

Blogging as a research and educational tool: a three years experience^{*}

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Abstract: Blogging can be also used to share knowledge in research and education. We have been using many blogs with the following purposes. One goal has been to raise awareness about research methods in the information technology field by supporting information exchange, collaboration, and cooperation between researchers. We have been using a common blog for 3 years to share inter- and intra disciplinary knowledge among us. We have also collected stories and interviewed colleagues and friends. An other goal is the use of blogs during our teaching experience as an instrument to support the exchange of knowledge with students. A comparison of the use of blogging is presented with positive and negative aspects that have been experienced.

Keywords: E-learning, Education, Research methods, Cooperative learning, Blog

1. INTRODUCTION

Our aim is to share some experience on the use of blogs for research and education. Nowadays, a new interest in blogging has arisen in the academia, for example Norwegian University of Science and Technology (NTNU) has started to organize courses about the theme of blogging and research, but this was not the case in the past. We have been using the blogging tool for research purposes since October 2004 and three years at the time of blogs and internet is an age. Since 2004 the blogosphere has exploded. As of December 2006, Technorati indexes over 55 million weblogs. When we started to talk about our blog to our colleagues and friends, it happened that we were not understood. At the time of writing academia has accepted blogs as a research and educational tool. The blog Die HardBloggingScientists (HBS) provides a manifesto about blogging in academia that is useful to reflect about our own experience. There are many ways to reach out in the internet: homepages, wiki, blogs, social networks like Facebook, MySpace, and e-mail. With web 2.0 the internet allows more interaction and more user generated content than before. A blog is an updated internet page where one or more authors express points of view and tell to the world what is happening. The posts are often presented in inverted chronological order. Some blogs are pure diaries for the blog writer. Others are more oriented to a theme, professional or artistic. Bloggers use often pointers to other web pages and other blogs. Many forms of content are allowed by blogs: text, pictures, sound files, video pieces, presentations (slides), links to other blogs, links to whatever, comments. The content can be structured by categories and tagging, and the readers can be informed of new content in the blog by RSS feed or email.

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Blogs can be part of bigger working environments like project management tools, Learning Management System (like Sakai), and Social software (like MySpace).

Our original idea has been to use blogs to catch the attention other researchers to share their experience with us. To do so we established a blog (Giarré and Jaccheri (2004)) (<http://www.researcherblog.blogspot.com/>) and we have used this to document our experience as researchers. Interdisciplinary research and education has been promoted by local institutions and funding agencies with the final goal of stimulating innovations that go beyond the technological advances in the single discipline. Interdisciplinary refers to the integration of disciplines. Each discipline is characterized by a body of knowledge, a vocabulary, traditions, scientific methods and procedures. Our own experience as researchers from different disciplines who wish to share knowledge and work together tells us that one challenging aspect, if not the most challenging, is knowledge about each other methods of research. The art of research can be learned by a combination of doing and reading research literature. Research communities rely on different research methods, depending on both the academic field and the tradition of the research institution and group. Research methods usually have been studied and debated at conferences and seminars (top down approach) and between friends and colleagues (bottom up approach). Research processes are learning processes in which experienced researchers, PhD students, master students, and external actors, collaborate to achieve research goals. Research processes are often driven and regulated by formalized methods and procedures, (desJardins (1994)). In order to learn research methods, one possible way is to provide an infrastructure to share research experience and

to look for a common language in different technological fields.

The final goal of the research activity of the blog (Giarré and Jaccheri (2004)) has been to increase awareness and knowledge about research methods in inter- and intra-disciplinary Information and Communication Technology (ICT) fields. The increasing of a common knowledge is obtained through a mean that is becoming more and more actual and widely used also in academia: the blog. This blog (Giarré and Jaccheri (2004)) is aimed at describing, comparing and improving the different methods of research that have been employed in different scientific areas. Supporting the exchange of information, collaboration, and cooperation between researchers is a way to learn research methods. The sharing units are stories written by researchers and organized in a blog. But the existing differences in the various fields and disciplines have standardized different peculiar meanings and languages. Writing and listening, discussing and exchanging information has the ultimate goal of let us know and learn the answer.

The experience with other blogs that we have opened, for research or for specific educational objectives, is also very important. It helps us to understand how blogging can be used not only as a way of writing and communicating information to the audience, but also as a way to really interact with them.

