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Breaking up the writing process: How a wiki can support the composition and revision strategies of young writers

Manoli Pifarré^{a*} and Ros Fisher^b

^a*Department of Pedagogy and Psychology, University of Lleida, Lleida, Spain;* ^b*Graduate School of Education, University of Exeter, Exeter, United Kingdom.*

*Corresponding author. Email: pifarre@pip.udl.cat

Understanding how best to support immature writers in the development of their understanding of the writing process is an important concern for researchers and teachers. Social technologies have become key features of leisure and work place writing, yet knowledge about how to design educational settings that take full advantage of the affordances of web 2.0 technologies to support early writing is scarce. This paper presents a small scale study that investigated how writing in a wiki environment might facilitate and support students’ use of composition and revision strategies. Our findings show that wiki can enlarge young writers’ experience of the process of composition and revision both through their own efforts and by observing the process in others. In this study students employed a wide range of types of revisions both surface and text based changes. These revisions took place during the process of composition as well as at the end. It is argued here that writing in a wiki not only provides young writers with experience of a mode of composition prevalent in the contemporary work environment, but breaks up the process of writing in a way that may support students’ understanding of the processes of composition and revision.

Keywords: collaborative writing; wiki; pedagogical issues; revision strategies; composition strategies; primary education.

1. Introduction

Writing is a complex endeavour requiring the orchestration of both secretarial and compositional skills. From a psychological perspective, it is argued that the cognitive demands of the writing process result in overload for young writers (Kellogg, 1999; Latham, 2002). Thus development of composition from transcribing simple propositions to a more sophisticated presentation of ideas can be a slow process. Furthermore writing is a social practice, requiring knowledge of the conventions of written text in addition to more familiar spoken language patterns (Perera, 1987). It demands understanding of the communicative context of the writing task (Bearne, 2003). For the teacher of writing, the classroom context needs to provide support for early writers as they develop understanding of the process of writing and learn to move from a few words to extended and more complex prose. This paper presents a small scale study that investigated how writing in a wiki environment might facilitate student's use of composition and revision strategies.

Developing early composition and revision

There is general agreement about what the psychological process of composition involves, particularly with experienced adult writers: planning, transcribing and reviewing (Hayes and Flower, 1980; Berninger and Swanson, 1994). Chewnoweth and Hayes (2001) propose a psychological model in which writing is envisaged as a sort of production chain. An idea is proposed in the brain and then translated into a language string based on the idea. This language string is evaluated and revised and passed to what is described as the transcriber to be turned into text. Reviewing is an ongoing process and revision can take place at any time during the process. However, such models consider writing as a mainly internal process in the brain of the writer. More social models of writing emphasise the need for knowledge of the purpose and audience for the writing (Roen and Willey, 1988) and knowledge of social and cultural conventions for writing (Cope and Kalanzis, 1993).

Much of our knowledge of the process of composition and revision is based on research with adult or experienced writers. Research that examines the process of writing in immature writers indicates that for young children the production of written text is a more direct process of 'think it, write it' (McCutchen, 1988). Bereiter and Sacardemalia (1987) in explaining how a writer becomes proficient proposed two writing strategies of 'knowledge telling' more common in novice writers and 'knowledge transformation' which is used by more mature and experienced writers. Chanquoy (2009) argues that in order to transform ideas rather than merely repeating them, reviewing and planning are important parts of this process. These ideas are further developed by Sharples (1999) who conceptualised the process of text production as creative design. This is further developed by Myhill who describes writers as designers (Maun and Myhill, 2005; Myhill 2009).

However, research has shown that early writers find this design process difficult: it is argued that young children simply tell (Bereiter and Sacrdemalia, *ibid*). Berninger and Swanson (*ibid*) showed how inexperienced writers develop the writing processes of planning, translating and reviewing. They argue that their experiments show that translating appears before the planning and reviewing processes (Berninger et al, 1994). It is argued that for the immature writer the cognitive load of transcription overrides any opportunity to transform (McCutchen, 1996). Research into the type of revisions young writers make indicates that revisions are more likely to be no more than error correction and changes to the surface features of writing such as spelling and syntactic errors (Sharples, 1999; Butterfield et al 1996). It is argued that inexperienced writers find it hard to take the position of the reader (Carvalho, 2002) or to make text level changes affecting meaning (Dix, 2006). However, Castedo and Ferreiro (2010) argue that where the task is sufficiently relevant to the writers students as young as 7 can take the position of the reader. In their research children were asked to write captions for photos of members of their family. With secondary students, Myhill and Jones (2007) found that these writers adopted many revision activities during writing not merely those concerned with surface accuracy. Indeed, it is important to recognise that design in itself is not beyond the capacity of

very young children. Pahl (1999) provides extensive evidence of children as designers in their drawing and model making. She argues that model making was less transcribed by the teachers' cultural expectations than writing and allowed children to explore ideas within their own socio-cultural contexts.

