

# iCamp

innovative, inclusive, interactive & intercultural  
learning campus

## iCamp Evaluation Framework

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### List of Acronyms

<b>Acronym</b>	<b>Description</b>
CCC	Cross-Cultural Collaboration
CPQ	Cultural Perspective Questionnaire
CSCCL	Computer-Supported Collaborative Learning
ESDA	Exploratory Sequential Data Analysis
SDL	Self-Directed Learning
SNA	Social Network Analysis
SNW	Social Networking
TAM	Technology Acceptance Model
TAWC	Text Analysis and Work Count

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## ***Executive summary***

The iCamp project is validation-driven with the overarching goal of identifying improvement suggestions to refine the conceptual models as well as technological requirements for successful online cross-cultural collaborative learning. Several objectives are to be fulfilled through three validation trials, which have different foci and scales and involve different Higher Education Institutions in Europe. The research methodology to be followed in iCamp is closely related to the design-based research, which, with the deployment of mixed methods, aims to meet dual goals of refining locally educational practice or intervention and developing more globally usable knowledge for the field. Whereas the first validation trials (Oct-Dec 2006) will mainly be exploratory, the second and third validation trials are formative (or diagnostic) and summative, respectively. iCamp will deal with the challenges not only in design and development but also in evaluation and validation. A generic evaluation framework by adapting the ValNET matrix has been developed; two overarching evaluation objects, namely Products/Resources (e.g. technological platforms, communication tools and educational material) and Results (e.g. outcomes and impacts), will be analyzed along five dimensions - technological, pedagogical, cultural, institutional and economic. Presumably, this generic framework is applicable for the three iCamp validation trials. In addition, we define a specific evaluation framework for computer-supported collaborative learning (CSCL). Evaluation of CSCL is known to be a highly complex and resource-demanding endeavour. Specifically, we will adopt mixed method evaluations by blending qualitative and quantitative approaches and by integrating social network analysis (SNA). Such triangulation of approaches is deemed indispensable for enhancing the validity and reliability of results to be inferred and for deepening the evaluators' understanding about the issues of interest. In summary, the iCamp evaluation framework places emphasis on relational and attributional data. The former addresses the evolution of social networks and their associated factors, whereas the latter addresses the development of individual competencies/attributes and their associated factors. Apart from these two types of data, indexical data in terms of quantifiable variables and ideational data in terms of evocative and volitional constructs will be studied as well, albeit to a lesser extent.

In accord with the three areas of challenges identified by WP1, namely cross-cultural collaboration (CCC), self-directed learning (SDL) and social networking (SNW), we propose corresponding analytic and empirical evaluation frameworks. For CCC, we focus on evaluating the three aspects of the collaborative process: conversational grounding, quality of interaction and task performance. For SDL, we look into how learners make use of learning contract and assess or self-assess their SDL competencies. For SNW, we analyze three types of social network development - direct, indirect and use of resources. A plethora of data capturing and data analysis methods as well as tools are required, including observations (self- and other-oriented), questionnaire (close and open-end questions), interviews (remote computer-mediated and face-to-face), discussion forums (synchronous and asynchronous), diary writing (e.g. blogs, e-Portfolio), etc. Concomitantly, a large amount of qualitative and quantitative data will be collected. Processing of the data will be supported with the use of open source (e.g. TAWC for text analysis, Pajek for SNA) as well as proprietary software (e.g. SPSS, ATLAS.ti). Sophisticated data analysis techniques such as exploratory sequential data analysis (ESDA) for continuous observational data and interaction analysis for video data will be employed. Besides, a variety of rating scales and inventories such as Self-Assessment for Self-Directed Learning Competencies (SDLC), Cultural Perspective

Questionnaire (CPQ), and Technology Acceptance Model (TAM) will be adapted for the particularities of the iCamp context. Similarly, existing coding schemes for content analysis will be modified to fit the purpose of the validation trials. Apparently, integrating multi-perspective and poly-contextual data and inferring implications from empirical findings to the future development of CSCL in the Enlarged Europe will pose real challenges for the iCamp validation team.

## 1. Rationales for Validation Trials

The iCamp project is *validation driven*, aiming to satisfy the overarching goal of the European Commission's specific programme in the application area of e-Learning. The experiences to be gained during the intensive validation phases will be documented in the form of best practice guidelines as an integral part of the iCamp Trials Evaluation Reports (D4.2, D4.3 and D4.4). The three trials will have different objectives, foci and scales, addressing the iCamp's pedagogical, technical and social challenges to the largest possible extent. Specifically, the Trials Reports will document evaluation frameworks as well as empirical data on cross-cultural computer-supported collaborative learning (CSCL), thereby filling the gap in e-Learning research because the number of studies on this particular topic is still limited.

Furthermore, iCamp addresses the main challenge of the Bologna process, which is harmonising European higher education and establishing the EHEA (European Higher Education Area). iCamp contributes to this challenge by establishing a sustainable learning community network in the Enlarged Europe and by fostering cross-border cooperation among the educational community. Engaging partners from the EHEA in the iCamp validation trials is the initial step for such extensible collaborations. Besides, the best practice guidelines to be derived from the trials can serve as an additional means for the sustainable implementation of the concepts and frameworks being developed during the course of the project, and, consequently, enable other researchers and practitioners to reuse as well as augment these resources.

In particular, during the validation phase of iCamp the question of how an e-Learning community evolves as a social network over time will be addressed by analysing certain influence factors, for instance, competencies of students (e.g. self-directed learning), the size of the network (e.g. number of 'nodes'), the shape of the network (e.g. any communication hub emerges), interaction patterns, etc. Social software like Weblog authoring tools offer new ways and mechanisms for the establishment and maintenance of a variety of social links that would otherwise not be possible. Dynamically coupled networks and social links become increasingly important for identity formation, the creation of reputation and trust, and the dissemination of information in a networked society. iCamp will model some of these emerging mechanisms and processes with reference to practical experiences and empirical data being captured in the trials.

### 1.1. Objectives

WP4 – Validation Trials – has a set of objectives to attain. Note, however, that the extent to which these objectives to be fulfilled will apparently be larger in the second and third trials than that in the first trials, because experientially, technically and administratively the project partners will be more mature for the later trials.

- To validate and demonstrate the effectiveness of translating conceptual pedagogical models of social constructivist learning into real-life educational practices

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- To validate and demonstrate the usefulness and usability of deploying the iCamp Space under real operational conditions of different Higher Education Institutions in the enlarged Europe
  - To validate and demonstrate the feasibility of internetworking the components of the iCamp Space
  - To acquire practical experience of enabling intercultural computer-supported collaborative learning (CSCL) with users widely distributing in different Higher Education Institutions in the enlarged Europe and to develop best practices guidelines thereof
  - To validate and demonstrate the scalability of the iCamp Space as being deployed by user groups of different types (i.e. different combinations of educators and students with varying expertise and experience), sizes and geographical locations
  - To yield empirical evidence of multifarious impacts of building and involving in the intercultural virtual knowledge community on educators and students of Higher Education Institutions participating in the trials, especially with respect to the three core components of an educational experience: cognitive presence, social presence and teaching presence<sup>1</sup>
  - To gain deeper understanding about the evolution of virtual knowledge communities based on the social network analysis approach and to identify critical success factors for sustaining these communities
  - To validate and demonstrate the effectiveness of different evaluation methods employed for assessing the utility and usability of the iCamp Space (i.e. meta-evaluation)

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<sup>1</sup> The three-element model is proposed by Garrison et al. (2000) to analyze educational experience with teachers and students being engaged in intellectual discourses (i.e. a community of inquiry) with the support of a communication medium (e.g. videoconferencing). Cognitive presence denotes the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication. Teaching presence includes designing and managing learning sequences, providing subject matter expertise, and facilitating active learning. Social presence is defined as the ability of learners to project themselves socially and emotionally in a community of inquiry.

## 2. Reference Frameworks for the iCamp Design Approach

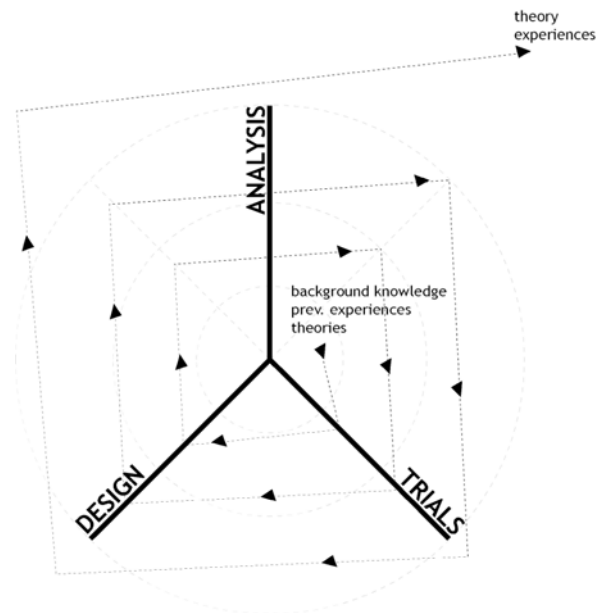
In the context of iCamp, the intervention is *not* the traditional, formal approach of experimental psychology where neat manipulation of variables is required. Instead, the intervention is the access to networked communications and interactions as well as the concomitant support enabling the effective use of such an access. The approach we adopt is analogous to **action research** (Avison et al., 1999), which is a relatively informal, qualitative, interpretive, reflective and empirical methodology that requires all the students to be kind of collaborative researchers. This approach associates research and practice, so research informs practice and practice informs research synergistically.