This paper is arranged as follows. In Section 2 the state of the art is presented, both on research and educational web resources. In Section 3, the (Giarré and Jaccheri (2004)) blog is analyzed in details, its infrastructure, its goals and an analysis of the achieved results during the three years experience. A discussion and final remarks is also added. In Section 4 the experience with the other blogs for research and education is presented, explaining the goals of each one, and adding a discussion on their success or failure. As a comparison with different use of the blog environment, our personal blog are also presented. Finally, some remarks and future activities are reported in Section 5.

2. BACKGROUND

2.1 Infrastructure

Many Web resources in the last years have turned from simple information points to places for promoting communities. A growing number of studies describe sites that are used to support distributed communities, kept together either by common practices or shared interests. In the last years a set of principles have been put forward for the design of web sites (sometimes called portals) for supporting distributed communities. Web sites, providing basic but very effective tools for communication and information sharing together with a virtual meeting place, can successfully support community building and knowledge sharing (Girgensohn and Lee (2002)). For example, in the field of software engineering experience factories have been suggested as a way to promote knowledge reuse among different projects, (Basili et al. (1994)). An extensive body of literature about community and organizational memories and within knowledge management (Schwartz et al. (2000)). In the control field, web-based sites and e-learning are mostly devoted to control laboratories, both on site

and remote. We all have experimented in our courses the importance of teaching how to control a process on real experiments, and sharing these labs through the web is effective to share a common engineering experience. One of the most used web-site (Control Virtual Library (2007)) is a collection of useful links, listing control groups, journals and other activities in the control fields but lacking, as far as our knowledge, mechanism for distributed communities. Why blogging, then? *Blogs combine the immediacy of up-to-the-minute posts, latest first, with a strong sense of the author's personality, passions, and point of view* (Nardi et al. (2004)). First question we ask to ourselves is: which is the goal of a blog? It is clear that form, functionality and contents should adhere to the goal of the blog. The goal of any blog can evolve over time, and this is what happened to our blogs. Possible goals of blogging are: for your own purpose: formulate, create, reflect, socialize; for the reader: disseminate, inform, inspire, provoke; for a private person: one way of dialog; for an employee or an expert: a way of update others about their works; for a researcher: a way to establish a community. The results people is expecting can be: show off, influence, dominate, have power, or simply communicate, exchange experience. Which are the possible readers? They can be friends or people, the academic or job network, they can be general unknown users, or persons sharing same opinion or interests.

2.2 Research methods

There are many initiatives connected to our strategic choice of focusing on research methods. As an example in the software engineering field, we refer to (Conradi (2004)). Here many interesting links are present, for example links to PhD courses on research methods. Our experience as Empirical Software Engineering researchers and supervisors for PhD students and our long term cooperation with industry actors tell us that, while there exist a bulk of good literature in the Empirical Software Engineering field, cooperation within the research group, cooperation with industry, and relevance of the research problems are actual problems. Too many PhD students work in isolation for many years and deliver theses which are seldom read by anyone else than the thesis reviewers. We report the Empirical Software Engineering PhD level course, held at both NTNU and University of Oslo since 2002, and described at (Jaccheri (2005), Jaccheri and Østerlie (2005)) as a prototype. Here, a basic Empirical Software Engineering syllabus is identified. In addition, creative methods especially thought for innovation and cooperative processes have been exploited. The process has been documented by pictures and videos available at (Jaccheri (2005)).

2.3 Collecting knowledge

Sharing experiences through stories is emerging in many professions as a powerful way to exchange and consolidate knowledge. The use of storytelling is a way of connecting, knowing, and a way to facilitate the processes of nursing education, practice, and research. Well-designed, well-told stories can help others in learning from past situations to respond more effectively in future situations.

The work of (Bermejo (2005)) shows how to design cooperative learning activities on the Internet by using basic principles derived from contemporary pedagogical research results. According to pedagogical research in cooperative learning, one of the most effective resources for the cognitive restructuring of information is for students to explain it to someone else (Slavin (1995)). Two major schools of cooperative learning (Kagan (1994)) and (Johnson et al. (1998)) are based on the idea that cooperation can occur with little or no material designed specifically for a course.

The education community (Hadjerrouit (2005)) in engineering supports the view that a combination of constructivist approach to learning and exploitation of WEB technologies is beneficial to students. This in contrast to a passive transmission of knowledge based on books and lectures. According to the constructivist approach learning should take place in a collaborative way and the role of the teacher should change from that of being an active knowledge transmitter to an observing facilitator.