Thus, although much of the literature argues of the difficulty of composition and revision for immature writers, there is also evidence that students can engage with the process when the context is right. Teachers need to provide a context that supports student's learning of the writing process to help them move from telling to transforming (Null, 2010). However, although we understand something of the issues, we do not know enough about how to help young writers develop in their efficiency in the craft of writing. This paper describes how using a wiki can both provide rich experience of the process of composition and revision for young writers as well as providing the teacher with insight into how these writers have engaged in the process.

Affordances of wikis to support the writing process

wiki is one of the emergent generation of web 2.0 tools and applications. A wiki is a collaborative web site whose content can be edited by visitors to the site, allowing users to easily create, edit, revise, expand or link web pages to create a text collaboratively. Acting in this way, wiki participants become publishers rather than merely consumers of information (Sigala, 2007).

Several researchers have drawn attention to the potential of wikis for support composition processes. Thus collaborative writing is one of the most common uses that are attributable to wikis (Lundin, 2008), however, most studies focus on experienced writers. Different educational studies have emphasised the medium's strengths to support the writing process. Forte and Bruckman (2006) suggested that collaborative publishing on a wiki offers an interesting model for creating authentic classroom writing activities because it can support writing-to-learn activities such as research projects or problem-based activities. wikis support the different stages or processes involved in complex tasks such as distributing information, collaborative artefact

creation, discussion and review. They argue that these authentic writing activities are more likely to provide the context needed to move students' writing process from telling to transforming. Furthermore, the fact that any writing is published in the wiki to an audience can reinforce the social aspect of writing where texts are produced for a particular purpose or audience (Richardson, 2006).

Other studies show how wikis can support knowledge transforming strategies in writing. In a wiki students can add, expand and reorganise others' ideas easily and make the text longer and more accurate. For many students, expanding, organising and correcting their own work tends to be a rare event (Dix, 2006). The technological features of a wiki allow students the opportunity to get involved in these key writing processes. Mark & Coniam (2008) report how secondary students produced a greater quantity of text that was more coherent and accurate after there had been a considerable amount of expanding, reorganising and correcting activity in a wiki environment.

In addition to the text creation space, wikis have a negotiation space which can be used for enhancing students' awareness of the planning stage of writing (Parker & Chao, 2007). In the negotiation space students can brain storm ideas and arguments about the issue under discussion and reflect on which ideas will be included in their piece of writing. Planning processes are highlighted in the literature as an important element of the writing process in mature writers but some argue that they are rarely used in immature ones (Berninger et al, 1992). Moreover, the negotiation space can be used to argue students' ideas and negotiate agreements on how to write a text and what content to include, thus engaging students in reflection on the text during composition.

Distributed authoring, which occurs during the process of collaborative learning and writing through a wiki, implies, on the one hand, that users can view pages that others have published without having to wait for a publisher to compile the collection of individual parts, and on the other hand, that being able constantly to see the work of others supports idea generation

and enriches the individual's own writing (Trentin, 2009). When publishing and presenting their joint work to a wider audience, learners can benefit from the opportunity to appropriate the new ideas and transform their own knowledge through reflection. This is demonstrated in a study conducted with high school students; Allison (2005) noted that working through the wiki, students learned not only collaborative skills but also some strategies for effective composition and grammar from the other students.

Another of the advantages reported of wikis with the regard to the development of the writing process, particularly revision strategies, is that as students work towards the final document, all intermediate copies are retained. This provides an invaluable learning tool whereby students can see what errors they initially made – and subsequently corrected. The preservation of a record of all steps in a writing process and the accessibility to material from earlier versions by multiple participants can provide a powerful environment for fostering critical revision of the writing (Carr, Morrison, Cox & Deacon, 2007). Moreover, the affordance of the wiki to enable revision and reflection on different versions of the same writing may help students to perceive writing as a process orientated activity rather than a product orientated activity (Mark & Coniam, 2008).

Although it is claimed wiki affords many opportunities to support writing processes there are still relatively few reports of research that show how this objective can be realised in educational settings. This is even more noticeable with immature writers as most research using web 2.0 technologies and wiki is conducted in Higher Education (Parker & Chao, 2007; Carr et al., 2007) or secondary schools (Allison, 2005; Mark and Coniam, 2008).

The Research

Purpose

The study reported here intended to address this lack through the design, implementation and evaluation of a classroom project using a wiki with students aged 9-10 years. These data

form part of a larger research project about the affordances of Web 2.0 technologies in education.

Our main aims here are:

- (1) To explore how a wiki environment can be designed to support primary school students' composition and revision processes.
- (2) To study how students engage with composition and revision in the wiki environment and what type of writing revisions are enabled.
- (3) To discuss the role of the wiki in developing immature writers' composition and revision strategies.

