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A Web Collaborative Editor: awareness indicators in an experiment at school

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ABSTRACT

The ZWikiCoop is a Web collaborative editor used by children to describe a show they have seen together. We present an experiment where groups of pupils are simultaneously creating a common document, presenting a show to other children. The observation of a traditional method of work highlights group awareness indicators that a computer-based collaborative editor must support.

Keywords

Awareness indicators, Web collaborative editing, educational field.

INTRODUCTION

We present an experiment we have conducted in the Web collaborative editing context at school. There are two main stages in this experiment. The first one concerns the use of traditional material (whiteboard, sheets of paper, pencil, and eraser), and the second one concerns pupils' skills in editing with software.

This experiment has led us to develop a first prototype of a Web collaborative editor within the "cartable électronique"[®] project, in collaboration with teachers and pupils.

The following work intends to outline the importance of the definition of group awareness indicators in groupware interface design. The foremost idea is to analyse a traditional situation of collaborative work, and then to identify the natural group awareness indicators. In this study, we use the awareness conceptual framework of [8]. The experiment has led us to develop a prototype of a Web collaborative editor, including group awareness indicators. In the near future, we will conduct another experiment with a completed prototype (ie. including new awareness indicators) in the same classroom.

The issue we believe the workshop can best address is social aspects, which are a part of group awareness, for collaborative editing.

PREVIOUS WORK

Awareness involves the perception of important events and relevant actions in cooperation. Supporting awareness of others is an idea that holds promise for improving the usability of real-time

groupware [8]. Awareness information is integrated in some systems, as for the NESSIE project [9] which includes a specific server to manage event information, and to enable individual configuration of corresponding indicators. The technical goal of the NESSIE system is the development of an infrastructure through which the events in an electronic environment can be captured, distributed and presented to authorized users in the appropriate situation.

Awareness information is omnipresent in cooperative work, and the participants need to exchange it continually. In the CEMT[®] Project, this information is transferred by means of a specific protocol [10] upon the TCP/IP which enables exchange between clients and a server.

Today, it is worth noting that awareness aspects are taken into account more and more in the design of collaborative systems.

COLLABORATIVE WORK IN THE EDUCATIONAL FIELD

The "cartable électronique"[®] project

The main project of the SysCom laboratory is called "cartable électronique"[®] [3]. It was inspired by the main object that children carry every day when they go to school: the "cartable" (satchel or schoolbag), which contains books and pens, toys and so on. Technology gives us the opportunity to reduce the weight of the "cartable" without losing its content. SysCom has been working on this project since 1999 in collaboration with educational organisations in France (the French Ministry of Education and local authorities representing the Ministry) and the Department of Savoie local government ("Conseil Général").

The long-term goal of the "cartable électronique"[®] project is to give each person in the education sphere (pupil, student, teacher, family,...) the possibility of accessing several educational services anywhere, anytime, and of collaborating. An educational Web portal has already been developed in Savoie to play this role, and has been designed as a CSCW environment based on the possibility given to its users of creating and managing groups [4].

The Web collaborative editor

As teachers are already participating in experiments for the "cartable électronique"[®] project [3], it was quite easy to suggest a new educational service without having to convince them of the benefits of such a tool. The project is to provide them with a Web collaborative editor. In this context, they have expressed their pedagogical needs, such as learning socialisation and developing oral expression. Teachers and pupils use the Web collaborative editor in real time and all together in the same classroom.

THE FIRST PART OF THE EXPERIMENT

Defining a scenario

We have conducted an experiment in a school in Savoie (South-East of France). Its context is work with two teachers and a group of pupils in a classroom. This experiment has consisted in making a group of pupils, aged eleven or twelve, create a common document about a cultural event they have seen together. This document is to be published in order to inform other people about this cultural event. The pupils were seated in the same classroom with a clear view of each other. This experiment has involved several steps : brainstorming together, to form groups of pupils, to distribute parts of the document in groups, thus to share out various group tasks, and to choose relevant pictures together for the final document.

One of the teachers coordinates the whole group, and the other teacher writes their ideas on a whiteboard. The pupils speak about the cultural

event they have seen. The teacher who writes defines themes and chooses a title for each of them. After the brainstorming, the pupils form groups of three, and the teacher assigns one theme to each of them. Furthermore, the teacher gives instructions to the groups about the work they have to do (length of the document, timing, and aims in terms of content). The published document contains text, pictures and graphs.

During the first part of the experiment, the participants have produced several documents, such as the result of the brainstorming (classification of words with the teacher), personal and shared drafts, final texts, and chosen pictures.

The brainstorming aimed to define several sets of words classified according to subject. This activity provides pupils with common subject matter for the following work. It is not our purpose here to present the results of this first step.