In a panel (Doyle et al. (2004)), some fundamental questions of our fields arose: 'What is the core of control?', or 'What is important to form good 'control people?'. Panel discussions at conference, round tables and meetings have been in the past the only place where the community have met and shared knowledge. Some of the web-forum present are professional ones devoted to control engineers more than to researchers. In terms of research methods and process not much is available in the systems and control area or on PhD courses devoted to this topic.

2.4 The goals a blog on Research

In the context of our general goal of increasing awareness about research methods, we define three subgoals as description, comparison, and improvement of research methods.

We are interested in learning more about research processes and to share knowledge with PhD students and colleagues. We aim at investigating the analogies between our fields (Software Engineering and Systems and Control. What would I do if I started a PhD now? If I would do exactly the same, it means that I have not learned anything. What do I tell to a new PhD student? Learning can happen by supporting information exchange, collaboration, and cooperation between researchers. We are looking for a common language in different areas and we would like to find analogies or differences among technological fields. The topics under investigation are questions related to researchers background, their research methods and processes. We invite other people to participate. The incentive is the desire of learning that motivates any researchers.

In our work we go a step further with respect to the work presented in (Hadjerrouit (2005)) as we want to apply constructivist theories to our own process of learning about research methods and processes. This means that we, together with our research students and colleagues, are the learners and at the same time the facilitators of our learning process.

3. THE RESEARCHER BLOG

We propose our way to support the research community by establishing a researcher blog (Giarré and Jaccheri (2004)). The term *blog* is a shortened form of the coined word *weblog*. Although a blog is in essence an on line diary, the simplicity of the on line environment has meant that its use is limited only by the imagination of its users.

We see this blog as a blank paper where people write the contents posing questions and finding answers, with their stories. This is a *koiné*, a meeting point where researchers share their view about research and talking with the others, learn and teach about research processes.

According to (Nardi et al. (2004)), blogs are not only devoted to documentation of lives, or to express some felt emotions but also to articulate ideas through writing and to form and maintain community forum. Our blog is a community forum that is open to different research methods and personal research experiences. It aims at investigation of the relationship between research process and research results.

The story-telling theory (Bruner (1996)) is a process allowing the construction of a personal identity. To tell a story is the way how a reality and a society is known and understood. To tell a narration through a story is more efficient, memorable and involving with respect to more traditional way of organizing information and data. In this context the communication is not necessarily face to face. These observations are still valid in a forum or in a web-community. In this context to build and narrate a story is the way of determining and building the common language. Reaching a common understanding in a community over the web is a major challenge due to the "symmetry of ignorance" caused by the respective cultures and their use of different knowledge systems.

Researchers and PhD students from different areas in the Information technology fields (Control, Telecommunication, Computer Science etc.) and of many nationalities have been contacted to contribute to our blog. At the time of writing, the blog is moderated, but comments are allowed to everyone. We are discussing and experimenting alternative cooperation models, like that of allowing every interested user to submit their stories.

3.1 Questions and Interviews

In order to facilitate the *story-telling* phase, we have set up a set of questions. The blogger can either contribute by his own story or answering to the questions. We recognize that it is often easier for a student or a colleague, to answer to specific questions instead of telling a story. The questions have been changed and evolved during the years. We report the last set, the one that has been used also for the interviews.

- A) Which is your main research topic?
- B) What do you mean by research topic?
- C) What do you mean by research method?
- D) Would you describe your research method as:
 - a. Exploratory research (a new problem is structured and identified);

- b. Constructive research (a new solution to a problem is developed);
- c. Empirical research (empirical evidence on the feasibility of an existing solution to a problem is provided);
- d. Other.

D) Which factors influence the choice of your topic?

- a. the funding procedure
- b. the discussions at meetings and conferences
- c. the exchange of ideas with colleagues
- d. the reading of literature
- e. some genuine and inner interest
- f. Other

We designed these questions by looking at the stories that had been provided. The valuable stories were those that provided answers to these kinds of questions. Not each story provided answers to each question. Therefore we abstracted from stories to questions with the aim of collecting more complete information. We observed that while bloggers were positive to write free text, almost nobody provided answers to the questions just because we had published them on line. Our solution to this is to run face to face interviews around these questions which we further transcribed and publish on line on the blog.

3.2 Analysis and Discussion

We recall that the final goal of the *ResearcherBlog* is to support reflection and learning in the field of research methods.

At the time of writing this paper, the blog has 48 posts. We do not present here the entire list of posts, that can be accessed in the blog itself (Giarré and Jaccheri (2004)).