Methods

Twenty-five primary education students participated in this study. The students came from an urban school in a lower socio economic area of Lleida (Spain). Students worked together in pairs with the computer. For face-to-face collaborative activities and to work asynchronously in the wiki, they were grouped in groups of 6. For the purposes of this paper, we analyzed in depth the writing of two groups of six students.

We designed a classroom based project to prepare and scaffold students to write collaboratively in the wiki environment. The instructional process engaged students in three different learning phases with specific learning objectives (figure 1) and the whole project lasted for 13 sessions of approximately one hour each.

The Wiki Project

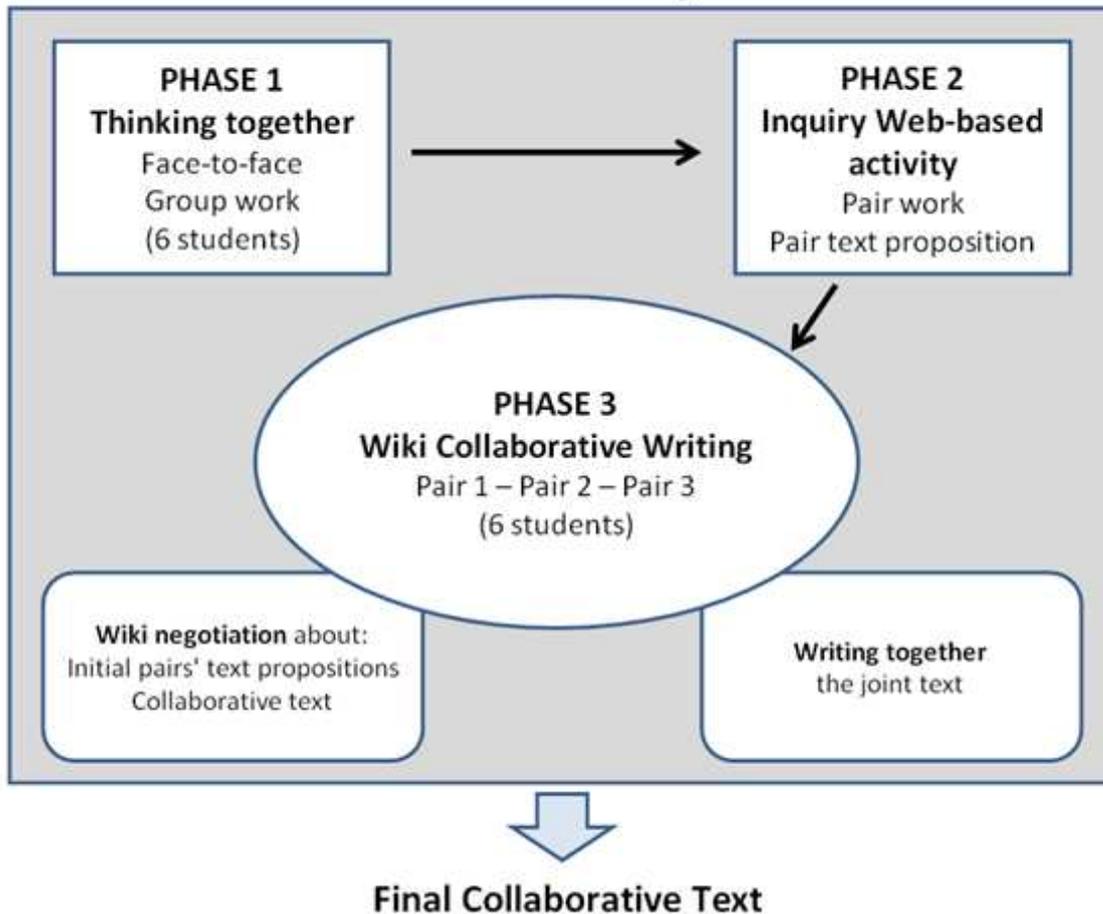


Figure 1. Main characteristics of the collaborative writing project

First, there were three face-to-face class sessions for which the main learning objective was to develop collaborative talk. In these sessions, a “thinking together” approach was used (Mercer, 2000) and students worked in groups of six on activities to enhance collaborative talk.

Second, and during the next 3 class sessions, students researched the topic they would write about later: the planet Mars and the scientific possibilities to set up a colony there. Students in pairs undertook a web-based inquiry activity about Mars: a new topic for the students participating in this study. In the activity, students had to search, select, integrate and argue about different types of information on the web about Mars. At the end of this stage, every pair of students wrote an initial proposition giving some ideas related to the possibility of setting up a colony on Mars and what difficulties would need to be overcome and how.

Thirdly, each group of six students (three pairs) joined in a wiki environment to write collaboratively in pairs a final text. Seven class sessions were used for this stage. The first of

these sessions focused on learning how to use the wiki spaces to write together. During the next six sessions, pairs took turns to work in the wiki for periods of about 10-15 minutes. In total, each pair spent between 7 and 8 periods working at the wiki (a total of 21 periods for group 1 and 24 for group 2 over the six sessions).

