Maria Loureiro, Isabel Huet, Ana Baptista & Diogo Casanova

Using ICT to enhance the online research supervision process

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Online research supervision is a relatively new and evolving process due to changes in university at both undergraduate and postgraduate levels. New models of research supervision include different research supervisor and student roles and entail the constitution of online research communities regarding common goals. Even though the potential of Information and Communication Technologies (ICTs) for shaping the supervision processes is undeniable, literature related to this issue is still scarce. This article presents a case study about the use of ICT to enhance the online research supervision process. ICT was used for content delivery and sharing, and to facilitate the interaction between postgraduate students and a supervisor, as well as between the students. Based on the supervisor's reflections, key positive and negative factors are also systematised.

Die aanwending van IKT om gekoppelde studieleiding te bevorder

Gekoppelde navorsingstudieleiding is 'n betreklik nuwe proses wat voortvloei uit universitêre veranderinge. Die ontwikkelende modelle van navorsingstudieleiding behels die verskillende rolle van navorsingstudieleiers en studente en die skep van gekoppelde navorsingsgemeenskappe met gemeenskaplike doelwitte. Die potensiaal van inligtings- en kommunikasietegnologie (IKT) om vorm te gee aan sulke prosesse is 'n ongewone navorsingsontwerp en daar is min relevante literatuur. 'n Gevallestudie word aangebied oor die gebruik van IKT om gekoppelde navorsingsstudieleiding te bevorder. IKT is gebruik om inhoud te lewer en te deel, en die interaksie tussen nagraadse studente en 'n studieleier, asook die tussen die studente onderling te fasiliteer. Gebaseer op die studieleier se terugskoue word sleutel suksesfaktore wat die grondslag vorm van sulke prosesse ook gesistematiseer.

Dr M J Loureiro, Dr I Huet, Ms A V Baptista & Mr D Casanova, Research Centre for Didactics and Technology in Teacher Education, University of Aveiro, Campus Universitário de Santiago, 3810-193 Aveiro, Portugal. E-mail: mjoao@ua.pt

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In the European agenda, as well as in other regions, different stakeholders, from political to academic fields, have stressed the need to increase the quality of supervision research activities. For example, the London Communiqué (Bologna 2007) posits that research programmes and practices at postgraduate level need to be improved. On the other hand, a growing number of students are enrolling in postgraduate research studies. In Europe, the massification of postgraduate studies, partly motivated by the Bologna Process, pushes Higher Education (HE) institutions to rethink the research supervision process. This situation requires higher demands from the same number of research supervisors, unless new models of research supervision are adopted. Accordingly, several authors, for example Wisker *et al* (2007), claim for different research supervisor and student roles and for the constitution of research communities regarding common goals.

Taking into account the potentialities of ICTs related with, for instance, their flexibility as far as distance communication and collaboration is concerned, one way to face the above-mentioned challenges resides in their use to enhance the research supervision processes. Yet the potential of ICT to shape supervision practices "has received almost no critical attention" (Morgan & Ryan 2003: 2). In fact, during an ESCalate workshop about research supervision, Joyes (2002) stressed the lack of knowledge concerning practices of online support for research training and the reduced understanding of the pedagogies involved in the online research supervision process; in other words, the literature in the field is still scarce. According to Stacey & Fountain (2001), online supervision is an important process under construction that needs to be figured out. Simultaneously, Evans & Green (1995) mention that "what is needed therefore is a richer, more complex picture of distance education modes of postgraduate pedagogy". In summary, even though several authors stress the potential of online research supervision processes, there is a need for developing and disseminating proper research in this area.

Taking into account what was exposed above, it is the authors' intention to share a case of good practices regarding the online postgraduate research supervision process based on the development of an

online community of practice (CoP). Therefore, the authors hope to make a valuable contribution to the field. This article briefly reviews related literature; gives the methodological options of the study; presents, analyses and reflects on data; critically analyses the positive and negative factors of the experience, and provides final considerations and implications.