One way to analyze the stories on our blog is to use an hermeneutic approach. In simple words, we can read them, comment them, and write new stories on the blog itself. During this process, categories will arise in a bottom up fashion. Another way is to use a top down approach and provide a formal analysis of the information on the blog by using our own sub-goals and discuss if and how each post address *description*, *comparison* or *improvement* of research methods. The idea is to go through each contribution and first see if the post is related to the research methods. For each post that is related to research methods, we evaluate if it is about the description of one method, the comparisons of two or more, or the improvement of one or more methods..

Many strategies are available within qualitative research to protect against bias and enhance the reliability of findings. In (Seaman (1999)), qualitative research methods have been described. In many disciplines, qualitative methods are used to handle the complexity of issues involving human behavior.

The research process we have been following in this work, encompasses three steps (goal definition, blog managing, and analysis). First there is the definition of three sub-goals that are description, comparison, and improvement of research methods. To achieve these, we have managed a blog and a preliminary qualitative analysis that maps blog stories and questionnaires to goals.

On the other hand, it makes us worry as we have been using blogs in a not systematic way and this will render the task of explaining to academicians our activity as a blogger arduous, even if we have documented this activity in some research papers (Giarré and Jaccheri (2005a), Giarré and Jaccheri (2005b), Giarré and Jaccheri (2005c)).

3.3 Final remarks on the Researcher Blog

We started our blog in 2004 as we were fascinated by the blog phenomenon, we believed that it could help us to keep our scientific and personal dialog alive even if we live at the south most and north most extremes of Europe. In addition to blogging, we have used actively emails and chat programs like skype. We have been participating to the European network Estia. ESTIA-Net is a program of the European Commission Directorate General for Education & Culture - Higher Education: Socrates-Erasmus Thematic Networks (initiated in September 2003 and prolonged until March 2007) and the first and second edition of International Conference on Interdisciplinarity in Education (PROJECT ESTIA-NET (2003)).

We realize that when we started we wanted to shape the content of our blog by imposing a structure and by inviting or interviewing people. This because we were inspired by the way we were used to work as researchers. The blogosphere has different rules. In the blogosphere one gives feedback's to other in a volunteer manner. In the blogosphere we are proud when somebody visit our blog and we are grateful to them who visit us in a way we deserve them a visit.

We have learned a lot in the process of posing questions to our colleagues and even trying to convince them to participate to our blog. At the time of writing, we have changed our focus from trying to convince people who are outside the blogosphere, to find, inside the blogosphere, academic researchers that, like us, use blogs as a research tool, further to conferences, journals, and books.

4. OTHER BLOGS EXPERIENCE

Hereafter, we present our experience with other blogs that we have been using in the same period. Some of them have been primarily used in education as a support during our teaching experience, while others are more research oriented. The aim of them were to present the research activity that is be going on some specific area. For example, (Jaccheri (2004 b)) was opened to document the activities as a software engineering researcher and (Jaccheri (2006 a)) was opened to continue in English a description about some research activities in the theme of art and IT.

When L. Jaccheri, was asked to give a lecture about IT texts, at the Youth literature festival in Trondheim in 2006, she opened (Jaccheri (2007)) to implement an interactive lecture with pupils.

The blog (Giarré (2007)) is also educational oriented, it is an interactive blog where the teacher explains some contents of her class, and the students comment or ask for further explanations. The aim is to have a more friendly and usable environment than a FAQ list. L.

Giarré encourages students to use this blog to establish a continuous dialogue and exchange of knowledge. This first year experience has not been completely successful. L. Giarré is writing on it in English, but she let the students use their native language (Italian), as an incentive. The main reason of the low use of it can be found in the fact that the students prefer not to interact in public, but they like a more personal direct interaction, like the one during office hours. Second, the students associated the idea of blogs to more personal environments like MYspace's one. When we talk of success, our metric is not only the number of accesses, very low (1317 accesses from february to august 2007) compared to the number of accesses of the Giarré's home page (9400 accesses during the same period) where the students can download the teaching materials, but also in terms of the number of comments and interactions during the semesters.