The wiki environment used in our work includes two frames divided vertically. The bar that separates them is movable, so that the students can adapt the space according to their needs. The left frame is “consultation space” and the right frame is “writing space”. The consultation space contains two tabs: a) instructions to use the wiki and b) the students’ initial ideas. These pop up as initial proposals from which to start the negotiation and composition processes in the wiki.

The writing space also contains two tabs (figure 2): a) negotiation, this is the negotiation space of the wiki. Here, the pairs discuss and reach agreements on how they want to construct the joint text, and to decide on aspects of their collaborative writing such as: what sections the final text will have; what content each section will have; what content is needed to be included in the group text. This joint process draws on the negotiation carried out before and during the writing of the text. Students are encouraged to explain to their wiki Group partners in the negotiation space what changes have been made in the collaborative text and why; b) group page, this is the space where the group, formed by the three pairs, writes the text collaboratively.

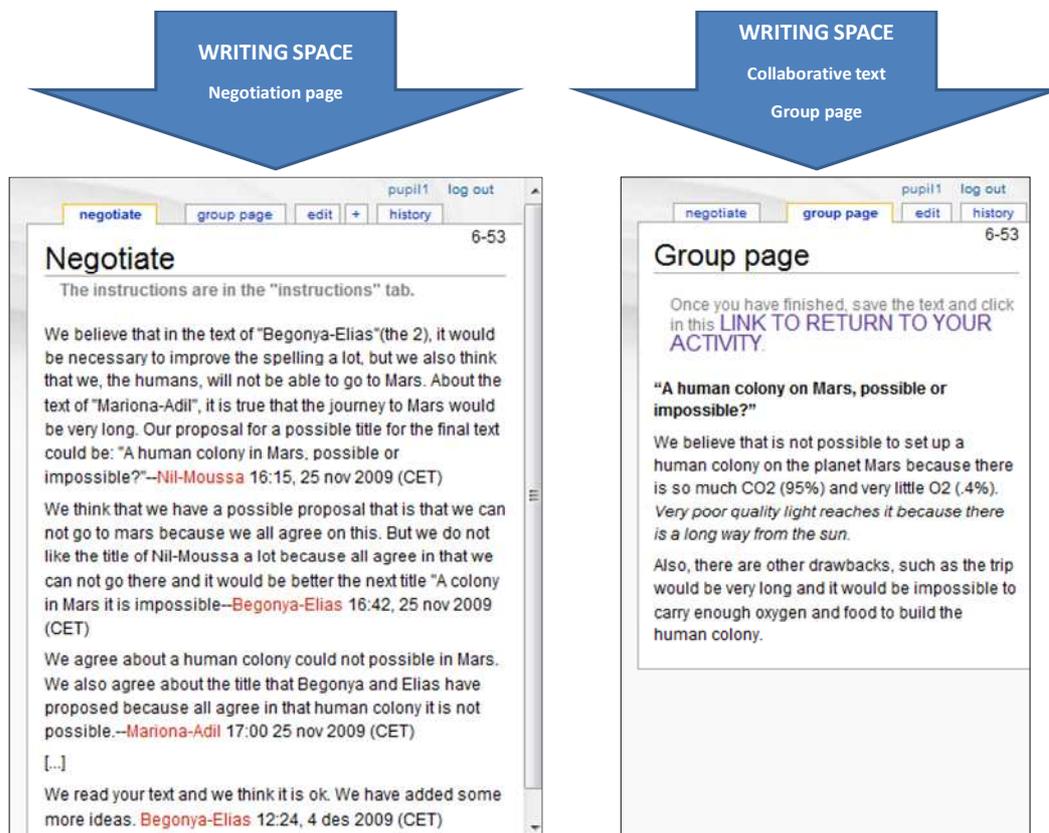


Figure 2: Design of the wiki environment: “negotiation” and “group page” tabs

Data collection

The data presented in this paper were collected during the 7 wiki writing sessions. We collected and analyzed in depth all the students’ contributions in the wiki environment. In particular, we followed the trajectory of the two groups of six students in two different wikis through the various stages of their wiki contributions both in the negotiation space and group writing page. This paper focuses mainly on the composition and revision of the final text in the writing area but draws on evidence from the negotiation area for additional information. We discuss the collaboration and discussion that took place in the negotiation space elsewhere (Pifarré and Fisher, in preparation).

Data analysis

In order to examine the processes of revision and composition for the purposes of this study, a variation on the tried and tested Faigley and Witte (1981) taxonomy of revisions was used as suggested by Dix (2006) with students of a similar age to those in the present study. Chanquoy

(2009) describes Faigley and Witte's taxonomy as the most complete classification taking account of 'both syntactic and semantic revisions' (pp. 87). We adopted the Dix adaptation precisely because it draws on the scope of the Faigley and Witte taxonomy and does not assume a more reductive view of beginning writers' errors which can be seen as no more than low level corrections (Chanquoy, 2009) such as changing words and suppressing errors (Sommers, 1980). In order to explore the affordances of the wiki to support composition and revision it was judged important to consider both text based and surface changes.