There are seven groups of three pupils each. According to the selected cultural event, the seven themes are : (1) the artist, (2) the context, themes and songs, (3) ditto, (4) style of music, (5) feeling of the artist with the public, (6) the title "Scat en mi mineur", and (7) the course of the cultural event itself.

Observations and results

The step we are interested in is the work in the small groups. First, we will briefly present in Table 1 the pupils' activities in the traditional way.

Group	Work
1	3 boys give their own ideas. They write a sentence each in turn.
2	3 girls give their own ideas. Only one of them writes the ideas (the scribe).
3	3 boys tell their ideas to the teacher who helps them. They write a sentence each in turn. They worry about spelling.
4	1 girl and 2 boys. Each of them writes his/her own ideas on a sheet of paper. Then they gather their ideas and they produce a draft. The final text is written. They decide on a title together. One of the boys draws on his sheet of paper.
5	3 girls write a sentence each in turn. One of them checks the spelling and coordinates the group. They produce a draft. The final text is an abstract of the draft.
6	3 girls. Two of them give their own ideas. Only one of them writes the ideas (the scribe), she uses an eraser and produces the final text directly.
7	3 girls of whom only one writes the ideas (the scribe). Another one gives her ideas. She produces a draft, and then the final text.

Table 1: Summary of pupils' groupwork

This experiment leads us to consider several roles : writer, reader, spelling checker, drawer, speaker, and eraser. Furthermore, participants need several objects such as a personal draft sheet of paper, a

final shared sheet of paper, and an eraser. In Table 2, we attempt to compare group awareness between the traditional way and a computer supported solution.

Specific questions	groupware awareness indicators		
	in a traditional way	with a collaborative editor (same location ; each on their own computer)	
	natural	computer supported	natural
Is anyone in the workspace ?	The participant can see each other as they are all together in the same place.	e.g. list of pupils names (no need for photographs because they know each other)	The participants can see each other.
Who is participating ?	The participants can see the one who is writing for instance.	e.g. identity of pupils participating	He/she does not have clear view of others' actions.
Who is doing that ?	Ditto ↑.	e.g. various colors or icons	Ditto ↑.
What are they doing ?	He/she can see the pencil or the eraser in a pupil's hand for instance.	e.g. telepointer	Ditto ↑.
What goal is that action part of ?	They define the goal aloud, or more discreetly if all of them are not concerned.	e.g. chat not to disturb if it does not concern all the pupils	They define the goal aloud.
What object are they working on ?	He/she can see the others working on private draft (sheet of paper) without looking at its content, or on a common whiteboard.	e.g. attached identity icon	He/she does not have clear view of others' actions.
Where are they working ?	The participant can see someone working on his/her personal notepad, but the content is hidden. In case of common work, he/she has clear view of others' actions.	e.g. radar views with padlock [6]	He/she does not have clear view of others' workspace.
Where are they looking ?	He/she can observe other participants' glance.	e.g. radar views [6]	Ditto ↑.
Where can they see ?	They can hide their own notepad not to be read. They can see the whiteboard, or sheets of paper put on a table.	e.g. padlock on fragments and the names of the authorized pupils	Ditto ↑.
Where can they work ?	By observing the other participants' location in the room, he/she can know whether someone can write on the whiteboard or not for instance.	e.g. access to various fragments depends on the participant's role (padlock).	Ditto ↑.
How did that operation happen ?	He/she asks the author of the operation.	e.g. action history	He/she asks the author of the operation if known.
How did this artifact come to be in this state ?	He/she looks at the work in progress, but without keeping trace.	e.g. artifact history	He/she asks the others if they know.
When did that event happen ?	Ditto ↑.	e.g. event history	Ditto ↑.

Who was here, and when ?	He/she was able to see the others.	e.g. participants' history	He/she was able to see the others.
Where has a person been ?	There is not any specific indicator.	e.g. location history	It is difficult for a participant to explain his/her "route".
What has a person been doing ?	Ditto ↑.	e.g. action history	Ditto ↑.

Table 2: Groupware awareness indicators

Firstly, the empirical analysis of group awareness indicators in the electronic situation highlights the necessity of providing the participants with computer supported indicators, even if they work at the same place. As far as the traditional way is concerned, the main difficulty is to keep traces of past activity. In contrast with this traditional situation, it is worth noting the awareness benefits of a computer supported solution, especially in following through the work (in other terms: traceability).

We distinguish two sets of indicators. The first concerns the own action field of a participant, such as "what is my current role on this part of the document ?", or "How can I transmit my contribution to other users ?", etc. The second concerns the action field of the other participants as described in Table 2. In the Alliance[®] project, [2] strives to answer the first set of questions, by providing each participant with a set of icons representing his/her role. These icons are active: by clicking them, the user can change the status of the associated part of the document.

The next stages of the first part of the experiment are briefly presented because of the necessary compatibility with the future electronic document. The first step consists in gathering all of the final texts, displaying them with a videoprojector, and re-reading them by the pupils themselves aloud.