1. Reviewing the field: how is research supervision changing?

The importance of research and research careers may be considered dynamos of development, since it is believed that they enhance economic and social well-being. Globalisation, another characteristic of the information and knowledge society, calls for new responsibilities and policies from the HE sector in general, and from research training programmes, in particular. In fact, universities, among other institutions, are expected to extend and (re)create knowledge, to transfer it to other social stakeholders, to train highly qualified professionals, and to give them proper tools in order to endow them with lifelong learning skills.

Research supervision models are also changing. Supervision focused on the individual, centred on private top-down relationships between the supervisor and the student and on dialogical communication contexts, which are increasingly being criticised and can be considered obsolete. Zhao (2001) claims that such models are not aligned with the postgraduate students' needs or with the social and academic demands of the postgraduate research process. The author presents research supervision models that focus on the importance of one research student to have more than one supervisor. To the author, the so-called "supervision committee" may be essential for students to get involved and be supported by experts and a supervisory group. On the other hand, Wisker *et al* (2007) report that the collegial research supervision process must involve research students, guardian supervisors and the constitution of online communities in order to enrich and enhance the supervision process and to provide opportu-

nities to develop collaborative work. In these groups, students can, for instance, guide each other and share resources.

In the complex context briefly described above, the competences that postgraduate research students are expected to develop nowadays are considerably different from those required not so long ago, due to the changing academic environment and a new conceptualisation of knowledge and academic work. In fact, postgraduate students are expected to develop original work and critical thinking, and to be self-efficient learners, to search and to manage resources and time, to collaborate with peers, to develop several research skills, and to disseminate their work in international settings.

Online research supervision, understood either as a virtual or as a blended-learning process, is characterised by the research student and supervisor working at a distance. According to Stacey & Fountain (2001), online research supervision is an important process under construction. Its evolving nature is due to the generalisation of university postgraduate studies (in Europe, namely in the context of Bologna) and the consequent increasing number and diversity of postgraduate students (Wisker *et al* 2007, De Beer & Mason 2009) and to the evolution of the possibilities offered by ICT.

In the past decades we have witnessed and experienced a considerable evolution in ICT tools, in particular after the rising of Internet access. The evolution of ICT facilitates the emergence of forms of research supervision that encompass the use of different tools, such as:

- Email, mainly to support postgraduate students on a one-to-one basis, as reported by Stacey & Fountain (2001). This same facility may also be used for formative assessment (Crossouard & Pryor 2009). Unwin (2007) reports the use of VoIP, such as Skype, for one-to-one communication to discuss ongoing work with research students.
- Virtual supervision environments, such as the one developed in the PROS (Promoting Researchers Online Supervision) project (Basiel 2000), or the use of WebCT (De Beer & Mason 2009), may also be of great importance: content areas and different communication tools are used both to deliver contents and to interact with research

supervisors and peers. In addition, Morgan *et al* (2006) point out that, when using Learning Management System (LMS), it is possible to create learning environments that facilitate research supervision and the development of research e-portfolios.

- Web 2.0 tools, as in "deepthink", a Second Life campus being developed to support an innovative postgraduation programme, was recently launched at the Open University (Rapanotti & Hall 2009). On the campus, a blend of synchronous and asynchronous Internet technologies is used. The campus includes a "welcome area" for orientation purposes, a "study area" to support students' collaboration, a "library area" to facilitate access to research resources, a "sandbox" to materialise objects and scripting activities, and the "main auditorium" for larger events. A recreation space is also available.

Brown (2005) argues that virtual learning environments are environments where students can meet in a highly interactive way using different tools, such as chats, blogs, and wikis. Moreover, according to the literature, supervision environments mediated by ICT can offer a richer environment, increase time and space flexibility, and support the use of different strategies (Unwin 2007), provide greater interaction between postgraduates and their supervisors (McKavanagh *et al* 2004), and increase the availability of the supervisors - one of the problems that students commonly experience (Muyinda *et al* 2008), along with feelings of isolation (Wisker *et al* 2007).