Dix's revised taxonomy, like Faigley and Witte, categorises revisions into these two categories of surface changes and text based changes. The first category of surface changes are subcategorised as either formal (e.g. spelling or punctuation) or meaning preserving including additions, deletions, substitutions, and restructuring. Using restructuring to encompass the three Faigley and Witte categories of permutations, distributions and consolidations is the main difference between the original and Dix's adaptation. The second category of text based changes covers changes that 'affect the meaning of the writing at concept and whole text levels' (Dix 2006: 6). These are subcategorised as either microstructure or macrostructure; each of these can be categorised in the same way as additions, deletions, substitutions, and restructuring. See Figure 3. Faigley and Witte distinguish between micro and macro structure by explaining that macrostructure changes would affect any summary of the whole text whereas microstructure changes, although altering the meaning, do not influence any summary.

Revision changes

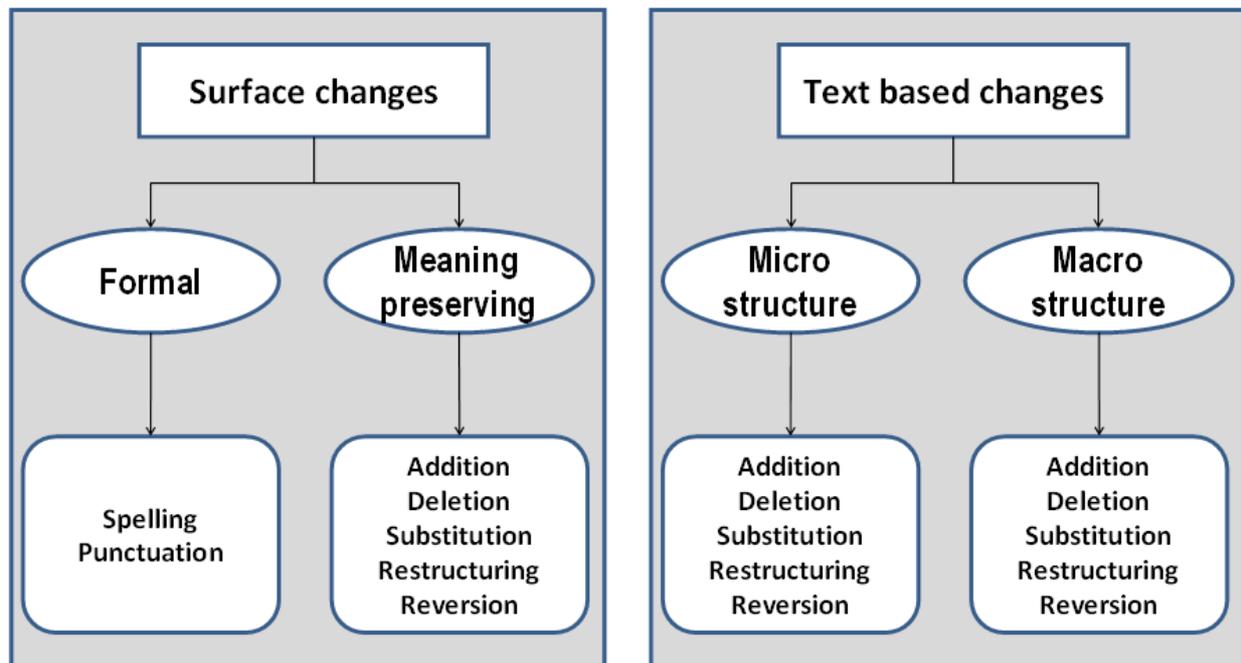


Figure 3: Taxonomy of revisions, adapted from Faigley and Witte (1981) and Dix (2006)

Although the literature tends to treat composition and revision as separate processes (e.g. Chanquoy, 2009), it was in fact difficult to distinguish between one and the other. To simplify the process, we categorised all text that was added to the end of the text as ‘new’ and all other changes to the text were categorised according to the taxonomy of revisions described above. However, in reality the distinction between composition and revision is not an easy one to make. This will be discussed later in the paper. At this point we also added the new category of reversion for additions or substitutions that reintroduced sections of text that had been previously deleted.

Once each alteration to the text had been identified and categorised according to the taxonomy above, a table was constructed indicating the number of each type of revision used by each of the two groups. Distribution of these revisions can be seen in table 1. This table enables comparison between these students writing in the wiki and other sources that report immature writers use (or non use) of revision strategies. Here it can be seen that slightly more text based changes were made than meaning preserving. However, there were only few changes to the macrostructure. The table also shows the difference between the two groups indicating that although group 2 made

more revisions than group 1, both groups used each type of change (both surface and text based) as indicated by Faigley and Witte’s taxonomy.