In the same vein, iCamp espouses the **design-based research** (DbR) approach that attempts to bridge educational theory, design and practice (the Design-based Research [DbR] Collective, 2003). DbR is essentially grounded in the situated learning paradigm (e.g. Brown, Collins & Duguid, 1989; Lave & Wenger, 1991) emerged in early 1990s. The paradigm advocates the extremely significant role of context in learning and thus promotes authentic learning settings. In addition, DbR is also akin to Donald Stokes' (1997) use-inspired basic research paradigm, highlighting the importance of addressing both the goal of use (i.e. practical implications) and the goal of understanding (i.e. theoretical implication). Compared to other lines of research that have been practiced in the field of education, the deliberate blending of theory-driven design of learning environments and interventions with empirical research renders the DbR promising.

Some of the basic characteristics of this approach are reflected in the iCamp research design: the cyclic interaction of design, enactment, analysis and redesign, the collaborative partnership between researchers and practitioners as well as the authentic settings for user trials (DbR collective, 2003). A simplified image of the design-process for the iCamp pedagogical model is depicted in Fig.1. The conceptual work has been guided by an analysis of previous experiences and theories with a focus on constructivist approaches. User stories that were collected by various partners helped to shape the common understanding of a joint vision. A tools and service survey has been conducted in order to give some insights into the currently available infrastructure in Europe's higher education institutions. In the preparatory work we also identified some promising tools, especially amongst social software applications, that may be implemented and refined for the iCamp personal learning environments.

Like formative evaluation, the DbR uses mixed methods (Section 3) to analyze outcomes of an intervention (i.e. provision of the CSCL environment of iCamp, integrating different roles, methods and tools) and to refine the intervention. In particular, the DbR typically triangulates multiple sources and data to link intended and unintended outcomes to processes of enactment. Each of the three iCamp validations trials, as a kind of sustained intervention being embedded in a three-month regular curriculum in a higher education institution, are messy settings prone to complications. A complex intervention as such can involve tens of designers, theorists, evaluators, facilitators and students who aim to experience or improve the innovative practice. In these situations, it is extremely difficult, if not impossible, to decipher or disambiguate causality; influencing factors are so intertwined that it is impractical to isolate or study them; emergent problems entail alternative strategies and ad hoc actions. To enhance the reliability and validity of findings, we follow the

recommendations of the DbR: triangulation from multiple data sources, repetition of analyses across cycles of enactment, and adoption/adaptation/creation of standardized measures/instruments.



**Figure 1: iCamp's cyclic and spiral design process**

### **3. Evaluation Methodologies**

#### **3.1. Generic Evaluation Framework: ValNET**

ValNET<sup>2</sup> is used as a generic reference model to check the range of evaluation areas to be covered. Accordingly, there are five dimensions of innovation (MENON network, p. 24):

- Technological innovation (e.g. using new software)
- Institutional (e.g. forming new forms of association between the public and the private sector)
- Pedagogical (e.g. providing self-directed learning outside the conventional teaching environment)
- Economic (e.g. adopting a more cost-effective solution)
- Cultural/linguistic (e.g. developing a multicultural software to be tested in different countries)

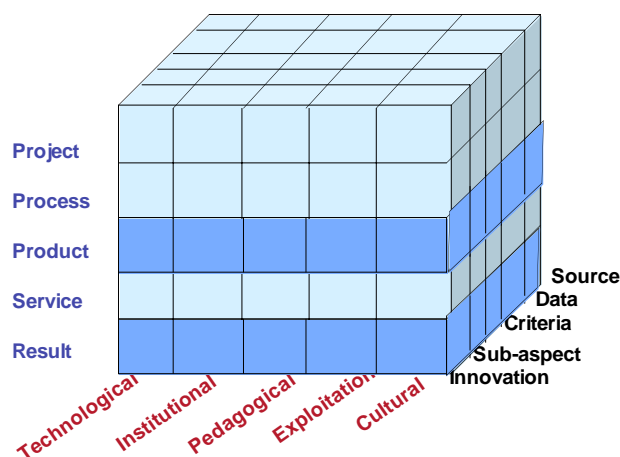
An overarching evaluation object, be it Projects, Working processes, Products/Resources, Services or Results, is reviewed with respect to these five dimensions. The main innovative aspects of an overarching evaluation object are first identified, then the data to be collected, the evaluation criteria and the possible sources of validation, be it human or inanimate material, need to be defined in broad as well as fine categories. The three axes - evaluation objects, innovative aspects, and analysis schemes - of the ValNET matrix (Figure 2) indicate the high complexity of this framework.

Apparently, it is beyond the scope of iCamp to address all the 'cells' of the validation cube (Figure 2). Hence, we highlight certain aspects of the comprehensive ValNET framework that are considered as most relevant to iCamp and address them systematically. However, it does not exclude the possibility that the other aspects of ValNET will be incorporated in the iCamp evaluation framework during the course of the project's lifetime. iCamp adopts a flexible and open-minded strategy to adapt and refine our evaluation framework contingent on emerging opportunities and needs. Specifically, we place more emphasis on two overarching evaluation objects, namely Resources/Products and Results. The former articulates the objects in new technological platforms, LMS methodological tools, online educational material, whereas the latter articulates the objects in outcome and impact (Details see ValNET D2.1, pp. 39-43, 46-53). A range of evaluation instruments are to be used for data collection:

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<sup>2</sup> ValNET is a validation framework that has been developed by the MENON network under the auspices of the EC 4<sup>th</sup> Framework Programme. Recently, VALNET has become an EUN (European Schoolnet) project where the participants from various countries have been trying out this validation framework.

- *Questionnaires* – open- and close-end questions being administered to all or a sample of actors involved; they will be in conventional printed and web-based forms;
- *Structured interviews of key actors* – Interviewees will be students, facilitators, site coordinators, system developers, and theorists. Major questions are to be addressed
- *Case studies* – site visits to collect documents, to observe related activities and to interview personnel. Consequently, a holistic picture based on these data can be drawn to give a contextual account of the workflow of working in the iCamp Space;
- *Focus groups/Workshops* – open or closed face-to-face forums for key actors to address issues of interest;
- *Computer log files and blog messages* – tracking the communication traffic among the actors and archiving messages being exchanged among them.



**Figure 2: Adapted from the ValNET matrix**  
(NB: the deep blue areas are foci of the iCamp evaluation framework)

An evaluation framework by adapting ValNET has been developed for the iCamp validation trials (Appendix A). Five major aspects are addressed, namely Pedagogical, Social/Cultural, Technical, Organizational/Institutional and Business/Exploitation. While this framework is viable on a generic level, focusing on *data identification* (i.e. which data to be acquired), *data source* (i.e. who provides the data) and *data collection* (i.e. how the data to be captured), we extend the evaluation framework further into *data analysis*. Furthermore, we put emphasis on the three areas of challenges identified at the pedagogical level (cf. D1.1; see Section 4 below).

### 3.2. Specific Evaluation Framework for CSCL

Evaluation of CSCL is a highly complex and resource-demanding endeavour (cf. Fjuk & Ludvigsen, 2001) as it involves extricate interactions among people, technologies, tasks, pedagogical approaches, and organizational as well as cultural constraints. Consequently, **mixed method evaluations** (Greene et al., 1989; Frechtling & Sharp, 1997) by blending qualitative approaches (e.g. interviews, think-aloud, focus group, discussion forum) with quantitative approaches (e.g. subjective rating scales, performance measures, psycho-physiological measures) are deemed desirable. This so-called **triangulation** can not only strengthen the validity of findings but also enhance evaluators' understanding of the phenomena of interest. Presumably, multi-perspective data obtained from different stakeholders – users (learners, instructors), groupware developers, e-Learning theorists – can substantiate empirical findings and stimulate deeper insights. For the formative evaluation of the participatory aspects of CSCL, an approach of integrating **social network analysis** (SNA) (Scott, 1991; Wasserman & Faust, 1994) in a mixed method evaluation has been proposed (Martinez et al. 2003). This approach is consistent with the constructivist perspective that emphasizes the coupling between the social and the individual aspects of human activity. Such a combination of qualitative, quantitative and SNA methods call forth data from different sources, meeting the need for capturing diverse forms of interaction arising in computer-network supported learning environments. Specifically, an array of research methods and sources of evidence are employed to garner different types of data (Figure 3).

In summary, iCamp evaluation framework is an analytic framework emphasizing on relational and attributional data. The former addresses the evolution of social networks (i.e. the linkages between group members; the social structure of groups) and their associated factors, whereas the latter addresses the development of individual competencies/attributes and their associated factors. In addition, indexical data in terms of quality ratings of artefacts as well as of domain-specific knowledge gain and ideational data in terms of meanings and motives of actions in group activities will be studied, albeit to a relatively lesser extent.

Research Method	Source of Evidence	Data Type	Type of Analysis	Data Collection
Behavioural	Instruments	Indexical	← Variable Analysis	Manual Aided Automatic
Survey	Questionnaires, Interviews	Relational	← Network Analysis	
Documentary	Texts	Attributional	← Interaction Analysis	
Ethnographic	Observations	Ideational	← Typological Analysis	

Figure 3: Multi-method research and multi-perspective data

### 3.3. Multi-Dimensional Data Matrices

For the iCamp validation trials, the data structure is complicated as different dimensions are involved (Figure 4), including actor, time, culture and unit of analysis.

- Actor: students / facilitators
- Culture: cross-cultural / same-culture
- Unit of analysis: individual / group / organization
- Media use: synchronous / asynchronous / mono-modal / multi-modal
- Time: short-term / long-term

Presumably, interaction patterns and communication styles can differ substantially across the three types of actor combinations: student-student, student-facilitator, and facilitator-facilitator. Culture difference is known to be a significant factor to account for the interactional and communicative variations in face-to-face as well as online communities. Online social networks are more complex than face-to-face ones due to the very fact that different media can elicit different behaviour in their users. We aim to systematically document different sources of evidence (Figure 4) to understand the interplay of these aspects. Furthermore, the whole duration of the validation trials lasts three to four months; such a period of time normally does not allow any appreciable change of attitude or value. Consequently, we aim to track how the relations to be established in the validation trials will be developed beyond the trial period to estimate impact of the intervention.

