A Study and Analysis of Google Wave and its Potential Impact on Education and Collaboration

by Johanna Hane

Google Wave is a service developed by Google that describes it as e-mail as it would look like if it was invented today.

In short, that means a combination of email, instant messaging, wikis and social networks. Google says the tool can be used for communication and collaboration in real time through the Internet. They believe that our need for communication has changed radically since e-mail was invented about 40 years ago.

The service operates in such a way that it starts so-called "waves" which communicate directly, in real time, with those you chose to communicate with. Once you have created a "wave" you can invite the people that you want to participate from your contact list. When you write a message it will appear at once, while writing, for all who are participants in the "wave". If the other participants are not online, the message will still be sent in the "wave" and they can see it when they go online.

People who are connected as a participant may respond directly in the "wave" or modify a text, and everything can be seen directly on the others' screens without having to wait for the person to be done editing or to be finished writing their message. To attach a file you drag the files you want to attach directly into the "wave" from the computer desktop or any other folder and the files are displayed directly on the screens of the other participants.

Wave is supposed to be developed by users. Even now there are a lot of accessories, so-called "gadgets" and "bots" to facilitate and expand opportunities for the use of Wave. For example, there is an addition that translates from one language to another, in real time. However, one should remember that the current version of Wave is only a "preview" and there will certainly be some changes before the service is released to the public.

For a more comprehensive presentation, see the links on page 9.

* Computer supported collaborative learning
The approach for my study

The choice to study the phenomenon Wave was not at all obvious at first. I was interested in studying both the Fronter learning platform and the virtual world Second Life before I came into contact with Google Wave through a discussion forum on the Swedish social network Dela and my partner who works with web development on a daily basis.

I finally decided that Wave was something I was curious about. It seemed like something I could use in my profession and something that is now very controversial in all sorts of circles, albeit mostly online in various blogs and forums.

To learn as much as possible about Wave, I felt that I needed to try it out. In order to be able to test it, one must be invited, and to get an invitation proved to be easier said than done. To my great happiness, I won a contest on the Internet and therefore had my Wave account.

I needed someone to test it with, so I looked up a Facebook group where people in the same situation had put their account information. I started a "wave" (without any prior knowledge) and invited all these people. I asked them to help me with this assignment and give them instructions.

What happened next is hard to describe in words. I have therefore chosen to show you, using a recorded "play back" sequence how the "wave" evolved.

In the film we see, for example, how the participants take responsibility for organizing the flow, how the debate are developing both in the question I asked, and on the procedure itself. Soon, the participants begin to, at their own initiative, add "gadgets" and discuss the use for these.

As a second step in my test of Wave, I asked participants to imagine that together we should compose a text on Google Wave. I started to write one line and it soon developed into a small text.

In addition to what myself and the invited participants from every corner of the world in my wave have discussed, I tried to pick up different reactions from other places. I have discussed Wave with my friends, I have read about it on Twitter, blogs and forums, I have looked through numerous of other waves where hundreds of people are doing exactly the same thing as the participants do in my own wave.

Clarification:

When I refer to Wave with a capital letter, I mean the actual service that Google has created. When I write about a wave with small letters, I mean the "wave" in which participants are invited and where they write messages and create together.

In this study I describe Wave as a service. Wave really is a protocol for which Google Wave is a client / service such as Outlook is an e-mail client.

Wave in practice

One may wonder why Google admits only a relatively small number of users to the Wave. You could say that it is quite unusual at all to let users in at such an early stage of the launch of this kind of service.

The reason for Google's approach seems to be that they want the users' feedback and comments on areas of development now in order to create a service that can be used for what the intended users want. The idea is that anyone should be able to participate in creating applications for the new service, and already there are being developed a variation of both useful and useless supplements.

When you read what people write about Wave in forums and in blogs you notice a certain degree of frustration with not being invited. There are many speculations and the service is both raised up to the skies and dismissed as something that will never be a "hit".