With the use of Internet in distance education contexts, research students can operate without the presence or geographic proximity of their institution. Postgraduate studies have been found to be suitable for online learning strategies, namely because students feel that it is easier to manage study, family and work (Stacey 1999). Consequently, online research supervision should be explored whenever research students are separated from regular advisory meetings and personal contact with their supervisors, the daily contact with colleagues, and the institutional support infrastructures, such as technology, libraries and study rooms (McKavanagh *et al* 2004). In fact, this is the case with the majority of postgraduate students in educational programmes in Portugal, since they are also teachers.

Finally, it is important to highlight that when the supervision process is supported by ICT both research students and supervisors are required to possess and develop specific skills and attitudes. Stacey & Fountain (2001) refer to the ability to use technologies, to critically approach information and motivation as key factors that contribute towards the success of online research supervision, for both student and supervisor. To Bibby (1999), electronic supervision requires a strong social presence in order to develop confidence relationships between student and supervisor. The following sections will describe how ICT was used to develop confidence, as well as strong lifelong relationships between a supervisor and her students.

2. Methodology

According to the theoretical background briefly outlined above, this article presents a case study of an online research community of practice (CoP), named *CoTiques*, where ICT was used to facilitate the supervision process and simultaneously involve postgraduate students in collaborative research processes. The technologies used include the LMS (Blackboard) used at the University of Aveiro and other external tools for synchronous communication and collaborative writing purposes. The aim was to find answers for the following research questions: how can ICT enhance the online research supervision process? and what are the positive and negative factors of online research supervision?

Given the scarce number of studies in the field and its evolving nature and taking into account the complexity of the phenomena under study, this case study has a qualitative, descriptive and explorative nature. In addition, the research questions are centred on the "how" and "what" of a contemporary reality (Yin 1994). Accordingly, data-gathering techniques include mainly the supervisor's reflections and observation mediated by the technology used; in other words, the information registered in the LMS is one of the main sources of data collection that has been studied through content analysis. Quantitative data related to the number of posts in forums is also used to illustrate the description.

Besides the supervisor, the study involved more than twenty students, enrolled for master's degrees in the academic years 2004/05 to 2007/08 at the Department of Education of the University of Aveiro (Portugal). Eighteen students finished their dissertation. All students except one were teachers and their ages varied between 25 and 50 years. They taught at different levels, from primary to secondary education. Even though the majority of the students were doing a master's degree (MsD) programme in Multimedia in Education, some were doing their studies in other courses such as Science Education in Primary School or Curriculum Development.

3. Setting the scene: *CoTiques*, an online research community of practice

From 2004/05 to 2007/08 one of the authors supervised more than twenty MsD students. To be able to accomplish her supervisory duties with success and to reduce the dispersion that this work involves, she explored several strategies and proposed the constitution of an online research CoP, named *CoTiques*, through the use of ICT, in particular an institution-based LMS, Blackboard.

Taking into account the elements of a CoP (Wenger *et al* 2002), the knowledge domain of the research community was the integration of ICT in educational contexts (one of the research interests of the supervisor). The practice of the CoP *CoTiques* is research in the aforementioned domain, since it was the topic of the students' research projects. Figure 1 illustrates how the CoP was organised. Besides the common domain, students' research projects were organised into themes (Figure 1). Through a process of negotiation of the research projects and questions with the students, small research teams were constituted (2-5 members). According to Wisker *et al* (2007), students' stress situations can be avoided and clarification can be worked out in supportive group environments. In fact, students can be more easily involved in helping each other in small teams, ICT being an important source of support.

An online CoP was created through the use of ICT, with shared goals, domain and repertoire (Wenger 1998), where several collabo-

rative activities took place, such as sharing, discussing, and testing ideas, problems, and ongoing work. Open and free dialogue communication took place, allowing for the development of both oral and writing skills.