Change	Surface Changes						Text Base Changes					
	Formal			Meaning Preserving			Microstructure			Macrostructure		
	G1	G2	Total	G1	G2	Total	G1	G2	Total	G1	G2	Total
Formal	8	7	15									
Addition				0	3	3	2	6	8	2	0	2
Deletion				0	1	1	4	1	5	0	0	0
Substitution				1	5	6	0	1	1	0	1	1
Re-ordering/ restructuring				1	2	3	0	1	0	0	0	0
Reversion				0	4	4	0	1	1	0	0	0
Total				2	15	17	6	10	16	2	2	4

Table 1: Distribution of revisions (number of times each type of revision is presented in each group).

Surface changes

Formal changes have been counted here but not discussed due to the difficulty of examining these in translation. These changes covered the expected range of spelling, punctuation and use of accents (a feature of the original Catalan language).

Although both groups made a similar number of formal changes, Group 2 made many more meaning preserving changes than group 1. For example, when describing the storms on Mars ‘much stronger’ was substituted for ‘more powerful’. The small number of such changes is surprising in the light of writers such as Berninger et al (1994) who argue that immature writers’ early revisions are likely to be at word level before sentence or finally paragraph and text level. This supports our argument that revisions arise more from the context of the writing than the age or stage of the writers.

Text-based changes

Additions were the largest number of microstructure changes. They were deemed to have altered the meaning as new information was added. These additions could be a whole sentence such as the addition of, ‘very poor quality light reaches it because it is a long way from the sun’, or just one word as in the addition of ‘nowadays’ in, ‘It would not be possible *nowadays* to set up a human colony on Mars’.

As can be seen from Table 1, few of the changes made were to the macrostructure. As indicated by Parr (1992 in Dix, 2006) these tend to be more evident with experienced writers and, indeed, the examples given by Faigley and Witte are at a highly sophisticated level. Only three of Dix’ nine young writers made changes that could be deemed macrostructure. In the current project, many of the additions which we categorised as ‘new’ would have affected any summary but we counted these as part of the composition process rather than revision (see figure 4). One example where a revision was categorised as a macrostructure change was where one pair changed the title from ‘A human colony on Mars, possible or impossible’ to ‘A colony on Mars is impossible’; thus changing the text from discussion to argument.

These findings challenge views that argue that young writers do not address changes to the text beyond simple formal or meaning preserving changes (McCutchen, 1996; Chanquoy, 2009). However, they do support those who argue that more sophisticated changes are achieved when the context of the writing is sufficiently supportive.

The historical record of changes available in the wiki allows us to consider not just what changes were made but also which pairs of students made which changes, see figure 4. This enables us to see how each pair did or did not contribute to the text. It can be observed that, contrary to expectations of some commentators (as above), all six pairs made some text based changes again supporting the view that this is possible for young writers if conditions are supportive. This facility can also help the teacher judge each pair’s contribution. Here it can be seen that in group 2 there was one pair who did not contribute any new text, whereas another pair added most of the

new text and surface changes. It can also be noted that one pair in each group seemed to take the role of copy editor, making most of the formal changes.

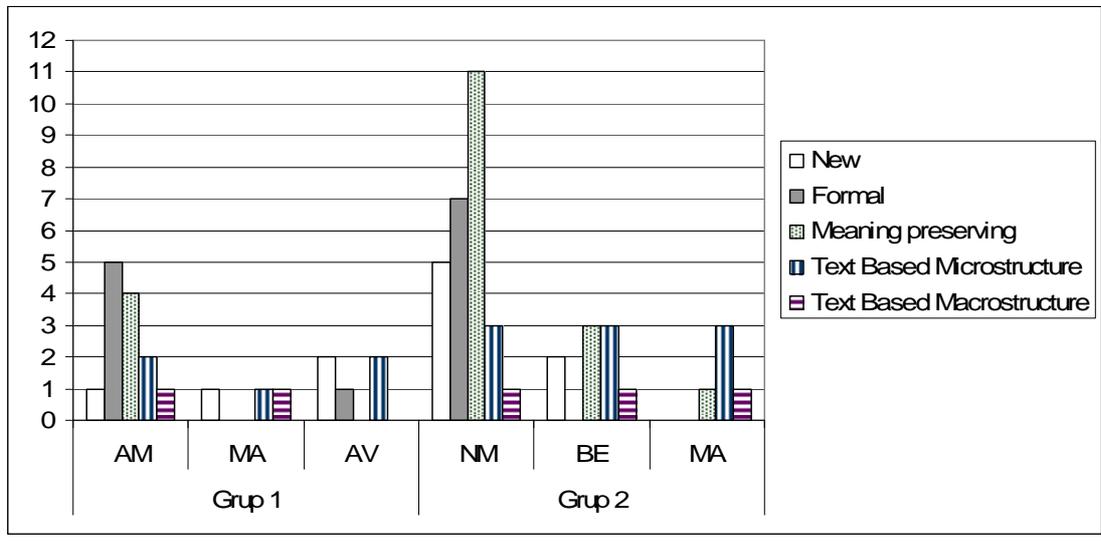


Figure 4. Analysis of changes made by each pair (AM, MA, AV, refers respectively to the three pairs of group 1; and NM, BE, MA, refers to the three pairs of group 2)