In either way people choose to relate to Wave, it seems as if everyone wants to get an invitation. Google has thus managed to create something that everyone wants, even before the service is released. The feeling of exclusivity is evident.

Can everyone come and play?

There are all sorts of tips on how to get an invitation. The easiest way is to know someone who was entrusted with handing out invitations. Otherwise, you can write to Google and "ask nicely" and hope for the best.
Pedagogical benefits and drawbacks with Wave

With the help of the participants in my wave, and by reading what is written in various forums, wikis, blogs, etc. I have come to the conclusion that there are a lot of advantages to using Wave for training purposes.

To begin with Wave is an excellent tool for collaboration. Participants can collect thoughts and other resources into a single wave, which acts as a living document since you can edit what others have written. The teacher may also be able to give further instructions, ask questions and comment on student work during the process.

Another advantage is the "play-back" mode where the teacher has the opportunity to see a wave develop. It is a totally new way of looking at work processes and it provides opportunities for newcomers to take part of what has happened before. It also gives students the opportunity to reflect on their own learning process.

Because Wave offers the opportunity for both synchronous and asynchronous communication, the work does not need to be coordinated by all participants. If they can not participate discussion in real time, they can always see exactly what has happened and change the outcome afterwards. This can be usefully applied by students who are unable to attend a seminar, or for distance learning. Students can use Wave to compare and discuss their notes from lectures afterwards, but they could also write within the same document during the actual lecture. By that everyone can follow what is written in real time, Wave could affect the way students use their language, spelling and grammar in a statement. In programming courses, there are endless possibilities to allow students to be creative since Google allows users to help creating the tool. By adding various "gadgets" created by users, you can adjust your wave for the group's needs. Wave can thus be used to collect various parts of the web, eg. photos, videos, maps, news, and to discuss them together. This of course creates a good opportunity for interdisciplinary work.

Because Wave is not yet released to the public, it is easier to speculate on the positive impact the service can have on education and learning. However, I want to present some of the obvious drawbacks of the current situation. If these will be corrected before the service is released or not remains to be seen.

First and foremost, there is still no way to create waves in which participants only have reading access. In some cases, maybe you do not want that everyone who sees the work also will be able to edit its content. It should be possible to attribute various rights of the wave to each participant. This would be useful in such as political debates in which two participants are arguing against each other. Other participants could comment on the speeches and vote on who they think is best, but not change the actual arguments. Many users have expressed frustration at the structure of Wave at the moment. It is difficult to distinguish between messages that have to do with the topic and general "noise". The result is messy and it is easy to miss "important" messages. Currently, the system is also very slow in general and disturbed by "bugs". This is not unusual in early versions and should be corrected in the official version.

Finally, there is the question of what happens when you do not want to use a wave any longer. It is impossible to finish a wave. You can not leave a wave that you participate in, but you can "mute" it by pressing a button. Then it will no longer be shown in your inbox. Will it die by itself? Surely if it’s only a few participants, but other waves may now live far far beyond the point that the creator wants it to ...

Google or not?

I choose to write Wave as a separate phenomenon, without involving the company Google too much. That is because the protocol will be open for any the company or individual to use. Just as a company can have its own mail server everyone is supposed to be able to have their own Wave server.

Google has developed the protocol, but does not own it in any sense, just as one can say that no one owns "e-mail", "the discussion forum" or "the blog".

"I mean come on. You could draft the Constitution together with this thing"

Kevin Conner

Google or not?

I choose to write Wave as a separate phenomenon, without involving the company Google too much. That is because the protocol will be open for any the company or individual to use. Just as a company can have its own mail server everyone is supposed to be able to have their own Wave server.

Google has developed the protocol, but does not own it in any sense, just as one can say that no one owns "e-mail", "the discussion forum" or "the blog".

"I mean come on. You could draft the Constitution together with this thing"

Kevin Conner
“The organization of Wave needs to improve before all of the benefits can be seen. And more training is needed for the users to create a standard”

Zak Moreland, Atlanta,
Theoretical basis: social constructivism

To understand why Wave could potentially be revolutionary for education and learning one has to understand what makes it being seen as a superior CSCL-tool, what the theoretical basis it is based upon and why there is a need for this type of tool at all. Here I will assume the following perspective: Knowledge in collaborative construction, knowledge by mediating artefacts, and knowledge building through argumentation.

