# Challenges of Validating the Multifaceted Fully Online Cross-national CSCW Environments

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**ABSTRACT**
Four categories of challenges have been identified in validating the multifaceted fully online cross-national CSCW environments set up in our project iCamp: *Organizational* - constraints for recruiting facilitators and students; *Pedagogical* - defining cultural boundaries, translating self-directed learning concepts into practice, and tracking social networking; *Technical* – interoperability issues and evaluation support tools; *Managerial*: - ideological conflicts about which and how evaluative measures should be taken. Resolutions for some of the challenges are presented.

**Author Keywords**
Cross-cultural, self-directed learning, social networking, interoperability, social software, mixed method evaluation

**ACM Classification Keywords**
H5.3. Group and Organization Interfaces: *Computer-supported collaborative work*

**INTRODUCTION**
The soaring popularity of social software such as blogs, wikis, IP telephony, videonconference, and bookmarking applications, has posed two major challenges to researchers and practitioners: Firstly, which theoretical frameworks can inform the design of virtual learning environments (VLEs) to exploit these emerging technologies? Secondly, which evaluation methodologies should be adopted as well as adapted to validate these VLEs and assess their impacts effectively as well as efficiently? Our project, iCamp (http://www.icamp.eu), aims to tackle these challenges. It is pedagogy- and validation-driven with the overarching goal of identifying improvement suggestions to refine pedagogical models and technological requirements for successful online cross-cultural collaborative learning. Pedagogically we ground in the social-constructivist theories. Technologically we build upon a selected set of prevailing technology-enhanced learning tools by rendering them interoperable. Our VLE exemplifies an intercultural CSCW empowered by extensive uses of social software. Its validation is realised through three trials, which have different foci and scales and involve different Higher Education Institutions (HEIs) in Europe. Table 1 summarizes the main features of the three validation trials. The design of our VLE was purported to be ameliorated according to outcomes of the trials. We have employed mixed method evaluation approaches to deal with the messiness of authentic learning situations, and encountered various challenges, which we discuss in this paper.

**Table 1**: Summary of the features of the three validation trials

| Trial | Sites | No. of Group | Main Collaborative Task | Pedagogical Focus | Tools mostly deployed | Data captured and analysed |
|---|---|---|---|---|---|---|
| Trial-1 Oct.06 \| Jan.07 | 4: Turkey, Poland, Lithuania, Estonia | 8 (4 or 5 students each) | Developing a questionnaire under the key theme 'cross-cultural e-learning' | Cross-cultural collaboration | Blogs, Emails, Google Doc & Spreadsheet, MSN chat, Skype Flashmeeting | Communication diary; Questionnaire; Interview; Text archives (**blogs**, emails, chats, etc) |
| Trial-2 Oct. 07 \| Jan.08 | 4: Czech, Slovenia, Poland, Turkey | 7 (2 to 5 students each) | Individual groups with a specific project topic under the overarching theme "new media" | Self-directed learning | Blogs, Wikis, Emails, Flashmeeting, Skype | Questionnaire, Interview, Automatic tracking (myDentity); Text archives (**blogs**, emails, iLogue, chats, etc.) |
| Trial-3 Mar. 08 \| Jun. 08 | 8: Bulgaria, Croatia, Estonia, Finland, Lithuania, Poland, Spain, | 10 (7 to 8 students each) | Structured weekly course work leading to the design of e-learning course | Self-directed learning (Social networking) | Blogs, Wikis, Google Group Emails, Moodle, Skype, Flashmeeting | Questionnaire, Interview; Text archives (**blogs**, wikis, Google Group, iLogue, emails, etc.) |

## FOUR CHALLNEGES & RESOLUTIONS

Based on our practical experiences of implementing and evaluating the three field trials, we have identified four major categories of challenges in evaluating the fully online CSCW environments. In the ensuing text, we describe individual challenges and associated resolutions, if any.