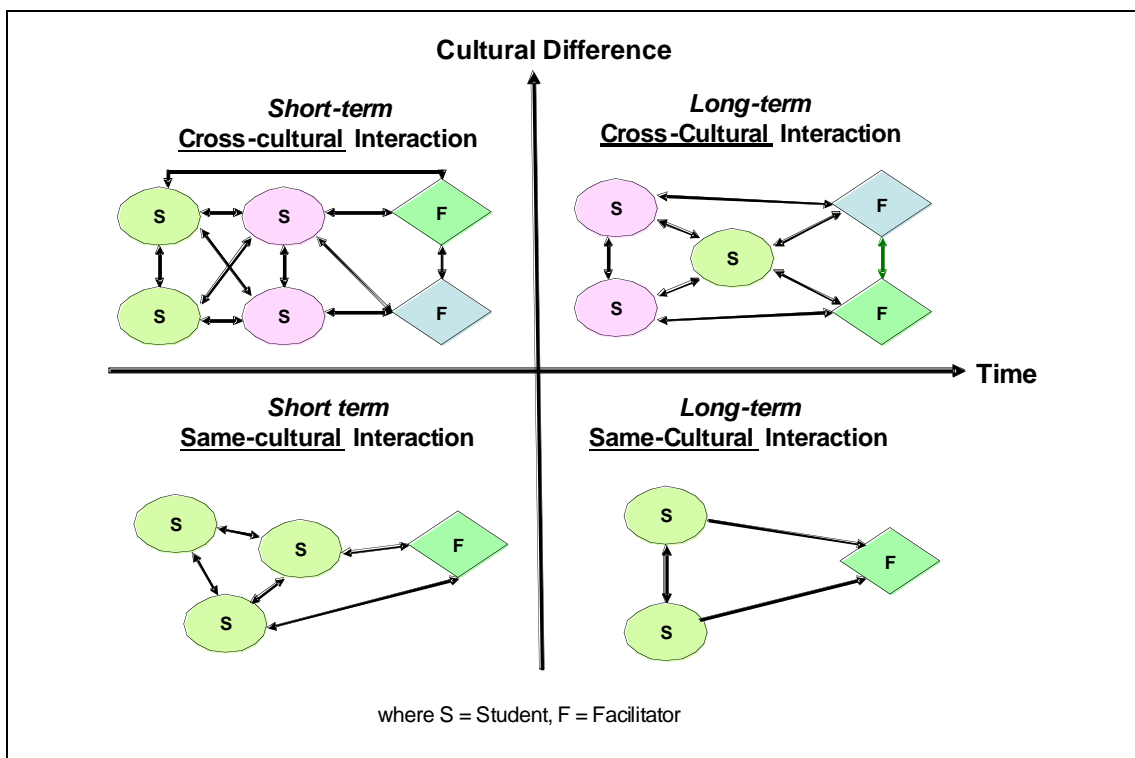


Figure 4: Multi-dimensional data of iCamp validation trials

## **4. Evaluation of the Three Areas of Challenges**

In the deliverable **D1.1** “iCamp Pedagogical Approach and Theoretical Background”, three areas of challenges are identified, namely self-directed and self-organised learning, social networking, and collaboration in a mediated and networked environment across national borders. Each of the areas commands different sets of competencies, which entail different evaluation methods and measures.

### **4.1. Cross-cultural Collaboration (CCC)**

A model for evaluating cross-cultural collaboration has been developed by Convertino and his colleagues (2006). It is analogous to the basic concept of the information processing theory: Input-Process-Output (IPO) model

- Team input consists of cultural composition and collaboration medium
- Team process consists of common grounds, cognitive consensus, and awareness
- Team output consists of cognitive consensus achieved, perceived satisfaction, and observed/perceived performance

Specifically, the collaborative process comprises three aspects, namely conversational grounding, quality of interaction and task performance (cf. Setlock, Fussell & Neuwirth, 2004). For each of these aspects, we elaborate the rationales, metrics as well as data analysis methods that fit the context of the iCamp validation trials (Table 1).

**Table 1: An evaluation scheme for three aspects of the cross-cultural collaborative process**

Aspects	Rationale and Metrics	Data Analysis
<b>Conversational grounding</b>	The term grounding refers to the interactive process by which communicators exchange evidence in order to reach mutual understanding. Grounding processes are influenced by the medium of communication (Clark & Brennan, 1991)	<p><b>Discourse analysis</b> (e.g. clarification request, long pause, inappropriate feedback)</p> <p><b>Video analysis</b> (e.g. raised eyebrows, quizzical look, halting action)</p>
<p><b>Quality of Interaction</b></p> <ul style="list-style-type: none"> <li>• cognitive consensus</li> <li>• perceived satisfaction</li> <li>• awareness</li> </ul>	<p>It comprises <b>three factors</b>:</p> <p><b>Social</b> How well individual group members are collaborating in terms of mutual respect, responsiveness, politeness, friendliness, etc;</p> <p><b>Cognitive</b> How well the group performs the task in terms of mutual stimulation, ease of drawing consensus; effective use of time; etc;</p> <p><b>Affective</b> How satisfied or frustrated the group members feel during the task; whether the affect is mainly engendered by the task, the working environment or the behaviour of fellow group members.</p>	<p><b>Text/Content analysis</b> of blogs, emails and other verbal data (e.g. keyword identification in the utterances of group members)</p> <p><b>Interaction analysis</b> of video recordings (Jordan &amp; Henderson, 1995) and Exploratory sequential data analysis ESDA (Sanderson &amp; Fisher, 1994)</p> <p><b>Questionnaire</b> for measuring cross-cultural interaction (Appendix B)</p> <p><b>Cultural</b> Perspective Questionnaire<sup>3</sup> (multilingual)</p>
<p><b>Task Performance</b> perceived and observed</p>	<p>The extent to which the jointly created artefact meets the quality criteria such as scope coverage, coherence, accuracy, preciseness, clarity/comprehensibility</p>	<p><b>Review</b> of the artefact by experts and peers based on the criteria</p> <p><b>Questionnaire</b> self-assessment</p>

## 4.2. Self-Directed Learning (SDL)

<sup>3</sup> <http://www01.imd.ch/research/cpq/index.cfm>

SDL is deemed indispensable for successful learning experiences, given that conceptual understanding and skill acquisition become much deeper and more permanently than otherwise. SDL denotes that the learner initiates the learning, makes the decisions about what kinds of learning experiences are expected to occur, how and when. The learner selects his own learning goals and carries out the chosen methods at a preferred pace, and validates on an ongoing basis whether the learning goals are met and refines the goals according to the evaluation outcome (further elaboration see D1.1).

Learning contract is a sophisticated approach to the realization of SDL, which consists of four major elements: learning objectives, learning resources and strategies, evidence of accomplishment, and criteria as well as means of validation. With a learning contract a learner can plan and personalize any learning experience. It can take on many shapes and forms ranging from audio tapes, outlines, descriptive statements, elaborate explanations of process and product, to electronically submitted forms. There exist a number of rating scales to enable learners to self-assess their SDL competencies, for example, Self Rating for *Self Directed Learning Competencies* (Appendix C), which is derived from Malcolm Knowles' (1975) original conception of SDL.

By making a learning contract, metacognition is enforced (Coffield F. et al., 2004). It is also supported by other researchers to follow metacognition principle with pre, during and post session evaluation. Knowledge of learning styles can be used to increase the self-awareness of students and facilitators about their strengths and weaknesses as learners. In other words, all the advantages claimed for metacognition (i.e. being aware of one's own thought and learning processes) can be gained by encouraging all learners to become knowledgeable about their own learning and that of others. According to Sadler-Smith (2001), the potential of such awareness lies in "enabling individuals to see and to question their long-held habitual behaviours" (p.300); individuals can be taught to monitor their selection and use of various learning styles and strategies.

Moreover, as Apter (2001) suggests, an understanding of the various elements which produce different states of motivation in different contexts can "allow people to come more in control" (p.306) of their motivation and hence of their learning. Learners can become more effective as learners if they are made aware of the important qualities which they and other learners possess. Such knowledge is likely to improve their self-confidence, to give them more control over their learning, and to prevent them from attributing learning difficulties to their own inadequacies. The upshot could be that students and teachers choose the strategy most appropriate for the task from a toolbox of strategies.

In one of the iCamp validation trials, students will be asked to develop learning contracts with respect to the goals being defined for the trials, thereby enabling students' SDL competencies to be tracked. Empirical data thus derived may shed some light on the question of how to support the development of SDL competencies. It is also intriguing to study how teachers perceive their role change from being an instructor to a facilitator. Structured interviews in the form of focus group are a practical means to examine this issue.

### **4.3. Social Networking (SNW)**

Social Network Analysis (SNA) is well suited for the study of participatory aspects of learning under a situated perspective, as it places social relationships at the centre of the study, while providing both individual as well as group-level perspectives. SNA methods need to be complemented in order to facilitate the study of the actual content of the practice in question. SNA, in its original and extended formulation (cf. de Nooy, Mrvar & Batagelj, 2005), is not particularly intuitive, given its heavy reliance on mathematical models. Hence, a reduced set of SNA indicators for the study of participatory aspects of learning will be used. While aiming to simplify the analyses, the indicators so selected should provide important information about the actors' individual activity and about the general structure of the network, according to different relationships. Furthermore, we adopt the concepts developed by Martinez and her colleagues (2003) to study social interactions in computer-supported collaborative scenarios with three generic types of social networks, namely:

- direct relationship networks, built from relationships between two actors (e.g. email-mediated or blog-mediated interaction);
- indirect relationship networks, built from relationships established through a shared object, (e.g. the creation and later reading of a document);
- use of resources networks, built from relationships between users and objects of the environment, be they sources of data or tools

As mentioned earlier, SNA is part of a bigger analytic framework of studying online communities. According to Hersberger, Rioux and Cruitt (2005), the development of online social networks for information sharing are conceptualized as a four-tier inverted triangle (Figure 5). In lieu of "information acquiring and sharing" in Hersberger et al's original framework, iCamp aims to address broader and more ambitious objectives - competencies acquisition and knowledge sharing. We interpret that the inversion denotes the expanding scope of resources for and of impacts of the activities in the corresponding tiers. The foundational first tier consists of four basic building blocks, which are common for face-to-face and virtual communities. The implication of this framework for the iCamp validation trials will be elaborated in the ensuing sections.