Figure 1: Organisation of the *CoTiques* work teams: an online CoP (St = students, Sv = supervisor, Exp = expert)

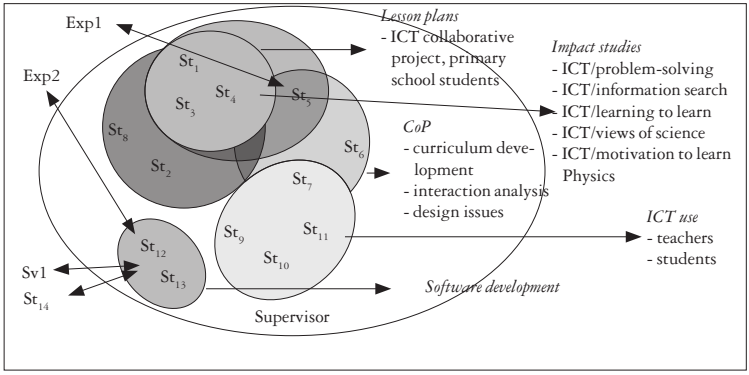


Figure 1 demonstrates that *CoTiques* is not a closed CoP, since external members can access the site, in particular during the validation of the data-gathering instruments (for example, of the impact studies) and of the data analysis (in particular, the studies involving interaction analysis). For instance, Profs M McIsaac and C Gunawardena helped validate the content analysis made by two students. External members were also involved throughout the evaluation process of a course that was under development (Guerra *et al* 2007). The involvement of these external members is very important for validation processes, as referred to above, to potentially increase the visibility of the work in progress as well as its relevance, and to increase students' motivation levels.

In addition to using ICT tools to interact, members of the *CoTiques* met face-to-face. Such meetings were an opportunity to present ongoing work and thus systematise and discuss research topics. They

were also essential to facilitate online interaction, as they provided opportunities to deepen the sense of community among its members.

4. Data findings: how was ICT used and why?

Figure 2 is a print-screen of the *CoTiques* home page. The menu on the left gives access to different content areas, where documents were shared. Table 1 summarises the tools and their purpose.

Figure 2: *CoTiques* home page

Considering the different tools, it is important to emphasise that the content areas are crucial and can be updated both by the research students and the supervisor (all the members had authorised permission). As with "deepthink" (Rapanotti & Hall 2009), it is possible in *CoTiques* to share specific bibliographic references, essential to broadening the community members' academic, professional and personal horizons. While the scope of the themes of the students' research

projects are broad (Figure 1) in order to reduce the dispersion that several content areas could induce, only three content areas were created to share bibliographic references. The main topics of these areas are: "ICT integration in education", "Learning communities and CoP", and "Research methods". In a fourth area, the members could share the proceedings of conferences they had attended.

Several personal content areas were created and constituted an archive of the students' ongoing and final work. In their personal areas, students could share their research projects, articles, progress and final reports, final dissertations, and presentations. As Morgan & Ryan (2003) highlighted, these areas are very important for newcomers, since students have a set of validated documents and examples on which they can rely to develop their own work.

Table 1: Blackboard tools used and associated objectives

Tools	Objectives
News	Share information (news, conferences, and so on)
Participants	Socialise (general description and contacts of the members)
Content areas	Share students' documents (projects, articles, presentations, dissertations, and so on), organise bibliography, retrieve information
Forums	Share, discuss, synthesise ideas, evaluate peer and supervisor activities and work, ask questions, socialise
Group tools	Share, discuss, synthesise ideas, evaluate peer and supervisor activities and work, ask questions, socialise
Email	Alert to new information uploaded to the platform (to motivate interaction)

The forums is another important tool used to share and discuss ideas. In fact, several forums were created to present, share and discuss ongoing work and the documents delivered in the content areas. Each of the above-mentioned content areas was associated with a specific forum, to discuss the related theoretical framework and concepts (the conceptual forums in Figure 3).