### Organizational Challenges/ Resolutions

- *Selection of trial sites*: All the three trials were situated in cross-cultural settings. A trial site was essentially a research/teaching unit in an HEI - a faculty member or researcher, who played the role of facilitator, brought in a group of her or his students to join the trial. To study the potential impact of cultural differences on interaction and communication patterns among the trial participants, the trial sites should be as diverse as possible in terms of their socio-cultural backdrops. However, the participation in the trials was contingent on resources and support offered to the research/teaching unit concerned, such as the tangible incentive the faculty member to be rewarded, the administrative body's accreditation of the grade a student earned through participating in the trial, etc. In Trial-1 and Trial-2, the trial sites were only the project consortium partners, because they were obliged to take part as their contractual duties for the project. Besides, these partners could fulfil some basic requirements (i.e. experience in technology-enhanced learning) for participating in the trials.
- *Hunting for facilitators with relevant profiles*: The eligibility of a trial site hinges crucially on whether a facilitator candidate with a relevant profile is available there. Essential attributes of an online facilitator include: being knowledgeable not only about the subject-matter but also the pedagogical concepts underlying the trials, competent in deploying the enabling technologies for online collaborative learning activities, able to monitor and assess students' learning and collaboration, confident in conversing in English which is their second or even third language, being motivated and accessible almost round-the-clock to give timely feedback and support to students. As these (and some more) requirements were apparently very demanding, it was challenging for us to secure appropriate candidates. Consequently, the facilitators involved in the three trials had quite a large variation of abilities, skills and experiences, ranging from being very motivated and active to sluggish and passive, from being experienced online collaborators to totally naïve ones. Furthermore, as a lesson learnt from Trial-2 where external facilitators (those who were not the project consortium members) withdrew when they realised that they were expected to volunteer their own resources, in Trial-3 we paid the external facilitator with monetary rewards. These tangible incentives proved to be quite effective.
- *Recruiting students with relevant profiles*: Students participated in the trials either on a voluntary basis or as a mandatory requirement for their course work. They were recruited by the facilitators in the respective local sites. Students were expected to have some basic knowledge about and interest in the collaborative tasks (cf. Table 1). They were expected to learn how to use different communication tools and select appropriate ones for specific tasks on their own (self-directed learning competency [1]). Besides, being confident of communicating in English and ready to invest a reasonable amount of time in the trial activities were the two other requirements. All in all, the critical quality of student participants was being highly motivated. However, less than 20% of the students over all the three trials could be described as such. Specifically, the language barrier proved to be quite a significant hindering factor. In addition, some students had a full-time job and thus could allocate a limited time for the trial tasks. Unfortunately, these issues could not be remedied (i.e. English proficiency can't be improved in a couple of weeks and the students would not quit their job), leading to withdrawal of the students and demoralisation of the group. Careful student selection is an apparent resolution, but, like in the trial site selection, the pool of students that the facilitators can pick from was small.
- *Assessment schemes*: Typical assessment issues identified in physical, group-based projects are applicable to their online counterparts: How the students can be assessed fairly and effectively? Should the same group grade or different individual grades be granted to members? What should the relative weights be ascribed to the facilitators' and peers' ratings? As a lesson learnt from Trial-1 when the assessment scheme was only finalised towards the end of the course and the students complained about being unfairly treated because they would have allocated their efforts in a way that could best fulfill the evaluation criteria, in the last two trials the assessment scheme was decided and made known to the students *before* the kick-off of the trial. However, the student peer review process did not work out well, because of the time constraint, being inexperienced in reviewing, and the fear of harming social relationships.

### Pedagogical Challenges/ Resolutions

The iCamp project has proposed three pedagogical pillars that are relevant for the development of our VLE, viz. cross-cultural collaboration, self-directed learning (SDL), and social networking [2]. Translating these concepts into practice has resulted in several issues:

- *Alignment of evaluation frameworks with pedagogical models*: There are inherent conflicts between capturing data and maintaining the authenticity of the learning situation. It is well recognised that when an entity is aware of being monitored its behaviour is likely to change. Besides, in such a distributed learning environment where the participants could basically work

anytime anywhere, it was almost impossible to conduct any systematic direct observation. Consequently, it was necessary to rely heavily on the participants' subjective self-reported data. Further, data collected in the messy learning situation were inherently confounding and did not enable us to draw any robust conclusion. A resolution is to triangulate multi-source and multi-perspective data.