The constructivist approach to learning is that man builds knowledge in interaction with other people. "Constructivist drawing inspiration from Vygotsky and Dewey have always argued that learners must be active participants in the learning process for they are the only ones who experience the activities that the Provide Grist for construction" (Petraglia, 1998: 135). This means that in order to learn something you have to be involved in social practices in which knowledge building can take place as a result of joint activities and reflection. Therefore, communicative processes will be essential in such a perspective on human learning and development. It is through communication that the individual becomes involved in knowledge and skills (Saljö, 2000:37). Knowledge seen not as something fixed and absolute, but as a process in which each participant contributes to enhance both the individual and the common knowledge. The principal means of communication is conversation between people. Saljö argues that conversation has been, is and always will be the main arena for learning (Saljö, 2005:33). In order to create conditions for learning there have to be opportunities for conversation and other forms of communication. Learning occurs primarily through participation in activities and as a consequence of participation, not through teaching (Saljö, 2005:48).

That a student is currently in a teaching situation is not synonymous with that she learns something, but if she is an active participant, either in a talk with the teacher, or any of her fellow students there will be all prerequisites for learning to happen. Petraglia writes that authentic learning takes place when students is in a dialogue with someone else. "Cooperative learning enables students to share their knowledge and skills while providing opportunities for them to observe the learning process of others. Collaboration not only allows the student the chance to see learning activities modeled, but also provides opportunities to articulate one's thinking to an audience" (Petraglia, 1998:75-76). The student can, by looking at their colleagues' knowledge development, even catch sight of their own learning.

In order to preserve knowledge human beings construct different types of artefacts that can mediate knowledge between people. To understand learning, is to understand the practices people develop in relation to mediating tools and the communities of interpretation that arise (Saljö, 2005:208). An artefact is a fixation of knowledge. To be able to use a tool you must be part of community of interpretation wherein the artefact is used and understood in common. The absolute most important tool we humans have developed is language. Language is the tool by which individuals can borrow insights, skills and knowledge of others (Saljö, 2005:81). We may share with others what we already know and understand what others want to convey to us. By creating inscriptions and symbols, we can also make ourselves independent of time. It has helped us to create a collective memory and given us the opportunity to externalise knowledge. (Saljö, 2005:62). Scripture is powerful when it comes to store information and stories and reading is a creative process and not just a mechanical identification of words and sentences. Meaning is not in the text itself but it is the reader who will ascribe meaning to the word and the text (Saljö, 2005:120-121). Scripture mediates knowledge between writers and readers, who are independent of each other in time and space. Human beings have a need to create systems in the form of artefacts to help us classify and categorize our experiences to make them understandable for us (Petraglia, 1998:121).

In order for us to understand the creation of knowledge as argumentation, we need to understand knowledge as related to reasoning and action in social contexts, and as a result of active attempts to see, understand and manage the world in a certain way (Saljö, 2000: 26). All learning is situated, i.e. takes place in a given context. Petraglia says that "learning is the name we give the argumentative process that trans-Press among teachers, students, and their real worlds" (Petraglia, 1998:128). This means that we must accept that there are more than one answer to our questions, that there are multiple truths and that knowledge is not absolute. Petraglia's argument for a rhetorical approach to education and learning is that instead of thinking in terms of "right" and "wrong" way of thinking, we should use "good reasons" for what we say (Petraglia, 1998:122). We should consider "what do people accepted to be real, and why" (Petraglia, 1998:123).

In summary, the social constructivist theory means that learning is situated and occurs in environments in which people communicate with each other and through artifacts. Since we see the world from different perspectives, we must accept that there is not only one absolute truth, but that knowledge building is an argumentative process that tries to find good reasons for something to be in certain way.
Analysis of Wave as a CSCL-tool

Below, I will, based on literature and research on CSCL, analyze Wave and try to find out if it can be said to be an appropriate tool to create an environment where learning can take place.