Finally, the pupils look at twelve photographs. There are two formats, rectangular (the artist with the public) and circular (the artist's face). The pupils vote by a show of hands to choose two photographs. One of them checks the vote. In the last step, they propose titles for the photographs, and they vote again to choose only two of them.

As an extension, our system could integrate other functionalities such as a vote device for instance.

THE SECOND PART OF THE EXPERIMENT

In this part of the experiment, we ask pupils to open a simple user text editor in their own "cartable" in the educational Web portal [4]. In addition to the natural discussion, we ask them to communicate by means of an integrated chat. This first step allows us to evaluate their skill in using a computer and

especially the functionalities of a text editor and a computer-based tool for communicating.

Assessment

After a debriefing with the pupils, we have noted their requests. The on-line help is essential. They need an eraser tool and a spelling checker. They would like to write on a private draft space before sharing their text with the other participants. They do not mind if the teachers can read the chat. Lastly, pupils would like to have an on-line dictionary, containing specific words relative to the cultural event (eg. jazz, swing, etc.).

USE OF OUR WEB COLLABORATIVE EDITOR

After the experiment, we have used the produced documents (sheets of paper and pictures) to simulate the same work by means of our prototype of the Web collaborative editor. In fact, the answers, requests, and clues we have gotten from participants were interesting enough to resume the work in small groups in an electronic context. We present the very first results in terms of feasibility in this paper.

Results

Working together on the same document implies a perfect coordination of the various tasks. This requires a well-structured document. The latter is broken down into several pieces called "fragments", representing the seven themes. The participants are associated to public and private working spaces, represented by the fragments and a personal notepad. They can act and contribute to the joint activity by means of roles. For instance, the teachers are in charge of the structure of the document and the management of the groups : the corresponding role is "administrateur" (or manager). As it is not possible to present all the screens of the ZWikiCoop, we have attempted to describe the most meaningful one in Figure 1.

From a technical point of view, the ZWikiCoop editor is built above the Zope[®] open-source application server [11], and is not based on the ZWiki product as its name might lead one to think. ZWikiCoop uses Zope[®] capabilities to manage content and build collaborative applications.