- *Culture is a fuzzy concept*: There are a number of definitions of culture in the literature, ranging from the static to dynamic model [4]. Our data revealed that the cultural differences among the sites were subtle. It leads us to query where to draw clear cultural boundaries.
- *Self-directed learning* (SDL): While tools usage proved to be not an issue, given the ease of use of most social software, translating SDL concepts into actual teaching strategies was shown to be somewhat problematic [cf. 1]. Some facilitators were not familiar with the notion of SDL or personal learning contract (PLC). They struggled to strive for the balance between being an "authoritarian" and a "non-interventionist" – the two extremes. There are no explicit criteria to determine when a student has matured into a self-directed learner and the facilitator can then fade out completely. Besides, the value of PLC could not be appreciated by the students who tended to develop theirs almost at the last minute of the trial. Besides, SDL strategies were perceived as excessive demands by some students, who were so accustomed to traditional teacher-led education models. Intensive face-to-face training on such key pedagogical concepts *prior to* the trial is deemed indispensable.
- *Balanced pedagogical scenarios*: Addressing tradeoffs between different pedagogical scenarios is hard. The loose structure of Trial-2, which allowed much leeway for the facilitators and students to accomplish their projects, has resulted in a non-trivial period of confusion and idle waiting time because a clear bootstrap to launch the related work was lacking. In contrast, the over-structured Trial-3, where the quite demanding tasks were specified on a weekly basis, proved to be overwhelming for the students as well as the facilitators. No ingenious resolution can yet be identified.
- *Social networking*: One of the pedagogical focuses of Trial-3 was social networking in the sense that the students would look for advice and ideas from people beyond the network established in the trial. However, the data showed that the students failed to demonstrate this competence. Presumably the extension of one's personal network is a long-term effect which can't even be measured within the three-year project's lifetime (let alone a three-month trial), but in a student's learning trajectory in the future.

**Technical Challenges/Resolutions**

One of the goals of the iCamp project is to achieve *interoperability* between different tools from both pedagogical and technical point of view [5]. Attempts to attain this goal have led to several technical challenges:

- *Interoperability support*: In each trial the participants were recommended to deploy a selection of social software applications that support collaborative learning activities (blogs, wikis, calendar, IP telephony, videonconference, bookmarking, etc). They were strongly encouraged to use them, but it was not compulsory. Achieving full interoperability between these recommended tools proved to be very challenging, and iCamp could only attain this ambition to a limited extent. The interoperability feature achieved was Objectspot, which implements a federated search over a dynamic number of digital libraries and learning object repositories. However, there were no real needs for students to use this tool.
- *Personal learning contract (PLC) support:* The PLC plays an important role in supporting SDL [3]. In iCamp, two tools, iLogue and Weblog, were introduced. iLogue is an in-house product specially designed for supporting the development of PLC. It enables easy editing, versioning and feeding and supports all the basic elements of a PLC, whereas the students have to manage manually their PLC if they use Weblog, which was recommended for the individual and group reflective activities. Besides, we expected that iLogue would help us understand how the students develop their PLC, which in turn could improve their SDL skills. In reality, the students showed stronger preference for Weblog, primarily because of their familiarity with this tool.
- *Social network support*: To support students in managing social networking, myDentity was developed. This tool requires only a valid email address for registration. The goal of myDentity is to visualise individuals' email interaction networks. Consequently, it can provide very useful social awareness information for the students during their online collaborative learning activities. Such information can be very useful for evaluators to derive the interaction patterns. However, myDentity was an unsuccessful attempt. A few students registered for a myDentity account, and even fewer students logged into their accounts to view their interaction sociograms [6].
- *Tools usage evaluation support*: To evaluate the tools usage is a big challenge. Survey is one of the most popular instruments for data collection. It was used, though differently, in all the three trials. We also carried out interviews to collect data about the tools usage.
    - Trial-1: In this trial, we introduced a tool called communication diary. Such diary allows students to keep track of the communications with their facilitators as well as peers. However, only the frequency and purposes of the tools usage could be captured by the diary. In addition, only a few students fully used the diary for the whole Trial period. We could not capture real usability problems.