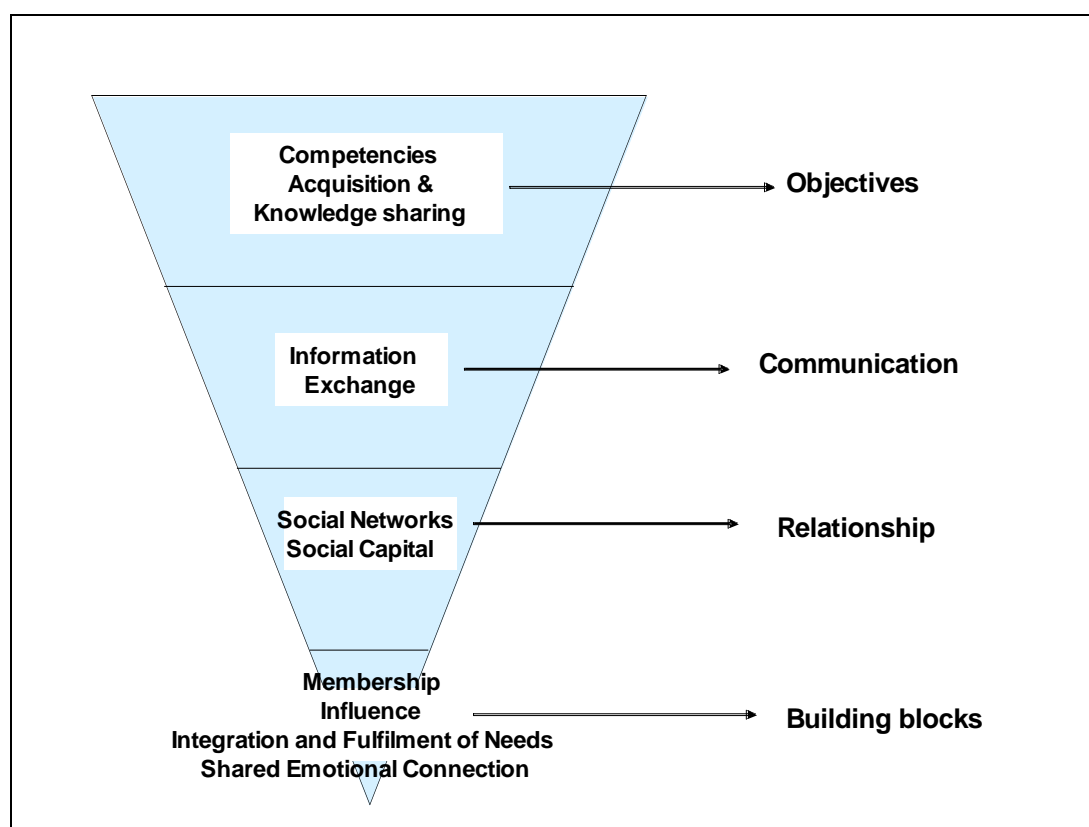


Figure 5: Analytic framework for online learning communities (adapted from Hersberget et al., 2005)

#### 4.4. Key Competencies

Three major categories of key competencies have been identified by the DeSeCo (Definition and Selection of Competencies) Project (<http://www.oecd.org/edu/statistics/desecco>; Rychen & Salganik, 2003) and reiterated in D1.1, including:

- **Category 1: Use tools interactively, including language and technology**

In the context of the iCamp Space, a range of ICT tools will be at the participants' (including facilitators and students) disposal, including blogs, digital libraries, LCMS, videoconferences, instant message applications, etc. We are interested not only in whether the participants can use such tools interactively, but also, more important, in how they use them **creatively** to achieve their specific learning goals. In other words, evaluation will focus on how participants can do with tools rather than on what participants can do with them. Concerning the language use, English will be the primary medium for cross-cultural collaborations. As most student participants are not native English speakers, the opportunities to work with fellow students in English will have some positive impact on their language skills. Towards the end of the trials, the student participants will be asked to self-assess their confidence and ease of speaking and writing in English. In addition, systematic content

analysis of student participants' verbal communication archives can reveal the impact.

- **Category 2: Interact in heterogeneous groups**

The heterogeneity of a cross-cultural collaborative learning group provides valuable opportunities for student participants to develop and advance their competencies subsumed under this category. Cross-cultural collaborations entail skills in communicating ideas to others, listening to ideas of others, turn taking, negotiating divergence, interpreting emotions, managing conflict, and making decision. More important is the awareness of and sensitivity to cultural differences. Different sources of data will be collected and analyzed to understand the development of these competencies (Section 5.1)

- **Category 3: Act autonomously**

The notion of self-directed learning (SDL, Section 5.2) well exemplifies this category of competencies. The key competencies for SDL are being able to understanding the differences between teacher-directed and self-directed learning, to work collaboratively with others (people and resources), and to select strategies skillfully and with initiative (Knowles, 1975). Learning contract is proved effective in fostering SDL and will be implemented in iCamp validation trials to understand how it functions in online collaborative communities (cf. Section 4.2)

Noteworthy is that these three categories of competencies, each with a specific focus, are interrelated. The competence to think and act reflectively is deemed fundamental. Nonetheless, meta-cognitive skills like reflection are not developed overnight, but rather are integral of a long-term or even lifelong personal development. Given the relatively short duration of the iCamp validation trials, what we can garner will probably be limited. However, the data may allow us to identify some patterns of interaction or trends of development, albeit preliminary or immature.

## **4.5. Data Analysis Tools**

A variety of software applications are identified that can be deployed for capturing and analyzing data for the validation trials. Here below we roughly classify them into three types and enumerate some examples for each type.

### **Social Network Analysis**

- UCINET (<http://www.analytictech.com/ucinet.htm>)
- Pajek (<http://vlado.fmf.uni-lj.si/pub/networks/pajek/>) -
- VISONE (<http://visone.info/>)

Several iCamp partners are experienced in deploying these software applications, which are proved useful to depict the development of social networks in different aspects (Section 4.3).

### **Qualitative Data Analysis**

Content analysis is a technique commonly used to analyze transcripts of discussion forums, be they computer-mediated or unaided. A range of content analysis instruments have been developed, reflecting a diversity of theoretical approaches (e.g. social constructivism, social network theory, community of inquiry) and differing in the choice of unit of analysis (e.g. thematic unit, message, sentence) as well as in the method to evaluate validity and reliability (e.g. Cohen kappa, Holsti coefficient) (details see De Wever et al.,2005). Values of these parameters vary with goals of individual projects. Furthermore, standardized or customized text analysis schemes can be applied manually to code the verbal data (see a typical example in Appendix D). Here below are some automatic tools for text analysis, which will likely be deployed for analyzing empirical data of the iCamp validation trials:

- TAWC (Text Analysis and Word Count) (<http://www.andrew.cmu.edu/user/adk/tawc.html>) It is an open source software. TAWC enables easy processing of digital text such as transcripts or online log files, and allows researchers to define *word categories* which contain lists of *words* or *word patterns*.
- Text analysis for competencies - a tool is being developed by the iCamp partner - the Vienna University of Economics and Business Administration (VUE). The basic idea is similar to TAWC. Two functions are to be tested (i) to classify text entries as either a question, an answer or a comment based on certain pre-defined keywords; (ii) to assess the quality of a question/comment/answer based on some pre-defined wordlists. Results of such analysis could somewhat reflect the student participant's competence in critical thinking.
- ATLAS.it (<http://www.atlasti.com/index.html>). It is an application for qualitative analysis of large bodies of textual, graphical, audio and video data. It offers a variety of tools for accomplishing the tasks associated with any systematic approach to "soft" data--i.e., material which cannot be analyzed by any formal, statistical approaches in meaningful ways.

### **Quantitative Data Analysis**

SPSS (<http://www.spss.com/>) will be used to process quantitative data. In particular, given the complexity of the data structure, advanced statistics for analyzing multitrait-multimethod matrix (Campbell & Fiske, 1959) are required.

## 5. Design and Evaluation of First Validation Trials

In this section we describe in detail how first validation trials will be implemented and how the aforementioned evaluation frameworks are to be instantiated in this context.

### 5.1. Basic Facts

**Duration:** October - December 2006

**Participating institutions and roles:**

Four partners from the iCamp consortium will be involved in the first validation trials (Table 2). There will be interesting mix of students with different academic, cultural and linguistic backgrounds.

