing the degree of collaboration and interactivity among members. It also offers the possibility to compare successive versions: sections which have been deleted will be highlighted in red, information which has been added will appear in green, and modifications will be shown in yellow. Detailed instructions on how to edit and publish with this website is also provided to the participants in the activity.

Students attended introductory tutorials in which they were briefed on collaborative work to construct knowledge and formal writing. Following Parker & Chao (2007), students were given clear instruction on the task to perform, the composition of their group, the way the task should be distributed within groups, the mode of interaction and the timing of the phases. They were trained in the use of the Wiki webpage to edit or print, create tables and diagrams, alerts or page history. They were also instructed on ethical attitudes in interactions, adding, removing, or changing content to improve the ongoing document in their own group Wiki. They could enter other groups' Wiki but were not allowed to make any changes except on their own group's Wiki. They also received instruction on research techniques, as due to the specific nature of the project, they were required to read, reflect, discuss, agree, write, produce and revise. In scheduled sessions, students familiarized themselves with the Wiki website and got organized to meet deadlines.

The size of the group is important to reach maximum performance from each and every one of the students. As previous studies have confirmed that in small groups there is better cohesion and intimacy (see Pérez-Sabater; Montero-Fleta & Rising, 2011), in this pilot study students worked in groups of four.

Research data were obtained on the following:

1. Process assessment: A qualitative survey was administered through group interviews to get data about the pros and cons of the implementation of the Wiki for collaborative work.

2. Product assessment: an important component of the course is the final group project presentation. Each group presented the material developed in the final assessment sessions and also provided feedback on the Wikis completed by other groups. Although Wikis discourage 'product oriented writing' while facilitating 'writing as a process' (Lamb, 2004: 42), the material produced by the groups was assessed by the teacher so as to get the students more involved in the final outcome.

3. Teacher's feedback on student involvement: analysis in terms of frequency and type of contribution.

5. Findings

5.1. *Feedback on the process*

Generally speaking, students found the activity enriching. The degree of collaboration and interactivity among members was satisfactory. They took advantage of the possibility of being able to learn from the work done by other groups. They mostly considered that being able to work from home had saved time in their completion of the task. Some stated that being aware that all their peers were reading their projects had forced them to pay close attention to

form and correctness, and had even prevented them from committing plagiarism, as the research on online writing carried by Abbas (2002) suggested. A great majority of students singled out that the approach had helped them to improve writing in English, communication skills, research techniques and team work.

Opinions against showed the preference of a minority of students for using e-mail for their information exchange in successive drafts and elaboration of a final document. Some of them complained about technical problems with the webpage. One student alleged his preference for carrying out projects individually.

From the teacher's point of view, being able to have access to the page history, a site where all edited versions of the project are listed with date and author, facilitates tracing each student's contribution. Tracking the changes made in successive interactions is a cumbersome task for the teacher. Although the Wiki project was devised for collective assessment because of the nature of the tool, individual students were traced on the number of times or length of interaction in the Wiki but mainly assessed for the quality of their contribution. There were short interactions of some students which richly contributed to the final product and conversely, some students interacted extensively and did not improve the ongoing draft much. We were not surprised to see that highly committed and interested Wiki contributors interacted more frequently than other students. The control over the rate of interactions definitely avoided the presence of free-riders.

5.2. Feedback on the product

Each group delivered an oral presentation in class on the content of their Wiki in the final assessment period. Feedback on the final project of all the other groups was also provided; some comments led to lengthy discussions supported by clarifications provided by project teams where linguistic skills and critical thinking were put into practice. The final product created by every group constituted a topical knowledge repository, i.e. course content that supplements and extends delivered material (Cole, 2009).

5.3. Teacher's feedback on student's engagement and production

The students' engagement in the Wiki was satisfactory, as the lecturer checked the progress by accessing the Wiki regularly and gave feedback either verbally or by email (following Holtman, 2009). Information on the page history of a group demanded once further enquiry by the teacher to find out why a Wiki seemed to have only one member as participant. The students in this group, adduced that a member of the group had been named to play the role of editor in chief and was the one who had been responsible for updating the information in the Wiki, but all of them were contributing equally. This showed that the students in this group had spent a significant amount of time working individually and had used the Wiki simply as a repository of the work in progress.

The different kinds of interactions made in the Wiki were analyzed according to their contribution: adding new content, clarification of previous information, reorganizing ideas, grammar revision, style, format or references. The page history e showed that certain students had mostly been involved in providing new content, and other students had focused more on rearranging already existing information. An analysis of the level of English of the authors of these contributions showed that students with a level of English above average were responsible for 65% of new content, 86 % of grammar revision and 73 % of style.

6. Discussion and conclusion

Our initial hypothesis, that a Wiki-based approach will engage students in collaborative construction of knowledge, was largely confirmed. The project has counted on a general involvement of the students in its development, minimizing free riders and sucker effect.

The second hypothesis, stating that students with a higher level of English make richer contributions in the Wiki, was partly confirmed. Some good students showed a higher participation in content, grammar revision and style but also students with a lower level of the language provided insightful ideas that enriched the draft. On the other hand, suggestions or questions raised by the latter students helped to clarify points which were not clearly enough dealt with.

Our third hypothesis, that digital natives do not have problems in using new technologies, is an only partly valid assumption. Students required some sessions to get used to the website and also required technical assistance in the process. Complaints were made on slow loading speed, difficulty with tables, editing problems or the absence of a spelling checker; a friendlier interface was also demanded. No problems of vandalism, deleting information in other projects, were detected; only some involuntary deletions at the beginning were recorded.

Our results have confirmed the benefits of Wikis to construct knowledge collaboratively in the language classroom. The Wiki writing approach has created a student-centered learning environment in which student-driven course content, a repository of knowledge for further use, has been produced. Our findings agree with Anson and Miller-Cochran (2009) that emerging technologies can help to create constructivist learning environments that challenge students to participate more actively in their own education.

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