In terms of the research process, a range of topics enabled the emergence of the following discussion forums, which seemed important for the professional and academic development of postgraduate

research students: developing a research project (the first step); doing a literature review; discussing methodological issues; analysing data, and writing the thesis. Other general topics included a socialisation topic, essential to develop the sense of community (the "caffè"), and a topic focused on different subjects apart from the ones mentioned above. For instance, in this last topic progress reports were shared and discussed as well as the difficulties students were facing. The following quotes are worth mentioning (free translations of two students' correspondence):

> Since we are sharing difficulties [...] I am reading (taking simultaneously notes) the bibliography [...] but I feel that this is a very unproductive work. By the end I got the feeling that I am stuck [...] can anyone help me? (Subject: Re: difficulties, Author: student F, 2006/10/10 15H23m).
>
> I'm afraid that this is the way, since we are not experts (not yet ☺), nevertheless we should focus on recognised authors, [...] take notes, writing is a good strategy, of ideas, questions, [...] later on maybe from discussions or other readings we will be able to find answers [...] I have noticed that doing so I am able to find some answers but I also know how I got there (Subject: Re: difficulties, Author: student G, 2006/10/10 16H02m).

These show that postgraduate students helped each other and that the interaction helped to "trigger off" (Wisker *et al* 2007) students' thoughts about their learning. In fact, this strategy promoted the development of reflective and meta-cognitive thinking. Two groups also explored group work tools such as forums, file transfer features and email. One group of students (G1 – primary education teachers) was developing a collaborative project related to the impact of ICT integration in science education, at the primary education level (as shown in Figure 1). Since they lived in different geographical regions of the country, teaching and learning strategies were planned using group work and synchronous communication tools (chat). Once the entire process was registered, another student analysed the collaboration strategies used by the group. The ICT tools used to develop this collaborative project provided both an opportunity to implement the project at a distance and an interesting source of data that allowed new insights into the research relating to online content analysis of collaborative strategies. Gunawardena *et al*'s

(1997) model of interaction analysis was adapted for the purpose of analysing synchronous collaborative online interactions within a community of teachers.[1]

Two of the students involved in software development projects also created a group (G2) involving external members (a student and a supervisor). As presented in Figure 3, this group was less active in the platform than G1, due to several factors: some of the members were less familiar with the platform and with ICT in general, and the group were able to develop the majority of the work in face-to-face meetings. Apparently, this group did not fulfil some of the conditions required to value the use of ICT for supervision purposes, previously pointed out.

Figure 3: Posts per group of forums

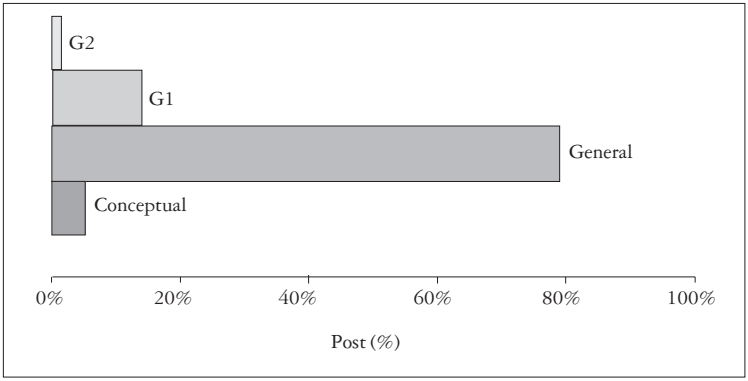


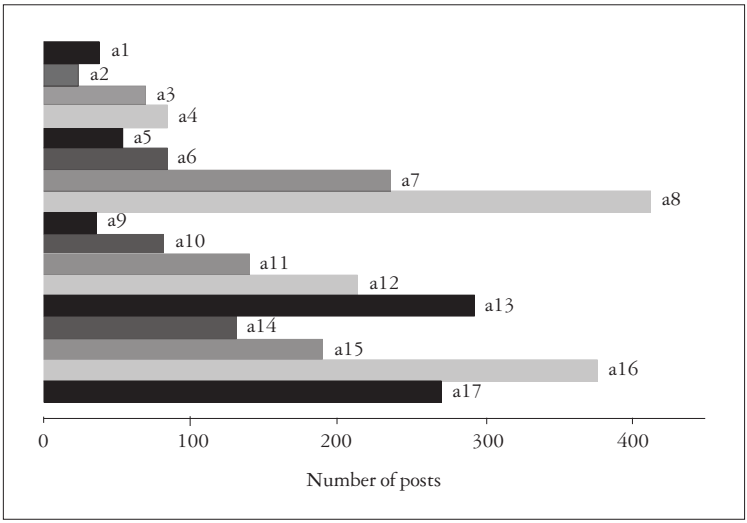
Figure 3 also shows that the topics with greater active participation were those related to the development process of ongoing research projects, such as the general topics concerning methodological issues and writing. One can conclude that postgraduate students seem to ascribe greater value to the research process than to the discussion of the conceptual frameworks underlying the research