**Table 2: Overview of the participating partners for iCamp first validation trials**

	<b>ISIK (Turkey)</b>	<b>AGH (Poland)</b>	<b>KTU (Lithuania)</b>	<b>TLU (Estonia)</b>
<b>Facilitator</b>	Selahattin Kuru	Maria Nawojczk	Egle Butkeviciene	Katrin Niglas
<b>Coordinator</b>	Gürol Erdoğan	Agnieszka Chrzaszcz	Gytis Cibulskis	Terje Väljataga
<b>Domain</b>	Software Engineering	Sociology	Sociology	Social Sciences
<b>Number of students</b>	10	10	5 to 10	10
<b>Student background</b>	Undergraduate computer engineering program	Undergraduates students	Master students	Master/PhD students
<b>Type of participation</b>	Compulsory	Voluntary	Compulsory	Compulsory

**Pedagogical aspects:**

First validation trials will focus on exploring the feasibility of **Cross-Cultural Collaboration** in the context of the iCamp space. Coincidentally, the practical application of the other two conceptual frameworks – Self-Directed Learning and Social Networking - will be studied as well

Groups of international students will be required to develop a **questionnaire** (i.e. artefact) with reference to the key concepts "cross-cultural comparisons" and "e-learning". Given the heterogeneous backgrounds of the students (Table 2) and the objective of promoting self-directed learning, it is desirable to give students leeway to specify the exact scope and title of the questionnaire. While the co-creation of the

questionnaire is the common core activity that the students from all four participating institutions (or trial sites) are required to accomplish, the implementation of the questionnaire thus created and subsequent statistical data analyses are optional activities at the discretion of individual facilitators' needs. A reference workflow of the first trials (Appendix E) is available. However, no strict adherence to it will be imposed. As the first trials are primarily exploratory, flexibility and malleability of the workflow is to be ensured.

As grouping of students is deemed a critical success factor for collaborative learning, it is imperative to identify certain grouping criteria, including gender, age, ICT competence, English proficiency, domain-specific knowledge, and cross-cultural interaction experience. With reference to the Vygotskian concept of zone of proximal development (Vygotsky, 1978), it is desirable that abler student participants mix with less able ones in a group. Eight cross-cultural groups with each of them consisting of five students will be formed. Considering some students may not feel easy to communicate in English or with their foreign counterparts, two students from a local site can be paired up to bootstrap their confidence as well as to end some emotional connection to each other during the trial period, thereby sustaining their motivation to be involved in the collaborative work.

The facilitators play a very important role here. They are the ones to guide the students and make suggestions for them. Besides, the site coordinators are going to give local support, especially the technical one and then the iCamp researchers will provide the facilitators with support of different kinds.

#### ***Technical aspects:***

A set of so-called minimum technical requirements have been identified (Table 3), which all the four participating sites can fulfill to a large extent. However, owing to the limited IT infrastructure at students home, the trials will primarily take place in the respective campuses.

**Table 3: Overview of the participating partners for iCamp first validation trials**

	<b>Technical Minimum Requirements</b>
<b>Item 1</b>	Bandwidth - 24-hour-7-day access to the internet!
<b>Item 2</b>	Internet access at home
<b>Item 3</b>	Wifi at the university; Computer rooms, ensuring that there is a reserved computer room, so people do not disturb others when videoconferencing
<b>Item 4</b>	Ensure that students have webcams for videoconferencing
<b>Item 5</b>	Ensure that students have head-sets for videoconferencing
<b>Item 6</b>	Notebooks for students
<b>Item 7</b>	Telephoning should be for free for students: Skype, Skype-out could be reimbursed for the students, using a partner's land line should be possible, etc.

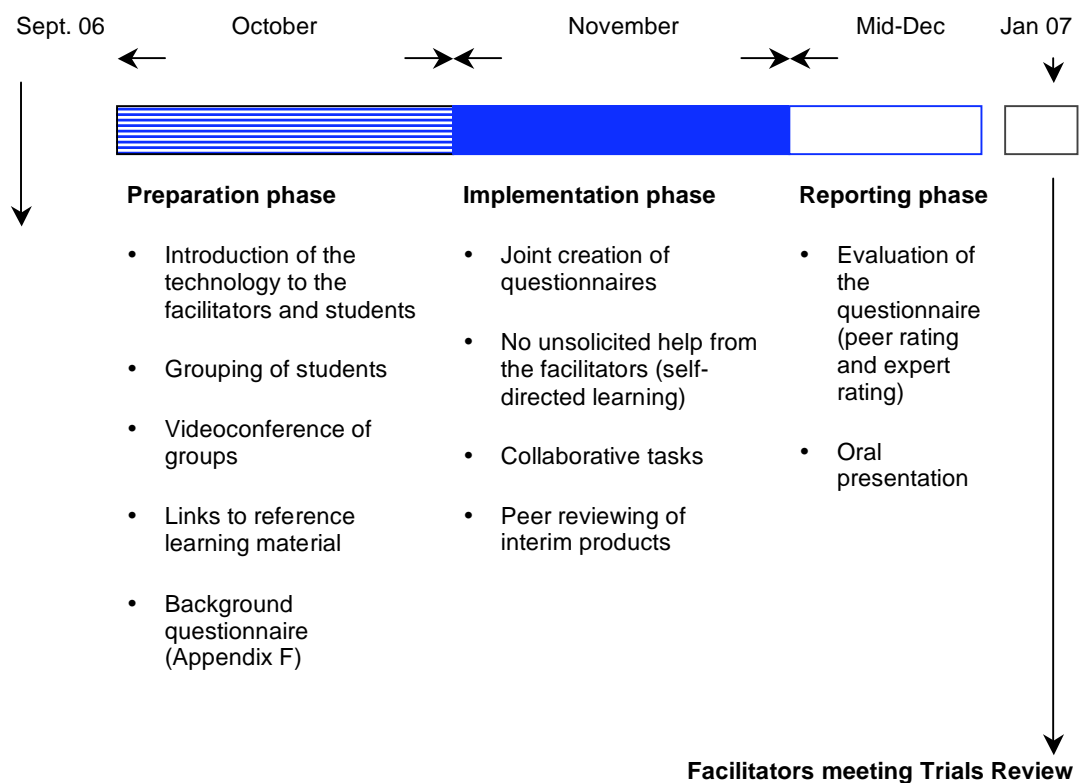
### **Constraints:**

Formal constraints such as accreditation, time schedules and curriculum are critical contextual factors that have to be taken into account. There is a risk that the whole validation setting fails due to one of these formal constraints. Researchers and practitioners have to work closely on setting up the trials in a favourable way where formal constraints do not interfere with the learning experiment. From a pedagogical perspective, the attitudes and competencies of the facilitators and student participants as well as their willingness for collaboration with peers across Europe are critical influence factors amongst many others. Cultural differences and language problems might be additional hindering factors that need guidance to be overcome.

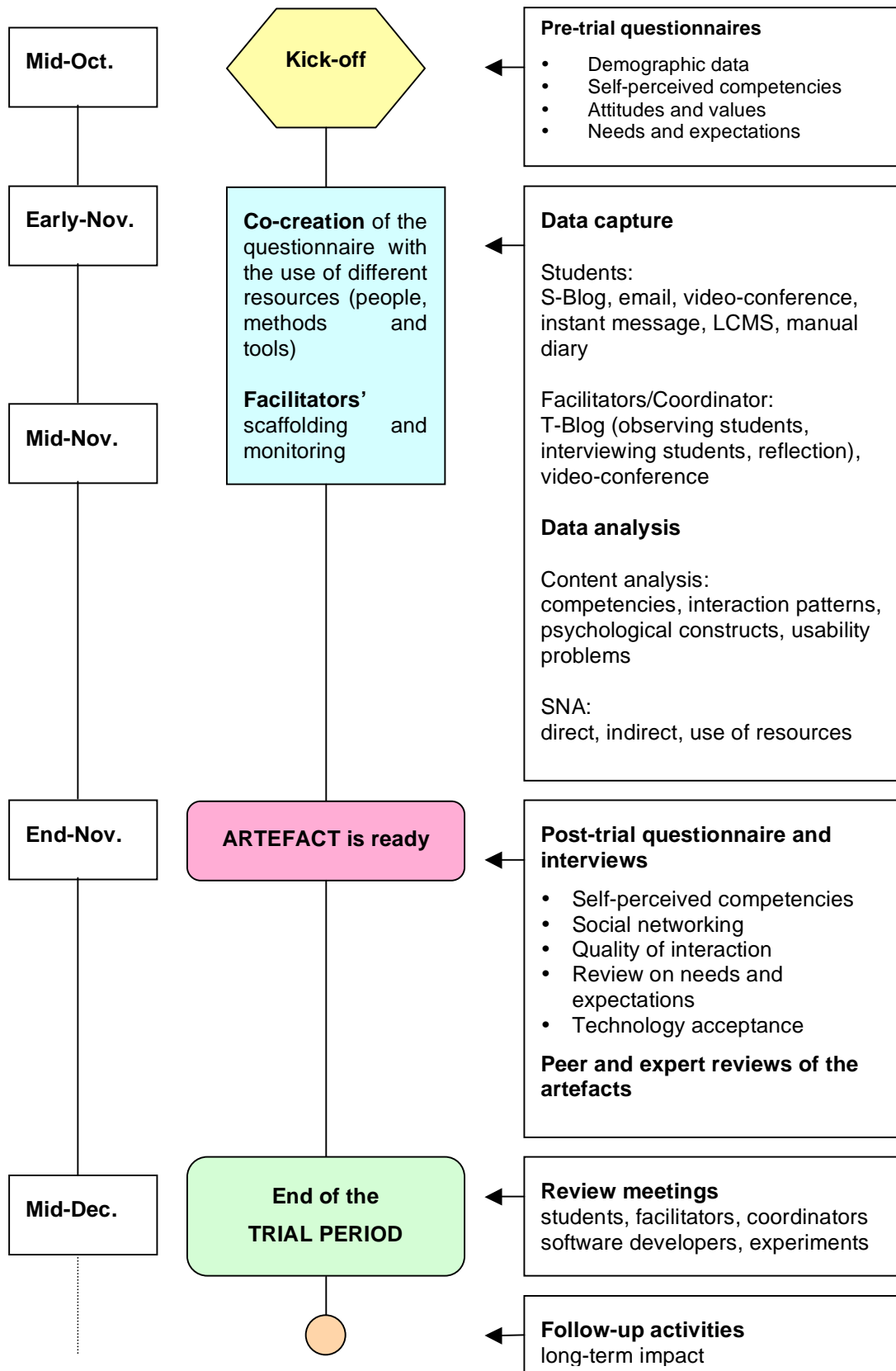
### **Working plan:**

Figure 6 and Figure 7 below illustrate the working plan for the First Validation Trials. Figure 6 depicts major activities that will occur during the three major phases of the trials, namely preparation, implementation and reporting, whereas Figure 7 depicts data collection methods for different phases of the trial. Noteworthy is that we aim to collect data about the short-term as well as long-term impact of the trials, especially the sustainability of the collaborative relations being established during the trials. Hence, follow-up activities in terms of interviewing some students and the facilitators will be carried out several months after the trials to be ended in December 2006.