Koschmann talks about how the development of new IT tools often has been closely tied to research on learning and knowledge. Unlike previous paradigms Koschmann believe that CSCL is based on several research areas that explores the social environment and learning as a social process (Koschmann 1996:11). The basic idea of Wave has been to create opportunities for collaboration. Google gives a few examples of how to use the service for various group tasks. An important aspect is that research in CSCL is more process-focused than result-focused and that it is interesting to understand this process from the participant’s point of view (Koschmann 1996:15). Using Wave, everyone who participates in a wave can follow the development, i.e. the process by using the “play back” feature. It transfers focus from the product to the process. The way in which Wave currently functions does not even result in any given product. You can not say that “now, this is finished” because each participant has the opportunity to continue the development of the wave as long as she wishes.

Suthers says that the computer can not replace the knowledge-building between teachers and students, but it can support and be a resource for co-learning (Suthers, 2005:2). The creators of Wave has completely left the idea of providing users with knowledge, but instead offers a tool for the users to develop themselves. Suthers also writes that CSCL should/can not necessarily replace communication face to face: “CSCL can explore the advantages of going beyond being there”, i.e. it may even be better than direct communication in creating something lasting that encourages reflection and development over time. Everything that is written in a Wave is saved, even that which is to be removed or edited are stored in order to be watchable in “play-back”. Participants can also always comment on what is written by opening new “mini-waves” so-called Wavelets inside a wave. Furthermore, he talks about how technology can facilitate collaboration in which some parts of the work being shifted to the technical solutions so that participants can focus on the co-creation (Suthers, 2005:3-4). When using Wave the participants leave things such as structure and storage of content to the technology and thus they can focus more on the actual task.

Rysjedal & Wasson argues that researchers tend to try to change students' and teachers' ways of working by experimenting with new tools (Rysjedal & Wasson, 2005:1). This is obviously one of the risks of introducing new technological tools in a learning situation. At present, Wave is experienced as very messy and would probably not be well received if teachers and students feel forced to use a new working method without understanding it first.

Wegerif lists five strengths of ICT in teaching that I find interesting: speed and automation, the ability to rapidly make changes, feedback and response, time and distance are no longer problematic, ability and capacity to integrate a variety of different means of communication (Wegerif, 2005:6). In the current situation Wave meets most of them. However, the speed and the automatics have to be further developed. Wave increases the possibility of integrating a variety of different means of communication via the so-called "gadgets" in a way that has not existed previously.

Dennen & Paul asks how one could see that a student learns something? They talk about how the use of the Internet has changed from being a source of knowledge to be a tool for building knowledge (Dennen & Paul, 2005:2). The creators of Wave have also changed. From being focused on finding knowledge in the form of a sophisticated search engine, they have now taken the step to use all the information that can be found on the Internet for the creation of new knowledge by helping and enabling users to participate in the process. To analyze the learning process of dialogues, Dennen & Paul says that we must look to the group and not each individual separately. They argue that just because you participate in a discussion, it is not certain that you have learned something. They conclude that we must look to the context in which learning occurs, and the structure of the dialogue that is ongoing. They argue that we can, by using methods like those used in discourse and conversation analysis, begin to understand how a team builds knowledge through discussion (Dennen & Paul, 2005:5).

Wave offers the opportunity to analyze the knowledge-making based on this type of practice since the entire work will be saved and made available for comments. It has been suggested that Wave would be a useful tool for distance learning. So & Kim believe that students are often dissatisfied with their collaborative learning in distance education. Half of the reasons for this dissatisfaction are linked to technology, i.e., networks, software and lack of opportunities for synchronous communication (So & Kim, 2005:3-4). Wave can not help distance education with all these problems, but offers the option to work both synchronously and asynchronously in the same wave. It would mean that students who wish to gather for a synchronous discussion could do so without those who are not able to attend missing something. They have always a chance to see the progression at a later moment. Something that has hindered the development of distance learning for a long time is that “the design and development of sophisticated collaborative technologies require considerable investment on time and money.”