Content of revisions

The types of revisions described by Faigley and Witte draw on linguistic categories; they do not focus on the content of the revisions. Flower and Hayes (1981) cognitive process model of the composing process refers to the writer’s long term memory to generate text (1981:370). In the model, Long term memory is the source of information about the topic, the audience and the writing plans; this latter seems to encompass linguistic or genre knowledge as well as task knowledge. Flower and Hayes argue that not only does the writer need to extract the necessary topic knowledge but also must reorganise and adapt this information to address the rhetorical demands of the task.

In the new and revised text in the wiki, there was evidence of both topic knowledge and linguistic knowledge. Whereas some changes drew on the writer’s knowledge of text: its structure and the lexical choices available, other changes seemed to draw more on the writer’s topic knowledge about Mars and the conditions for life there. In group 2, the dyad of NM expanded the simple sentence ‘A colony on Mars is not possible’ to ‘We believe that a human colony will not be able to be established on the planet Mars because ...’ Here they expanded the text to fit the rhetorical

demands of the task. The next pair, BE, added 'nowadays' indicating topic knowledge through an understanding of the possibility of developments in space travel.

Most of the recorded changes to the text, either as it developed in the Negotiation or as it was written on the text page, fitted into one of these two categories. However, another category was observed which we labelled 'personal content knowledge'. Only three instances of this were recorded but seemed worth noting. In these cases, the writer added something to the text that did not come from the topic research they had conducted to find out about the planet Mars; nor did it seem to arise from textual knowledge but seemed to arise from the pair of writers' personal interest. For example in group 1, MA, in response to the discussion about travel added 'an ecological train of electric solar beams'. This is challenged in the negotiation by the next pair, AM, asking how they can go by train when a spaceship is hardly possible. The next pair also demand that it be removed. When they next return to the computer MA add, 'To explain about the ecological train it's a spacecraft and would go out of the Earth as a satellite.' However, at their next visit AM delete this and change it to 'we would have to go by space ship'. This seems to indicate, in the composition of MA at least, evidence of that element in student's writing that Graves (1983) called 'voice', the imprint of ourselves in the writing process. This element lies outside of the model offered by Flower and Hayes in that it lies outside the rhetorical demands of the task and, it could be argued, denies the importance of the audience in favour of the interest of the author. However, this evidence of authorial voice must also be an indication of progress in the development of a writer. From table 2 it can be observed that whereas each pair contributed both topic and text knowledge to the composition, there was difference in the amount of personal content knowledge contributed.

Content of revisions				
<i>Group</i>	<i>Pair</i>	<i>Topic knowledge</i>	<i>Text knowledge</i>	<i>Personal content knowledge</i>
1	AM	2	5	
	MA	1		1
	AV	1	1	
2	NM	2	8	3
	BE	4	3	1
	MA	1	1	1

Table 2. Content of revisions

Discussion

Wikis as supportive environments to develop composition and revision processes

The small scale project reported here provides evidence of the way in which a wiki environment can provide opportunities for young writers to experience the process of composition and revision both through their own efforts and by observing the process in others. This paper has shown evidence that wiki can provide a rich environment to support composition and revision for young writers. The impact of the wiki project on students' composition processes can be seen in the way that wiki technology broke up the writing processes of planning, transcribing and revising for these young writers.

First, students were engaged in a space which led them to share and discuss ideas and arguments about the topic of their writing. Students used the negotiation space to share ideas for this purpose, but also as a space where students could jointly present and publish their own writing to an audience which would be looking at their writing for new content in order to fulfill their collaborative writing task.

Second, students in the wiki become simultaneously readers and writers. This facility to publish writing in a space where others can read it, and add, re-organize, revise or delete ideas gave an opportunity for students to learn through others' ideas and points of view to enrich their own writing.

Third, the affordance of wiki that students can interplay these two roles simultaneously –as readers and writers - also helped them to develop evaluation and revision processes; every time

that students worked in the wiki environment they found a new draft of the text to revise and make a new contribution to. Therefore, in the wiki project students were involved in a peer review processes which educational literature has highlighted as powerful in the development of students' critical reflection about what they have written and why; in provision of prompts to improve their piece of writing and stimulation to self-reflection about what they have done (Nixon & Topping, 2001; Phielix, Prins & Kirschner, 2010).