**Figure 6: Three major phases of the iCamp first validation trials**



**Figure 7: Data collection processes for different phases of the iCamp first validation trials**



With regard to the three pedagogical challenges (Section 4), we have identified a number of research questions which will be answered by empirical data to be collected in the trials (Table 4). In addition, the usability of the iCamp Space, especially user experience, will be evaluated.

**Table 4: Research questions for the first validation trials**

	<b>Questions</b>	<b>Criteria</b>	<b>Measures</b>
<b>Cross-cultural Collaboration</b>	<ul style="list-style-type: none"> <li>• Any difference in interaction patterns between local vs. cross-border groups?</li> <li>• Any change in cross-cultural perception and communication</li> </ul>	<ul style="list-style-type: none"> <li>• Recurrent, observable behaviour</li> <li>• Self-perceivable</li> </ul>	<ul style="list-style-type: none"> <li>• Verbal data (blog/ email/ IM)</li> <li>• Observation (behavioural data)</li> <li>• Social networking data</li> <li>• Video recording</li> </ul>
<b>Self-Directed Learning</b>	<ul style="list-style-type: none"> <li>• Any detectable attitude and value changes?</li> <li>• Any improved disposition for action and problem-solving?</li> </ul>	<ul style="list-style-type: none"> <li>• Self-perceivable (subjective) and others-observable (objective) changes</li> </ul>	<ul style="list-style-type: none"> <li>• Questionnaires</li> <li>• Interviews</li> <li>• Inventories/Scales (calibrated)</li> </ul>
<b>Social Networking</b>	<ul style="list-style-type: none"> <li>• How do social groups evolve (physical vs. virtual) in terms of size, frequency and quality of interaction?</li> </ul>	<ul style="list-style-type: none"> <li>• Newly established contact with peers and experts</li> </ul>	<ul style="list-style-type: none"> <li>• Journal writing</li> <li>• Tools usage</li> </ul>
<b>Usability</b>	<ul style="list-style-type: none"> <li>• To what extent do the iCamp Space enable participants to achieve their goals/needs effectively, efficiently and with satisfaction (pleasure)?</li> </ul>	<ul style="list-style-type: none"> <li>• Effectiveness</li> <li>• Efficiency</li> <li>• Satisfaction</li> </ul>	<ul style="list-style-type: none"> <li>• Task completion; Quality of artefact</li> <li>• Resources expended</li> <li>• Technology acceptance model (TAM)</li> </ul>

## 6. Conclusion

User trials are an indispensable means to validate innovative concepts and techniques being addressed in a R&D project that is user-centred and rooted in social constructivism. In the context of iCamp, we have identified some significant research challenges not only in design and development but also in evaluation and validation. Evaluation of computer-supported (or more precisely computer-network supported) collaborative learning (CSCL) is a complex endeavour, because CSCL, especially in cross-cultural environments, involve multiple roles and multiple contexts. Hence, it entails a palette of methods and tools to capture and analyze multi-perspective and poly-contextual data. Mixed method evaluations (or multimethod) by blending qualitative approaches with quantitative approaches are deemed essential. Verbal data in the form of blogs, emails, instant messages and transcripts of audio- or video-conferences need to be coded, interpreted and merged painstakingly to infer meaningful conclusions or insights. Processing of a massive corpus of narrative data can be supported by different open source or commercial off-the-shelf software applications such as TAWC, ALTAS.ti and QSR NUD\*IST (1997). Developing context-specific (or adapting existing) coding schemes is a non-trivial task. It is rather tricky to draw consensus among a team of raters, who may have different understanding of individual items in a coding scheme. Training for applying coding schemes to raw narrative data consistently is required to enhance the internal validity of the results of the trials. In addition, quantitative data (including self-assessment ratings on different psychological constructs and peer review of jointly developed artefacts) are garnered to triangulate the findings being derived from qualitative data. The picture will be further complicated by integrating social network analysis (SNA) into mixed method evaluations. Such integration is necessary to track the evolution of online collaborative groups.

In the foregoing discussion we have presented the detailed workflow and evaluation scheme for the iCamp first validation trials (Oct-Dec 2006). Nonetheless, the underlying pedagogical models, namely cross-cultural collaboration, self-directed learning and social networking, will persistently be addressed in the second and third trials (Figure 8). It is a matter of degree of emphasis on which of the three aspects to be examined more deeply. While the iCamp generic evaluation framework based on ValNET (Appendix A) will definitely be applicable for the subsequent trials, specific evaluation methods and tools (e.g. coding schemes) for CSCL will further be refined according to the practical experiences to be gained and lessons to be learnt through the first trials. In particular, we will address more closely the issue of external validity (i.e. generalizability of results across contexts) and construct validity (i.e. cause-effect relationships between variables of interest) (Cook & Campbell, 1979) in the subsequent trials.

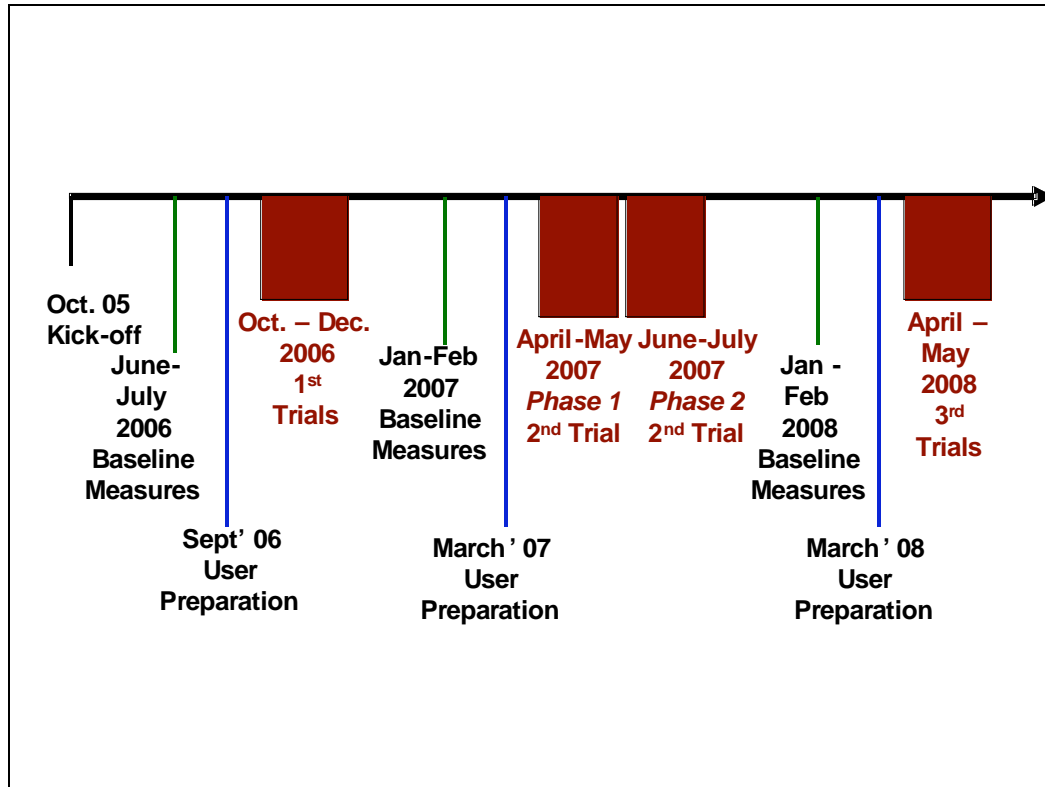


Figure 8: Timeline for iCamp three validation trials

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## Appendixes

### A. Appendix: iCamp Generic Evaluation

#### Pedagogical Aspect

Object	Actors	Evaluation Criteria/Questions	Data Collection Instruments & Analysis Tools
Pedagogical Models underlying the iCamp Space	Faculty	<ul style="list-style-type: none"> <li>▪ Comprehensibility of the models</li> <li>▪ Compatibility of the models with the existing teaching practice and the existing needs of the educational communities</li> <li>▪ Cultural conflict and management</li> </ul>	<ul style="list-style-type: none"> <li>▪ Discussion forum</li> <li>▪ Structured interviews</li> <li>▪ Questionnaire</li> </ul>
	Developers	<ul style="list-style-type: none"> <li>▪ Comprehensibility of the models</li> <li>▪ Practicality of translating the models into practice</li> </ul>	<ul style="list-style-type: none"> <li>▪ Structured interviews</li> <li>▪ Questionnaire</li> </ul>
	Administrators	<ul style="list-style-type: none"> <li>▪ Alignment with the vision of the Higher Education Institution</li> <li>▪ Cultural conflict</li> </ul>	<ul style="list-style-type: none"> <li>▪ Structured interviews</li> <li>▪ Questionnaire</li> </ul>
Pedagogical Impacts of deploying iCamp Space on Learning	Students	<ul style="list-style-type: none"> <li>▪ Cognitive presence – How does iCamp Space enable the construction of meaning through reflection and discourse?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Content analysis of private and public <i>Student Blogs</i>: -development of a classification scheme -Pattern analysis; inter-linking between blogs -Frequency and timing of posing messages</li> </ul>
		<ul style="list-style-type: none"> <li>▪ Motivation to learn in virtual learning environments</li> <li>▪ Attitudinal changes towards same-culture as well as cross-cultural collaboration</li> </ul>	<ul style="list-style-type: none"> <li>▪ Perceived attitudinal changes towards virtual learning environment and cross-cultural collaboration</li> <li>▪ Semi-structured Web-based interviews</li> <li>▪ Questionnaire</li> </ul>
		<ul style="list-style-type: none"> <li>▪ Meta-cognitive skills, especially reflection</li> </ul>	<ul style="list-style-type: none"> <li>▪ Content and discourse analyses of private and public Blogs with a classification scheme</li> </ul>
Pedagogical Impacts of deploying iCamp Space on Teaching	Faculty	<ul style="list-style-type: none"> <li>▪ Teaching presence – How does iCamp Space empower educators to exert impact on learners' cognitive/social processes and on the learning environment?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Content and discourse analyses of <i>Educator Blogs</i></li> <li>▪ Questionnaire on gauging the educator perception</li> <li>▪ Semi-structured web-based interviews</li> </ul>
		<ul style="list-style-type: none"> <li>▪ Reusability of Learning Objects (LOs) in different pedagogic situations</li> </ul>	<ul style="list-style-type: none"> <li>▪ Peer review process of Learning Objects</li> <li>▪ Case studies of the usage of Learning Objects in real everyday practice</li> </ul>
		<ul style="list-style-type: none"> <li>▪ Generation of new ideas and new working methods</li> <li>▪ Improvement of existing skills and competencies</li> </ul>	<ul style="list-style-type: none"> <li>▪ Structured interviews</li> <li>▪ Questionnaire</li> </ul>