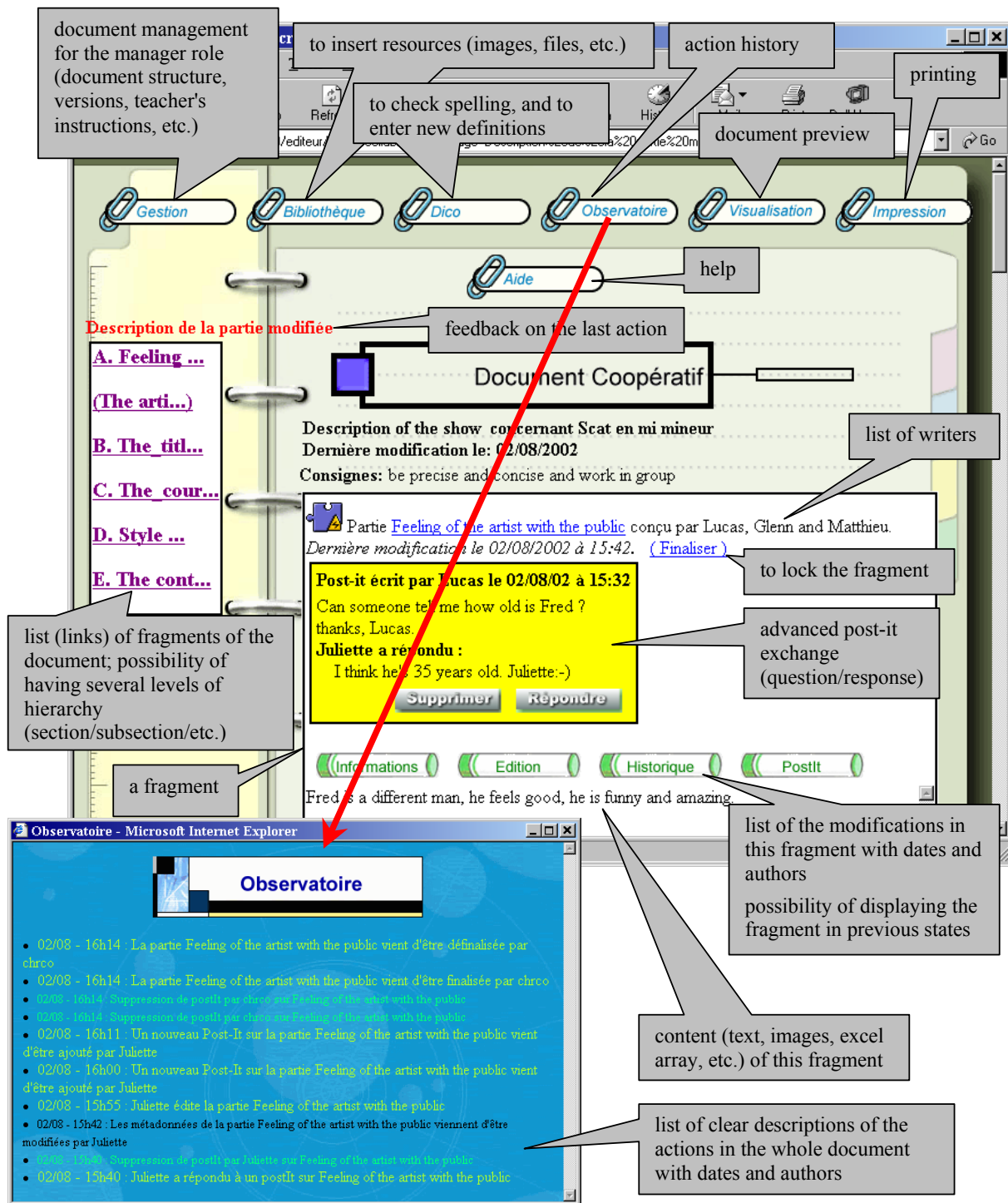


Figure 1: ZWikiCoop collaborative editor

It is worth noting that the more complete the information awareness is, the better the quality of the collaboration is. Despite the fact that we think awareness indicators must be more developed in

our editor, the existing functionalities are well-adapted to most of the current participants' needs. In Table 3, we attempt to present the basic awareness indicators of our prototype.

Concept	ZWikiCoop awareness indicators
Identity	The manager can register participants and give them a role. Every participant can see the list of the ones working on a specific fragment. Furthermore, a presentation of the authors is associated to each fragment (see "Informations" in Figure 1).
Location	The hierarchical structure of the document is available in the top left corner of the window. The participants can see, on a fragment, the name of the one who is currently working on it. Furthermore, the action history window enables one to follow the steps of the participants' activity.
Capacity	According to their own roles, the participants can access different parts of the document. For instance, the manager is the only one who can get access to the management interface of the document ("Gestion" in Figure 1). The writer of a fragment is the only one who can get access to it until he/she finishes. The other participants can only read the previous version.
Modifications	A list of the fragment modifications is available (see "Historique" in Figure 1). In addition, a participant can compare two consecutive versions of a fragment, by displaying them in the same window. The manager of the document can create versions of it, and he/she can work back on a previous one (one option of the "Gestion" menu in Figure 1). As only one participant can modify a fragment at a time, a closed padlock is associated to the corresponding fragment and nobody can edit it until he/she finishes. When a fragment is completed, its state becomes final on demand (final state is a specific feature requested by the teachers). It means that the fragment is no longer modified (see "Finaliser" in Figure 1). In that case, a specific closed padlock and a meaningful text appear on the top of the fragment.
Actions	The "observatoire" (see Figure 1) describes all the actions in a meaningful way. This interface is updated every 10 seconds. Though the whole document is shared in real time, the fragments are modified by only one participant at a time. Therefore, the participants can follow the actions by means of the action history (see "Historique" in Figure 1), but not the writing process in progress which is private until its completion.
Intentions	In the context of the experiment, the participants are working in the same classroom. Therefore, they can communicate directly in a natural way. In the event that they do not want to disturb the other participants, they can communicate via the chat. Each participant is aware that there is a new message by means of a sound (in case the chat is not opened). As far as a fragment is concerned, participants can use a post-it to make a comment (e.g. to say what will be done), or to recall an instruction (e.g. from a teacher), or to ask something. It is an advanced post-it as it enables a response inside, as for a forum (see example in Figure 1).

Table 3: Summary of ZWikiCoop awareness indicators

ASSESSMENT AND FUTURE WORK

This initial experiment is now finished, and has enabled us to evaluate the utility of a Web collaborator editing in a real context. We have conducted this experiment to enhance the natural group awareness indicators, and are using the results to influence the future system design. In a near future, we will conduct a new experiment with a new Web collaborative editor, which will take into account the awareness indicators. The final aim is to increase pedagogical benefits through autonomy, and to evaluate its usability.

DISCUSSION

Before talking about the benefits of a collaborative editor, one must verify whether the participants can

do at least the same work as they do in a traditional way. In this latter case, people are aware of many different things when they work in groups, some of which relate to the group, and some to the task or situation more generally [7]. Today, a lot of people are aware of the need to integrate social aspects in groupware design. In our experiment as in many others [1], we observe that awareness information depends on the context of work. It means that we have to strike a balance, according to [5], between awareness and privacy information. In other words, some awareness indicators must not be forced onto the user's screen, but must be accessible on demand.

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