The number and distribution of revisions for the young writers that participated in our study contrast to some previous research which argues that immature writers make little more than surface revisions to their writing. The findings from these twelve students indicate, as Dix previously, that even students in primary school have access to the full range of revision processes identified in the literature when an appropriate learning environment is created.

Although this can be no more than speculation because of the scale of our study, it can be argued that working through the medium of the wiki provided these young writers with the opportunity to be fully engaged in revision processes. During the composition process students received commentary from peers about their revisions and viewed and commented on the revisions of others. This must inevitably have widened their experience of the process of composition and revision. As students collectively examine and manipulate wiki writing, they not only present each other with opinions and criticism but also provide a real audience for each other's work; a valued audience to work with and to revise each other's work in order to fulfill the common commitment of improving the collective text. Thus wiki helped students to engage with the process of composition and become more actively engaged with the design process than may be possible in the usual classroom based writing tasks. Although the instances of our new category of 'reversion' were few and were only observed in one of the groups, the possibility of engaging in and reflecting upon a disagreement within the composition process must have contributed to a sense of the choices available to writers as they write.

Wiki as research tool

The project, has in addition, given further indication to researchers about the way in which young writers engage in composition and revision and some evidence of the differences in that engagement. As well as supporting some previous research about young writers' capacity to revise as they compose, we have added a new dimension to the discussion of composition and revision. The record of the joint composition process has indicated differences in focus for pairs within the group. For these twelve students, one pair within each of the groups had a greater focus on linguistic revisions, perhaps indicating a greater facility with writing and language production. It is also noticeable that, except for one pair, the contribution of scientific knowledge was spread relatively evenly with each pair contributing something of scientific knowledge to the task. This is an important observation, since it is often the case that those students who are less able to write well appear to lack ability in other curriculum areas due to their underperformance in writing. From our point view, the technological affordances of wikis that allow students to use a wide variety of ways to respond to their classmates' thoughts and writing; by editing, by expanding, by revising or by responding on the negotiation page, helped to all students to find their own 'voice' in the collaborative writing process. The addition of personal content knowledge to topic and text knowledge as a source of content for the composition of text has provided further embellishment to the Flower and Hayes (1981) model of the writing process. The idea of 'voice' in writing is not new but is often missing in both cognitive and pedagogical models of composition. This freedom in the way to participate in a wiki collaborative writing process certainly challenges more common ways of fostering students' composition and revision and might encourage each student to develop their own ways of composition through the online collaborative task.

Classroom implications in using wikis in primary education

Our study also has raised some pedagogical issues related to the use of wiki in primary education. The technological characteristic of wiki to record all the writing steps and versions of the

document is highlighted as a powerful learning tool because it can foster students' critical revision of the piece of writing. From our point of view, this characteristic of the wiki can also become a powerful tool for teaching. The students' writings are regularly available in the wiki for teachers to look back over the timescale of the collaborative writing experience to explore how students have engaged with and contributed to the writing. wiki enabled the teacher to judge each pair's engagement and contribution. There was also a permanent record of each stage of the process that could be drawn upon for record keeping or teaching purposes.

Whatever the potential of wikis to support key learning processes, some studies have already highlighted that to rely too much on the technological affordances of wiki to facilitate critical interaction capable of engaging students in productive collaborative writing does not always work (Cole, 2009; Lundin, 2008) and an instructional process that explicitly embeds how to use the wiki to reach collaborative learning objectives is needed. Our work took into account this statement and designed an educational intervention that prepared and guided students to use wiki affordances as a powerful tool capable of mediating understanding of the writing processes. From our perspective, it could be argued that the "thinking together" approach used during the project could be effective in this preparation because students made a great effort to share, discuss, take each other's opinion and revise each others' writing. In future research work, our intention is to get more empirical evidence to support this statement.

The conclusions drawn in this work present a positive and promising pathway to the design of classroom contexts that use informational and communicational technologies to support the development of composition and revision strategies for early writers. It is also considered that such learning environments that use "social software" would be helpful in the development of those digital competences that will allow to our students to actively participate in the creation of information dynamically in the network global society. Different voices have already alerted the educational community that although students possess the easy familiarity with Internet technology that characterizes them as "digital natives", there is little evidence that large numbers of young people are making extensive contributions to Web 2.0 resources including wikis and

few young people are developing innovative skill sets in their interactions with new technologies (Buckingham, 2007; Crook, 2008). Web 2.0 technologies require participants to develop specific competences related to collaborative knowledge creation, competences which can not be developed spontaneously but students' critical participation in these new technological environments is needed. If Web 2.0 technologies are to be deployed usefully across formal and informal learning, teachers and learners need to develop shared strategies and understandings around a participatory and creative approach to technology use in schools (Clark et al., 2009). Our project can also be seen as a contribution of this understanding.

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