**Social/Cultural Aspects**

Object	Actors	Evaluation Criteria/Questions	Data Collection Instruments & Analysis Tools
Social Impacts on Community Building	Students & Faculty	<ul style="list-style-type: none"> <li>▪ Social presence: to what extent do actors engage themselves emotionally and socially</li> <li>▪ Growth of personal network with time</li> <li>▪ Ratio of time spent on individual learning to social learning</li> <li>▪ Retention/Attrition rate</li> </ul>	<ul style="list-style-type: none"> <li>▪ Pre- and post- questionnaire on emotion</li> <li>▪ Content analysis of <i>Student/Educator Blogs</i> with a specific classification scheme</li> <li>▪ Social Network Analysis approach (i.e. number of links/nodes, emerging hub, interaction pattern, etc.)</li> <li>▪ Structured interviews</li> </ul>
Linguistic Adaptation	Students	<ul style="list-style-type: none"> <li>▪ Multilinguality of the international communication</li> <li>▪ Ease of communicating in a non-native language</li> </ul>	<ul style="list-style-type: none"> <li>▪ Questionnaire</li> <li>▪ Discourse analysis</li> <li>▪ Structured interview</li> </ul>
	Faculty	<ul style="list-style-type: none"> <li>▪ Multilinguality of Learning Objects</li> </ul>	
Cultural Conflicts	Students & Faculty	<ul style="list-style-type: none"> <li>▪ Culture-specific norms of communication</li> <li>▪ Culture-specific learning and teaching approaches</li> </ul>	<ul style="list-style-type: none"> <li>▪ Questionnaire</li> <li>▪ Content analysis</li> </ul>

**Organizational/Institutional Aspects**

Object	Actors	Evaluation Criteria/Questions	Data Collection Instruments & Analysis Tools
Impact on the structure and research landscape of HEI	Administrators	<ul style="list-style-type: none"> <li>▪ Does the existing structure (political, administrative and organizational) of the HEI enable the deployment of an e-Learning environment like the iCamp Space?</li> <li>▪ Does the participation in the iCamp project help the HEI to: <ul style="list-style-type: none"> <li>- gain attention or reputation in national and local communities?</li> <li>- receive external support for sustainable innovation?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ E-Learning Maturity Models (Marshall &amp; Mitchell, 2004)</li> <li>▪ Structured interviews</li> <li>▪ Questionnaire</li> </ul>
	Faculty & Researchers	<ul style="list-style-type: none"> <li>▪ To what extent are the iCamp Space and the associated practices considered as a point of reference for the development of new national initiatives?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Focus group</li> <li>▪ Questionnaire</li> </ul>
Integration of iCamp space into curricula	Departments and administrations	<ul style="list-style-type: none"> <li>▪ To what extent the iCamp Space is considered for adoption in teaching at HEI?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Questionnaire</li> <li>▪ Structured interviews with stakeholders</li> </ul>

**Technical Aspects**

Object	Actors	Evaluation Criteria/Questions	Data Collection Instruments & Analysis Tools
Usefulness and usability of the iCamp Space	Developers	<ul style="list-style-type: none"> <li>▪ Quality models of the iCamp Space (cf. ISO 9126 Part 1 to 4): Compliance with standards               <ul style="list-style-type: none"> <li>-Functionality</li> <li>-Usability</li> <li>-Efficiency</li> <li>-Reliability</li> <li>-Maintainability</li> <li>-Portability</li> </ul> </li> <li>▪ Interoperability check</li> <li>▪ Is the iCamp Space open and flexible enough to enable adaptation, localization and customization?</li> </ul>	<ul style="list-style-type: none"> <li>▪ Automatic computer analysis</li> <li>▪ Document analysis</li> <li>▪ Formal and informal usability tests</li> <li>▪ Formal performance and functionality tests</li> <li>▪ Structured interviews with stakeholders</li> </ul>
	Learners & educators	<ul style="list-style-type: none"> <li>▪ Which technical problems emerge while using the iCamp Space?</li> <li>▪ What kind of support is required for using iCamp Space?</li> <li>▪ Level of acceptance towards iCamp Space</li> <li>▪ Manageability and manipulability of iCamp Space</li> </ul>	<ul style="list-style-type: none"> <li>▪ Technology Acceptance Model</li> <li>▪ Questionnaire</li> <li>▪ Structured interview</li> </ul>

**Business/exploitation aspects**

Object	Actors	Evaluation Criteria/Questions	Data Collection Instruments & Analysis Tools
Sustainability of iCamp space and results beyond project termination	HEI	<ul style="list-style-type: none"> <li>▪ To what extent iCamp space will continue to be used beyond project termination?</li> <li>▪ Number of HEI willing to use iCamp space beyond project termination</li> </ul>	<ul style="list-style-type: none"> <li>▪ Questionnaire</li> <li>▪ Structured interviews</li> </ul>
	Content providers	<ul style="list-style-type: none"> <li>▪ Number of content providers (e.g. online libraries, etc.) connected to the iCamp space</li> </ul>	<ul style="list-style-type: none"> <li>▪ Questionnaire</li> <li>▪ Structured interviews</li> </ul>

## **B. Appendix: Questionnaire on Assessing Cross-Cultural Collaborative Interaction**

(Measuring Common Ground, Awareness, Cognitive Consensus, Perceived satisfaction, and Performance)

The questionnaire included clusters of items measuring common ground, awareness, cognitive consensus, perceived satisfaction, and performance.

<b>Questionnaire items</b>	<b>Source</b>	<b>Cluster</b>	<b>Notes</b>
1. There were too many inappropriate interruptions	Sellen (1992)		
2. There were many unnatural and uncomfortable pauses			
3. This was an unnatural conversation			
4. The conversation seemed highly interactive			
5. I found it difficult to keep track of the conversation			
6. I was able to take control of the conversation when I wanted to			
1. I was able to <i>understand</i> my teammates with no difficulty	Cross-cultural study, 2006		
2. I felt that my teammates <i>understood</i> me with no difficulty			
3. I was able to <i>express</i> myself clearly			
4. My teammates were able to <i>express</i> themselves clearly			
1. It was easy to communicate effectively given the tools available	Adapted from Daily-Jones et al.		
2. The mode of communication used in this task aided collaborative work			

3. I found it easy to communicate using the audio tool	(1998)		
4. I found it easy to communicate on the shared interactive map			
1. I was very aware of the <i>presence</i> of my teammates while working on the task	Adapted from Monk and Watts (2000), Daly-Jones et al. (1998)		
2. I could easily assess my teammates' <i>reactions</i> to what was said			
3. I could readily tell when my teammates were <i>paying attention</i> to me			
4. I could readily tell when my teammates were <i>concentrating on what I was saying</i>			
5. I could easily assess my teammates' understanding of what I said			
1. I could easily understand what my teammates were doing <i>at the same time</i>	Convertino et al., 2004, Convertino et al. (in progress)		
2. I could easily see what my teammates were going to do <i>next</i>			
3. I could easily see what my teammates had done <i>previously</i>			
4. My teammates and I developed more shared understanding about the <i>task</i> over time			
5. My teammates and I developed more shared understanding about the <i>tools</i> over time			
6. My teammates and I developed better understanding about <i>each other</i> over time			
1. I agreed with many of the points made by my partner	Mohammed & Ringseis (2001)		Note 1
2. I adjusted my viewpoint on some of the issues to incorporate the views of my partner			
3. The viewpoints expressed by my partner had no impact on my thinking about the issues on our design			

4. My partner made statements that influenced the way I feel about the issues on our design			
5. As a result of the points made by my partner, I now think differently about what the design should be			
6. My partner made me rethink my own views I had before the discussion			
7. Because of the discussion with my partner, I now have a completely opposite view on the issues than I did before			
8. My partner (or I) was willing to compromise on making decisions			
9. My partner (or I) asked the other member (or you) what his/her views on the issues were			
10. My partner (or I) actively asked the reasoning behind the other person's positions			
1. The welcome center should be designed to fulfill the purpose of maximizing profit	Mohammed & Ringseis (2001)		Note 2
2. The welcome center should be designed to fulfill the purpose of providing convenient and affordable services to tourists			
3. The primary purpose of the items added to the design should be to encourage spending and leading visitors to other businesses in the city			
4. The primary purpose of the items added to the design in the welcome center should be to provide convenient and affordable travel and entertainment options to the visitors			
5. The welcome center should be designed to be: (circle one) - 1=[completely for profit] - 4=[Both for profit and for providing affordable and convenient services] - 7=[Completely for providing affordable and convenient services]			
<b>Note 1.</b> With the last three items, the participants were asked to rate their own behavior and the behavior of their partners. An average score			

from oneself and one's partner was calculated as the item score for an individual.