The blog (Jaccheri (2006 b)) was issued during the workshop *Sensing Matter* that is part of the course 1-2-TRE:6 at NTNU. Sensing Matter is a workshop exploring rule-based design and assembly of wooden structures. The aim for the workshop was to test how an assembly process, including the people involved as well as the components to be assembled, could learn how to 'grow' or assemble itself. The conceptual tool for this will be the principle of iteration. An iteration is simply a repetition of a number of steps in a process, such as in a computer program. In this case, an iteration would be the rules that will take a certain situation at the start of the iteration, lets say components being in certain state, to another situation, which will in its turn will become the starting point for the next iteration. The students attending the class were divided in groups. Each group of students was asked to establish their own blog: (sensingmatter.blogspot.com; boogeymen.blogg.no; madcircuit.blogspot.com; www.sensingpressure.blogspot.com; computerfreaks.blogg.no) in order to explain their own project and to share their progress with others. They were used for submitting and publishing images, diagrams, sketches, comments, schematics of circuits, procedures, results and code. Entries to the blog were asked to be made daily. This workshop and this class was a great success and the fact that all the blogs are still active after one year is a clear sign of it.

4.1 Personal Blogs

In parallel with the research and educational blogs, we decided to open the following blogs, (Jaccheri (2004 a)) and (Giarré (2006)). Those are blogs used by us to write novels, poetry and pieces of text, book and movie reviews. They have to do with our lives in general and not only with our work, and this is why we refer to as personal ones. On the contrary of research and educational blogs, personal blogs have been a huge success. Both in terms of accesses and number of comments. The personal blogs have many aspects. One of the main reason for their success is that they take the role of a place where unknown people is meeting each other. Blogging is not only a way of writing and giving informations to the audience, but also a way to really interact and make new friends. L. Jaccheri opened also (Jaccheri (2006 a)) when she decided to exclusively use (Jaccheri (2004 a)) as a personal blog written in

Italian, even if she had originally opened (Jaccheri (2004 a)) as a way to share her research and personal interests in art and software. At that time she had chosen a platform that was primarily an Italian platform and in this way it was difficult to attract attention on a blog in English, even if it was on a nice topic like art and software. But (Jaccheri (2006 a)) was never a success. L. Jaccheri was bound to (Jaccheri (2004 a)) and she loose interest in blogging on (Jaccheri (2006 a)) after a few months. When reflecting on this fact, she explains this by using the diary metaphor. If a blog is a diary, one has one diary and not several ones.

5. FINAL DISCUSSION

This research activity started with the main objective of increasing knowledge about research methods. Using only the number of accesses as a metric to evaluate the achievement of our goal, we may conclude the following. It is clearly much more easy to express feelings and to comment on an artistic installation, or on a book or a novel than to describe research projects or research methods. The experience with the so-called researcher blogs has been a failure in quantitative terms compared with the one with the personal blogs (911 accesses in three years compared to 47900 accesses in one year and half of (Giarré (2006)) or the 26243 of (Jaccheri (2004 a))). The experience with the use of blogs for specific educational purpose that we presented is also at a very starting point, but we encourage it. We believe in it as a further instrument to help the teaching and the exchange of feedback with students. The joy of feedback it is not only in control (Kokotovic (1992)) but also in learning/teaching. Teaching and learning is a twofold process that has two main actors, the teacher and the students, and can be modeled as a feedback loop. If teaching is thought and remains an open loop process where the teacher is the source and the students are the recipient it's very hard that a blogging tool will help the exchange of ideas. As a final comment, we stress the fact that it has been very difficult to classify the blog Giarré and Jaccheri (2004), because the boundary among research and education are very loose, especially when we the goal is to understand research methods and the used tool is blogging.

The blog can be a mixture of many aspects: life, job, process, products, scientific competence, politics. It is an habit for the new generation reader to separate these from each other? It depends, sometimes adding a structure to it can be helpful (i.e. in (Jaccheri (2004 a)) Jaccheri is using tagging as a structured way of ordering posts) We experienced that there must be personal enthusiasm and that a research based blog to be actively updated and read must be based on a wish to write this in this format. Or it must be based the wish to share the research process and the life as a research.

One could criticize us for not using a defined research method in this work, but to combine qualitative story telling, personal diaries, and interviews. We are aware of that and we motivate our methodological choices by the fact that when we started to use blogs as a research tool, there was not documented method of how to use them. When we started the project very few were the blogs on research method and the use of blogging with

education. At the time of writing, a search for *blogging* on <http://scholar.google.com> gives 6160 results. If searching for *blogging* and "research method" gives 364 results. Among these we mention (Suzuki (2006)) where the diaries as introspective research tools: From Ashton-Warner to Blogs are described and (Brescia et al. (2005)) where blogging as a tool for education is discussed. A systematic review of research literature on the theme of blogging and research method is now on our agenda for further work.

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