1 Pereira L M & M J Loureiro 2010. Online collaborative co-construction of teaching strategies, to be published in *Educação, Formação e Tecnologia* [in press].

process. This is in accordance with the problems (as we have witnessed) that students demonstrate when they write the literature review and that are widely reported in the literature (Bitzer & Albertyn 2009). These are perhaps related to the epistemology of their practices, since nearly all of them are teachers. According to Pórlan *et al* (1997), teachers and researchers have different epistemological conceptions: the former value experience rather than theory.

Unlike what is reported by Unwin (2007), the platform was extensively used by the majority of the postgraduate students: seventeen out of twenty-six students contributed to the discussions (Figure 4). The level of participation is diverse, some of the students being at the core of the CoP and others being more peripheral, which is common in this type of social networks (Wenger 1998).

Figure 4: Posts by active student (a)



Besides Blackboard, other tools were explored (Table 2). Postgraduate students, in particular those involved in G1, used MSN to plan their projects. Audio conferencing and desktop sharing tools

were used in the revision phase of the dissertations and because several projects were related. These technologies made it possible to review more than one dissertation simultaneously, saving supervisor's time and efforts regarding the slower and more difficult phases of the students' research process. Moreover, it is believed that discussion was richer in this configuration than it would have been if performed dialogically. In this phase the supervisor also encouraged the students to comment on their peers' dissertations, even before the supervisor's own comments. In fact, this strategy contributed to extensive discussion, to the development of critical thinking and to strengthening the relationships between the CoP members.

In the CoP face-to-face meetings, ongoing work was presented and thus systematised and discussed. The members who did not have the opportunity to attend these face-to-face meetings could still follow the presentations and discussions using the above-mentioned tools. In addition, collaborative writing tools (such as a wiki or Google Docs) were used for collaborative writing, mainly of articles.

Table 2: Synchronous communication and collaborative writing tools and associated objectives

Tools	Objectives
MSN	• Share, negotiate and discuss ideas, peer-assessment, socialise, and so on
Skype/sharing tools	• Share, negotiate and discuss ideas, peer-assessment, and so on • Prepare presentations • Allow follow-up presentations during face-to-face meeting • Allow peer and supervisor assessment of written reports
GoogleDocs/wiki	• Write articles

5. Reflecting on the online research supervision experience

From the experience gained through the maintenance of *CoTiques*, several positive, negative and disparate factors (aspects that are simultaneously positive and negative, such as the ones that reveal con-

trasting evidence) emerged. These will be addressed in this section. Accordingly, some recommendations will also be put forward.

5.1 Positive factors

McKavanagh *et al* (2004) emphasise positive aspects when using ICT for supervision purposes such as the increased availability of the research supervisors. From this case study, if common virtual spaces for interaction are provided and common goals are negotiated, postgraduate students can also rely on their peers and have access to a larger variety of community members who are available to discuss similar problems. In fact, peer support revealed itself to be very important, providing a richer environment for feedback and reducing feelings of isolation. Moreover, from our own experience and as reported by Wisker *et al* (2007), it seems fruitful to organise students in small teams with related research projects to improve the relevance of peer feedback.