**Note 2.** Only items for the Prison task are included here. Items for the Welcome Center task are of similar format only with different content.

## C. Appendix: Self-Assessment on Self-Directed Learning Competencies

### PERSONAL RATING ON SELF-DIRECTED LEARNING COMPETENCIES

This form is designed to assist the learner in assessing his/her level of competence pertaining to various self-directed learning competencies. Knowing such information will help the learner identify those areas of strength that can be used in future self-study efforts and those that may need to be enhanced in various ways. For each potential content area, the learner is to check the most relevant column indicating a "self-rating."

- **DK** If you believe you currently do not have any skills pertaining to the listed competency or don't know what skills you possess. This may mean that you will need or will want to develop such competency through future discussion, reading, practice, etc.
- **LO** If your current competence related to the listed area is especially low, but could be raised toward a desired level through specific learning experiences.
- **MD** If your past experiences have provided part of the desired competence and some learning experiences or activities would develop the remainder.
- **HI** If your past experiences and activities have substantially developed the listed area.

(Adapted from Knowles, M. S. (1975). *Self-directed learning*. Chicago: Follett.)

### SELF-RATING ON SELF-DIRECTED LEARNING COMPETENCIES

(Self-rate the competency by checking the appropriate column box)

Competency Area	DK	LO	MD	HI
1. An understanding of the differences in assumptions about learning and the skills required for self-directed study	.	.	.	.
2. A concept of myself as being a non-dependent and self-directed learner	.	.	.	.
3. An ability to relate to peers collaboratively in seeking and providing help pertaining to learning activities	.	.	.	.
4. The ability to diagnose my own learning needs realistically	.	.	.	.
5. The ability to translate learning needs into learning goals, plans, and activities	.	.	.	.
6. The ability to relate to teachers as helpers or facilitators and take initiative in making use of their expertise	.	.	.	.
7. The ability to identify human and material resources appropriate to different	.	.	.	.

learning needs and goals				
8. The ability to select and utilize effective strategies for making good use of learning resources	.	.	.	.
9. The ability to collect and validate evidence pertaining to my accomplishment of various kinds of learning objectives	.	.	.	.
10. Other:	.	.	.	.
11. Other:	.	.	.	.
12. Other:	.	.	.	.

### ***D. Appendix: Sample coding scheme for analyzing verbal data cross-cultural interaction***

<b>Behaviour Categories</b>	<b>Code</b>	<b>Description</b>
<b>Planning</b>	GS	Group skills: a generic code applied to expressions that encourage group activity and cohesiveness.
	OW	Organizing work: Planning group work; setting shared tasks and deadlines.
	IA	Initiating activities: Setting up activities such as chat sessions to discuss the progress and organization of group work.
<b>Contributing</b>	HeG	Help giving: Responding to questions and requests from others.
	FBG	Feedback giving: Providing feedback on proposals from others.
	RI	Exchanging resources and information to assist other group members.
	SK	Sharing knowledge: Sharing existing knowledge and information with others.
	Ch	Challenging others: Challenging the contributions of other members and seeking to engage in debate.
	Ex	Explaining or elaborating: Supporting one's own position (possibly following a challenge).
<b>Seeking Input</b>	HeS	Help seeking: Seeking assistance from others.
	FBS	Feedback seeking: Seeking feedback to a position advanced.
	Ef	Advocating effort: Urging others to contribute to the group effort
<b>Reflecting/Monitoring</b>	ME	Monitoring group effort: Comments about the group's processes and achievements.
	RM	Reflecting on medium: Comments about the effectiveness of the medium in supporting group activities.
<b>Social Interaction</b>	SI	Social interaction: Conversation about social matters that are unrelated to the group task. This activity helps to 'break the ice'.

## ***E. Appendix: Reference Workflow of the First Validation Trials***

<b>Facilitator-centred Computer Supported Collaborative Learning</b>
<p><b>Actors:</b></p> <ul style="list-style-type: none"> <li>• 40 Undergraduates from 4 different European universities;</li> <li>• 4 Lecturers and 4 Trial Site Coordinators of the 4 European universities</li> </ul>
<p><b>System:</b></p> <p>First executable prototype of the Integrated iCamp Space (the network of tools, platforms and repositories)</p>
<p><b>Curriculum/Course:</b></p> <p>Research Design and Statistics for Social Sciences: Project-based Learning (12-week course unit)</p>
<p><b>Activity:</b> Working on an international project entitled –</p> <p><i>Cross-cultural comparisons of social sciences students' acceptance towards the use of new information and communication technology (ICT) in university education</i></p>
<p><b>Input:</b></p> <ul style="list-style-type: none"> <li>• Learning resources on research methods; electronic copies or links to these resources will be provided by the Lecturers</li> <li>• Students' prior knowledge in research methods and experience in cross-cultural interaction</li> </ul>
<p><b>Objective:</b></p> <p>Fostering students' knowledge and skills in designing research studies and applying statistical methods</p>
<p><b>Collaborative Task:</b></p> <p>Lecturers and instructors of participating universities are required to enable and monitor students to achieve the collaborative task of developing a joint questionnaire and to help them understand the related topics</p>
<p><b>Procedure &amp; Instruments:</b></p> <ul style="list-style-type: none"> <li>• Lecturers and coordinators group the students into eight teams according to some pre-defined criteria;</li> <li>• Each student is enabled to develop a personal webpage (cf. e-Portfolio) introducing themselves - a means to social networking;</li> <li>• Groups of students hold videoconferences to get to know each other;</li> <li>• Lecturers make relevant learning resources available electronically and use iBlog to provide an area to point students to these resources, and discuss issues arising in teaching and learning them;</li> <li>• Students are encouraged to maintain <i>Class blogs</i> and <i>Personal blogs</i>: <ul style="list-style-type: none"> <li>◦ <i>Class-blogs</i> will be moderated by tutors and used by students to share ideas and experiences. <i>Class-blogs</i> are grouped at the <i>national</i> and <i>international</i> levels. Students are free to join any of the blogs;</li> <li>◦ <i>Personal blogs</i> will primarily be used by students as a tool to reflect on the topics of</li> </ul> </li> </ul>

<p>interest and to organize their own thoughts;</p> <ul style="list-style-type: none"> <li>• Lecturers will have access to both <i>Class</i> and <i>Personal blogs</i>; they monitor the students' progress with respect to the effectiveness of cross-cultural collaboration;</li> <li>• Lecturers and instructors set up their own <i>Facilitator-blog</i> to exchange their views and experiences about various aspects of this innovative teaching program. <i>Facilitator-blog</i> is not accessible to students;</li> <li>• A special-purpose blog known as <i>Tech-blog</i> is established by the students particularly for discussing issues related to the technical problems of deploying the tools in use. <i>Tech-blog</i> will be moderated by some technical experts;</li> <li>• Groups of international students are required to develop a short questionnaire in English to measure the acceptance and post it to <i>Facilitator-blog</i> and international <i>Class-blog</i> to collect feedback for revision. Students should send the revised questionnaire to <i>Facilitator-blog</i>;</li> <li>• Students of four national groups are required to gather about twelve responses to the questionnaire through interviewing fellow students who are not involved in the project;</li> <li>• Students are required to post the raw data of the questionnaire responses to the international <i>Class-blog</i> and to analyse the data with the use of the statistical tool;</li> <li>• Students are required to produce a written report to answer the research question "<i>Are there any statistically significant differences in the level of acceptance towards the use of ICT in university education among the four national groups of students?</i>" Note that students should interpret the data with respect to their specific socio-cultural backgrounds;</li> <li>• Lecturers will give comments on the reports through the international <i>Class-blog</i>;</li> <li>• By the end of the trials period, a videoconference will be held where the facilitators and students will share the experiences being gained through their participation in the virtual knowledge community enabled by the iCamp Space;</li> </ul>
<p><b>Output:</b></p> <ul style="list-style-type: none"> <li>• Blogs</li> <li>• Joint questionnaires</li> <li>• Presentation</li> </ul>
<p><b>System Support:</b></p> <ul style="list-style-type: none"> <li>• Access to Learning Resources</li> <li>• Support a shared web-based working space for the students to distribute the related documents and collaboratively develop the questionnaire and report</li> <li>• Public communication zone for student communication, online discussions and threaded documentation</li> <li>• Mentoring support by peer student via "iBlog"</li> <li>• Individual learning diary or personal private space via "iBlog" for students' thoughts and mentors' guidance</li> <li>• Provide statistical tools for data analyses</li> </ul>

## ***F. Appendix: Background Data Questionnaire***

1. Gender:            male             female

2. Age:             <20     20-25     26-30     30 – 39     >= 40

3. Your Academic Level:

Undergraduate (academic year: \_\_\_\_\_)

Master student

PhD student

Other (specify): \_\_\_\_\_

4. Your major: \_\_\_\_\_

5. Please rate your **English proficiency**, both spoken and written:

Very low     Low     Medium     High     Very high

Remark: \_\_\_\_\_

6. Please rate your competencies with respect to the use of **Information and Communication Technology (ICT)** (e.g. email, blog, instant message, videoconference, mobile device, etc.):

Very low     Low     Medium     High     Very high

Remark: \_\_\_\_\_

7. Please rate your level of experience in **cross-cultural collaboration** (e.g. working together with foreign students/teachers to complete a task)

Very little     Little     Medium     Rich     Very rich

Remark: \_\_\_\_\_

8. Please rate your level of expertise in **research methods**:

Very low     Low     Medium     High     Very high

Remark: \_\_\_\_\_