- Trial-2: In place of the communication diary, the students were required to report their perception and usage of all the tools provided with two different periodic tool usage reflection surveys. They were also asked about their purposes and activities when using the tools.
- Trial-3: Like the previous two trials, blogs served as the main tool. The students were required to write their weekly reflections, including tools usage, on their blogs. One periodic tool usage reflection survey was distributed in the middle of the Trial.

In all the three trials it was very difficult for us to capture certain data. Consequently, we could only construct parts of the whole picture. For some of the technical challenges mentioned above, we have come up with some resolutions:

- A big question is what kinds of CSCW environments would be more appropriate for a fully online cross-national collaborative learning course? Should the environment be an integrated, "all-included" or should it be just a collection of CSCW tools? An integrated environment should be easier to be evaluated. However, because of the students' cultural, technical and organisational differences, we believe that it is very hard to provide a unique environment that meets all requirements from all the learning sites. If the "collection of tools" approach is chosen, it is extremely difficult to achieve interoperability among those tools because of the tool diversity, especially when the time allowed is restricted. On the other hand, the students might feel overwhelming when being introduced to separate tools with different interfaces and functionalities, and they might not use the tools at all. To help students overcome such a difficulty, a carefully designed introduction and training for each local site is a relevant resolution. The tools selection should be based on the predefined and convincing learning scenarios.
- There is no perfect way to capture 'all'[1] the data for the evaluation because of the diversity of the tools recommended and because students can also bring in their preferred applications. Although the students were asked to report their tools usage in their weekly reflection reports, only a few did that. To meet the need for capturing different forms of collaborative learning activities and interactions in such a complex cross-national CSCW environment, the evaluators should try to capture data from different sources and perspectives, e.g., the tools log files (objective), interviews (subjective), facilitators, students and researchers.
- Many factors might lead to the failure of the new interactive tools. How to evaluate those factors to improve the tools usage is very challenging.

[1] What is 'all' can be very ambiguous. Evaluation is a highly dynamic endeavour; ideas on what particular data are required to answer certain research question may only emerge during the process of data analysis.

(i) User-centred design (UCD) approach should be adopted when developing a new tool, by systematically identifying user requirements and usage scenarios.

(ii) The role of familiarity in the student's tool selection is very important. For example, the new, non-intuitive user interfaces of the communication diary, iLogue and myDentity discouraged the students from using them. A usable interface design and systematic training at the local sites might help.

(iii) The learning scenarios, the task complexity and the trial duration should also be taken into account. For example, most of the students developed only one version of PLC because of the relatively simple project tasks they needed to deal with and the short duration of the trials, the changes tracking function enabled by iLogue could thus be useless. Similarly, the students did not need to use a complicated search system like Objectspot to look for their learning materials.

### Managerial Challenges/Resolutions

The issue of ideological conflicts is not uncommon in a multinational consortium with partners having different academic backgrounds, research experience, and personal values. In our case, there were divergent opinions on what evaluative measures could be taken with which instruments and how. Outcomes of the trials were then compromised if no agreement satisfying all the partners could be reached.

## CONCLUDING REMARKS

The four categories of challenges are interdependent and intertwined. Resolving one challenge may have some impacts on the others. Researchers and practitioners in the CSCW community may find the aforementioned challenges familiar, though the exact contexts may differ substantially. Nonetheless, resolutions for some of the challenges can be generalised across contexts. With the presentation of our experienced challenges, we hope to invite discussions on identifying best practices to successfully deal with them.

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