The postgraduate students showed a wide range of abilities regarding the use of ICT. Only some of the students had had the opportunity to use the LMS previously. Some authors report that the lack of ICT literacy can impede participation in online learning contexts (Stacey & Fountain 2001). Accordingly, Moule (2006: 137-8) mentions that "an online community will need to ensure participants have the technological provision and necessary IT skills to support engagement". On the other hand, Meirinhos (2007), in a study involving Portuguese teachers, observed that the majority of teachers do not have sufficient technological competences to be involved in distance collaborative work. In the case of *CoTiques*, the majority of the students, as well as the supervisor, had the opportunity to further develop the ICT competences they already possessed. In fact, in the course of the research process, the students and the supervisor learned how to use new ICT tools, namely:

- for data management: some used specific software for data organisation and treatment, like the qualitative analysis software "Nudist";
- for data gathering through the development of online questionnaires;
- for communication: they all learnt to use Skype for audio- and video-conferencing;

- for collaborative writing, using Google Docs or wikis;
- for planning teaching activities integrating ICT, and for developing both technological and pedagogical competences related to ICT integration in educational contexts.

The problems that occurred concerning the use of ICT were often discussed and solved in collaboration. For instance, in the forum regarding methodological issues there was a discussion on the topic of information exchange concerning ICT tools to develop online questionnaires. Like Campbell & Uys (2007), we also consider that postgraduate students' involvement with ICT contributes to the recognition of their educational potential.

One of the main success factors was the development of a broader picture of the domain by postgraduate students actively involved in *CoTiques*. Online interaction and face-to-face meetings enabled them to discuss their own work as well as that of their peers. For instance, the group of students developing impact studies were able to have close contact with research concerning online interaction analysis and CoP and *vice versa*. Some of them also interacted with external experts and were able to call upon different sources of knowledge and expertise.

5.2 Disparate factors

Online research supervision in contexts similar to the one in *CoTiques* may reduce supervisors' workload. Since all questions and answers remain recorded, feedback given to one student can be useful for another. At times the supervisor felt overloaded perhaps due to the learning styles of the postgraduate students (some are more dependent than others), since some of them apparently did not value their peers' feedback, or had different attitudes towards online research supervision. Sharing and discussing this case study may provide a foundation to support the development of students and supervisors' positive attitudes towards online supervision. A Frequently Asked Questions (FAQ) feature may also help to realise the potential of ICT for research supervision purposes.

The content areas of the LMS seemed suitable to share students' documents but not to collaboratively organise a bibliographic

database. Given the evolution of ICT, in the near future we intend to explore Web 2.0 technologies more extensively so as to facilitate the process of bibliography sharing. More than having a common archive to share literature, this feature should include the possibility to collaboratively synthesise and discuss it.

Although interaction through computer conferencing is acknowledged as a flexible device, since it allows working at an individual pace and without geographical constraints, some students experienced problems in coping with the interactions developed. Related to this, some students demonstrated lack of time to actively participate, mainly by the end of school periods (they were simultaneously students and teachers). The same kind of problems are reported by Hew & Hara (2007) in their study on online knowledge-sharing motivators and barriers posed to teachers. In addition, working at a distance mainly through asynchronous written discourse did not suit some students – for instance G1, as referred to above –, leading them to use synchronous communication tools (MSN, Skype). By the end of their project, these students realised that what they had gained at the level of speed of discourse flow and sense of community, they had lost in the depth of the discourse itself (Pereira & Loureiro 2010).

Text-based interaction in computer conferencing is also regarded as bearing positive and negative aspects. While it can be argued that this type of feature allows for more thoughtful interactions – because lines of reasoning must be structured and arguments put forth –, it is, nevertheless, time consuming.

The fact that all interactions remained recorded is also considered to bear both a positive and a negative aspect. On the one hand, it facilitates discussion and information sharing that can be useful for different students. On the other, some postgraduate students seemed cautious and their participation was scarce, perhaps because Portuguese students, culturally, are not used to discussing their ideas in public forums. Moreover, some topics have a considerable amount of posts and it is difficult to find the information one is looking for, since the search tool of the LMS is very basic. Those difficulties are also due to the fact that, despite the supervisor's frequent alerts to carefully introduce the subject of the post, only very few participants actually did so.