Wave is currently a free service and it is up to each company / institution to develop it according to its own needs. It could mean that more people will be able to use the tool. For students to feel safe in using the tools provided, these should be immediate access to support, as well as an introduction with, for example, a workshop (So & Kim, 2005:5-7). This can be done because Google has put together waves where you can ask questions and discuss the service with others.

Weinberger, Fischer & Stegmann describes one of the advantages of CSCL, which is that students can exchange arguments and later evaluate sequences of arguments over time in a completely different way than when communication takes place face to face. They talk about the benefits achieved when students gain both subject-specific knowledge and meta-knowledge. Through CSCL, students can visualize their own and others’ learning process and thus it becomes accessible for analysis (Weinberger, Fischer & Stegmann, 2005:1-2). Since Wave stores all information from every wave, you can go back to a wave that has been inactive for some time to analyze it and continue to develop the content.
Roschelle, Rosas & Nussbaum believes that technology can play a dual role as mediating tools, "representing content to support student reasoning" and "Coordinating the flow of information in support of collaborative learning" (Roschelle, Rosas & Nussbaum, 2005:1). Wave fills a direct role of coordination of information flows and indirectly the role of content in part because the participants can use the gadgets for maps, images, video, etc.

Zahn, Hesse, Finke, Pea, Mills & Rosen writes that students can learn to observe and analyze through the tools they have investigated. The student learns to focus on important details in collaboration with others with video as a common starting point. Learning to integrate text and video will be to learn to create/design. The student learns to create a non-linear flow of information through association and references to previous knowledge, and work and learning through for example, hypertext forces students to consciously develop a common idea of what hypertext is, as a first step in the common learning process (Zahn, Hesse, Finke, Pea, Mills & Rosen, 2005:2-4). Wave is taking the phenomenon of "hypertext" to the next level. Not only you can link to the material you want in the actual "wave", but you can also insert the material directly into the "wave" just by dragging and dropping documents, images, etc.

Zemel believe that the interaction in CSCL is about reading, interpreting and producing additions to the ongoing discussion. Participants produce their posts alone, but together they create a series of posts where each post is designed to be read. How the interpretation of a post has been made is visible in subsequent posts (Zemel, 2005:2-3). Wave offers a new type of computer-assisted communication. First, it is non-linear, meaning that participants can choose to place their messages just anywhere in a wave, which facilitates the structure of the discussions. Secondly, participants can now design messages together. One produced message is not "hewn in stone" but can be edited a countless number of times by all participants. Still, the contributions are designed to be read, but by using "gadgets" one can complement the written language with images and there are even thoughts about, for example, creating possibilities to have a video conference while editing a document.

Twidale, Wang & Hinn suggests that play, learning and work goes into each other and they ask the question if not all three of these activities is actually a combination of each other. They believe that play is important in learning because it provides motivation, courage and creativity. "We see playful interactions with many communications technologies leading to new styles of interaction, as for example with young people's use of text messaging, instant messaging and blogging" (Twidale, Wang & Hinn, 2005:5-7). Looking at how fast films like this showed up after Google put up the preview version for special guests, you might think about what could happen when the public gets access to the service. Through play and humor, the creator of the film not only taught himself how the tool works and found a new use for it, but also demonstrated the service's capabilities to all the viewers of the film.

If Wave is to function as a CSCL tool in schools will still be an issue for the faculty. "The task facing educators, has been to turn what was a description into a workable prescription by creating the kind of curricular environments that permit authentic learning to take place" (Petraglia, 1998:72). Without space in teaching situations, Wave is not very likely to be an overwhelming success. The extent to which people will make use of the service in other contexts is difficult to predict, but teachers will play a crucial role in focusing on Wave as a tool for knowledge building or not. I will continue this discussion on the next page.

"In my country, there is a computer in almost every home and an internet connection to go with it. Internet Cafes are ubiquitous in most neighbourhoods and the rates are low - almost too cheap. Anyway this means we can use this kind of Internet-based tool to facilitate home schooling or small group work. It may be nonsensical to some of you, but we have 35-45 people in each class, which means discussion learning as well as debates are practically non-existent. GW can really help with that kind of change"

Hyunj Bae, Korea

Is this what characterizes a hype?

When 34 people have placed bids for a Wave-invitation on e-bay, of which the highest bid is at over $200...
Discussion and personal statement

In my presentation, I have been quite positive to Wave. I want to stress that my newfound interest in technology and web development is likely to have coloured my personal attitude. However, I have been careful to support my arguments on what research in CSCL has concluded. Of course, I see that there are a lot of negative sides of Wave at the moment, but since this is only a "preview" version, I have been careful not to criticize the service too much when neither I nor anyone else can know what properties the final version will have. (If there will ever be one?)

Collaboration

This is one of the reasons why I try to see the full potential of the service. It will be what its users want it to be. All participants can be involved in developing the tool by: a) finding common "rules" for the use, b) creating new accessories like "gadgets" and "bots" and c) finding new application areas in which each company / institution, or another group of people can "personalize" Wave to suit their purposes.

To return to the title of this study, "Google Wave - a revolutionary CSCL tool or an overestimated hype?" I recognize that the latter part of this issue is close at hand when you ask people who do not understand how Wave can be used. There is a tendency, especially among young people, to always be first with the latest. Once they had access to that which is the new and cool thing, it seems like it maybe was not quite as they had imagined it and the interest fades rather quickly because they can not see any relevant use for whatever it may be in their everyday lives. I myself have seen this phenomenon among my students with for example the service Twitter, or the virtual world Second Life. Both phenomena are much talked about / written about and have become great successes in the United States. In Sweden the interest has been a bit more lukewarm. The case of Second Life has of course much to do with the age limit, but many adults I talk to who've tested it have also stopped because they have not really seen the "point" with it. Twitter, which can be used in different ways, has been recieved similarly. With no really new feature that does not exist in media people already use is discovered that also seems interesting and relevant, the interest goes out pretty soon.

The future of Google Wave lies in users' hands. Time will tell if the service is being implemented as the "new e-mail". I find it likely, but in the very long run. As we know, we humans sometimes think that it is difficult to embrace new things. I think that in all cases it is clear that Wave will revolutionize the way we work together online, and it seems like a large group of teachers is at the forefront of this development. Just look here, here and here and on the number of waves of public education who have already filled my inbox.

It will be interesting to follow my wave now that its original purpose is fulfilled.
Below I present the literature that I refer to in the text, and a selection of links that might seem useful for further intensifying your knowledge of the subject.


All of the above are the conference papers from Computer Supported Collaborative Learning, Taipei, Taiwan 2005


Google Wave
http://wave.google.com
http://wave.google.com/help/value/about.html # video
http://bit.ly/1wU7q

Wikipedia about Google Wave
http://sv.wikipedia.org/wiki/Google_Wave

The Complete Wave Guide
http://completewaveguide.com/

Datormagazin's article on Wave
http://www.datormagazin.se/nyheter/article511290.cee

Discussion forums on Wave at the Swedish social network Dela! http://shareanduse.ning.com/group/googlewave

Facebook Group on Wave

List of accessories to Google Wave
http://sites.google.com/site/gwaveextensions/extensions-list

Meeting place for educators interested in Wave at Wikispaces
http://googlewaveeducators.wikispaces.com/

Pulp Fiction Wave
http://www.youtube.com/watch?v=sxP9oz9Cw0

The discussion forum Classroom 2.0 discusses Wave http://www.classroom20.com/forum/topics/the-google-wave-will-change

Playback sequence of my wave on Youtube http://www.youtube.com/watch?v=SJ1ADk5G8iw&hd=1

How can Google be used wave in education? (My wave)
Note: Only people invited to Google Wave preview can see this page.