Concerning the level of participation, interaction by means of computer conferencing can also be overloading (a sensation often referred to by newcomers) and non-existing. On the one hand, a considerable amount of messages can be posted but, on the other, there was often not enough participation, for reasons previously pointed out. By the end of the academic period, when teachers are extremely busy with assessment tasks in their schools, they do not have time to post messages.

5.3 Negative factors

There are two types of negative factors. One is related to the development of the bibliographic database: the tools available in the LMS are not satisfactory to attain this objective and very few items were uploaded by the students. Another negative factor, which still persists in the LMS used, is the lack of alerts when new content is added. Those factors, mainly related to the usability of the LMS, led us to suggest the use of Web 2.0 technologies.

Although these might not be regarded as negative factors, two problems emerged and must be pointed out as aspects that require improvement: the instability of the research CoP (as "older" students finish their degrees and newcomers access the CoP, a new complex process begins for confidence to be improved and a sense of community to be established), and problems to encourage postgraduate students to publish their results (since, as mentioned earlier, they are teachers and the publication of the research undertaken is of no valued for their careers). Bearing in mind that the dissemination of research results can contribute towards the articulation of research with teaching practices (Loureiro *et al* 2005), educational policies should value the dissemination of research carried out by teachers.

6. Final considerations and implications

Research students and their supervisors are increasingly becoming more connected via the Internet (McKavanagh *et al* 2004). This article described the case of a successful practice when using ICT to enhance the online research supervision process and thus contribute to this

relatively new field of research. Such research approach has not yet been disseminated in Portugal. It may be considered that the success of the strategies described relates to the following aspects: the quality of the process and of the research carried out, taking into account the feedback from students and the supervising peers who discussed the students' dissertations; the reasonable time allocated for the completion of dissertations, since the students who finished them did it within a period of one year to eighteen months, while teaching, and the development of research and ICT competences by all CoP members.

Nevertheless, the results are limited, since they represent the supervisor's reflections. Consequently, this case study needs further development of the success factors, through the triangulation of the supervisor's reflections with those of the students (internal validation) and an in-depth analysis of the interactions between the members of the CoP, to validate those perceptions. External validation has been partly assured throughout the collaborative preparation of this article. However, this reflection may encourage other academics to use such ICT tools to share their practices regarding their experiences and perhaps start the establishment of a CoP regarding this subject, so that postgraduate research supervision processes may be improved when using online tools.

In the introduction, it was mentioned that there is a growing awareness of the need to improve research and research supervision quality. An increasing number of studies focus on enhancing the quality of postgraduate research supervision,[2] and claim that it is urgent to put effective strategies into practice, where the monitoring and evaluation of the research process cannot be forgotten. This article also aimed at contributing to the development of this line of research. From the case study described and taking into account the superviso's reflections, a first step towards the evaluation of the experience was presented. Positive and less positive aspects were pointed out, providing recommendations for future research and development in the field.

This shared reflection can be considered important not only to disseminate this experience among Portuguese HE academia, which

2 Cf Brew & Peseta 2004, Park 2005, Petersen 2007, Felton 2008, Lee 2008.

have their own contextual, academic and research culture, but also among a broader academia who may be interested in sharing and reflecting on experiences concerning postgraduate research supervision processes and practices, namely when using ICT tools. This contribution may thus be regarded as a step towards the scholarship of research supervision, which the academic community must start to emphasise.

To conclude: the importance of engaging research supervisors in reflective practice was highlighted, in particular when focused on personal experiences from an evidence-based research point of view: it can have consequences not only for the individual him/herself, but also for the institution. In fact, a reflection process grounded on theory supports the experience described in this instance, by pursuing a "reflection-on-action" (Schön 1983) approach. A reflective path was shared, aiming to contribute towards an engagement of postgraduate research supervisors at critical and reflective moments regarding different past events and involving them in "turning experience into learning" (Boud *et al* 1985) as reflective practitioners. Reflection and questioning moments are essential to enhance the quality of postgraduate research supervision processes. Practices must therefore be shared, disseminated, evaluated and strategically planned for further improvement of the supervision process.

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