The Needlework in evaluating a CSCL system: The Evaluand-oriented Responsive Evaluation Model

Iván M. Jorrín-Abellán, Robert E. Stake,
Center for Instructional Research and Curriculum Evaluation, University of Illinois at Urbana-Champaign. 190 Children’s Research Center. 51 Gerty Drive. Champaign, IL 61820.
Email: jorrin@uiuc.edu, stake@uiuc.edu

Alejandra Martínez-Mónés, Department of Computer Science, University of Valladolid. Escuela Técnica Superior de Ingeniería Informática. Campus Miguel Delibes, 47011, Valladolid, Spain, amartine@infor.uva.es

Abstract: This article presents the Evaluand-oriented Responsive Evaluation Model (EREM), a comprehensive evaluation model to be used in the evaluation of a CSCL system. The model relies on a responsive evaluation approach to provide potential evaluators with a practical tool to evaluate multiple criteria and episodes.

Introduction: Initial Stitches

In 1927 theoretical physicist Werner Heisenberg articulated his uncertainty principle. Roughly speaking, it states that the position and velocity of an object cannot both be measured exactly at the same time, and that the concepts of exact position and exact velocity together have no meaning in the small scales of atoms and subatomic particles. We find the principle useful to illustrate the uncertainty involved in the evaluation of CSCL programs, courses, learning strategies, projects, and technological tools.

Evaluation is intrinsic to human life, hence complex and intricate. We are always balancing things, decisions, opinions as to whether or not ask something, do something, etc. Stufflebeam (1971) and Cronbach (1980) defined the main goal of formal evaluation as improvement in decision-making. But there are many purposes even for a single evaluation study (Stake, 2003).

CSCL is an interdisciplinary field different from other applications of ICT to learning and/or collaboration. This difference is its emphasis on group learning. Its theoretical foundations consider knowledge as a learner construction promoted by the interaction of learners with their social and physical environment. For Koschmann (2002) CSCL is “a field of study centrally concerned with meaning and the practices of meaning-making in the context of joint activity and the ways in which these practices are mediated through designed artifacts.” The design and enactment of CSCL systems and scenarios is inherently complex, with a wide mix of disciplinary perspectives. Teachers, curriculum designers, evaluators, students, and technology developers work together. Comprehensive evaluation of these systems is challenging. Treleaven (2003) argues that “evaluation in these contexts challenges traditional approaches to evaluation and requires new theoretical frameworks to guide analysis and interpretation.”

The different conceptions of the CSCL field, the strong social component that defines it, and the multitude of value questions surround the evaluator in uncertainty. Many criteria standards issues and interpretations of a complex system remain open even at the end of the study.

In this paper we present an evaluation model to be used by CSCL practitioners and evaluation specialists called Evaluand-oriented Responsive Evaluation Model (CSCL-EREM). The model is framed within what Lincoln and Guba (1989) have called the “Fourth generation of evaluation”. Evaluators respond to participants’ activity more than measuring them. The model orient the evaluator to the systemic activity, noting the uniqueness and the commonality of the evaluand to be evaluated. The evaluator is responsive to key issues and problems recognized by participants at the site (Stake, 2003).

Looking for the right Needle: Need for a comprehensive evaluation framework in the CSCL field

Often it is difficult to find a common conceptualization of CSCL among educators, evaluators, computer scientists, psychologists, and engineers, partly because their experiences differ so much. A comprehensive evaluation framework should help identify the diversity of their concerns, promoting a realization that evaluation studies answer some questions, mention others, and necessarily ignore most of them.

Many people see the CSCL field as more socially ambitious than other areas of ICT (Stahl et al, 2006). This fact constitutes a challenge to program evaluation (Treleaven, 2003) for developers, instructional designers and evaluators. An evaluand-centered evaluation framework (as opposed to technology-centered, personnel-centered, and policy-centered evaluation) should help guide evaluation toward holistic viewing. Some features of CSCL can be assessed along a single variable, but a comprehensive evaluation requires the broad study of functions, sequences, relationships and settings. Each event gives meaning to the next, each shortfall to the vigor of its neighbor.
The continuous development of new platforms and tools for collaboration and computer-mediated learning calls for far-reaching evaluation of the systems. At times, the learning environment should reign over the technical artefacts. Determining if meaningful educational practices are taking place requires the identification of criteria and critical events that determine the educational quality of a CSCL system (Crawley, 1999). Other evidence of the need for a comprehensive evaluation framework can be found throughout the literature.

Some proposed frameworks are good for particular questions, such as the Object Oriented Collaboration Analysis Framework (OCAF) (Avouris et al, 2003), a framework for the analysis of interaction processes. Other frameworks such as the Groupware Framework (Gutwin & Greenberg, 2000) focus on specifics like groupware usability. Some frameworks, such as the Communicating Model of Collaborative learning (CMCL) (Czeck-Kermanovic & Webb, 2000) are found hard to make practical. Some evaluation frameworks draw data only from stakeholders; others, such as Pinelle & Gutwin’s Framework (2000) and the CMCL framework, were designed to be used formatively by developers. Such frameworks can be valuable, but for systemic understanding, the entire evaluand needs to be studied.

Our twelve-year experience with the evaluation of CSCL systems has helped us identify requirements (Table 1) for a model that is comprehensive yet adaptable to settings and conditions. Our research team has evaluated a variety of undergraduate CSCL courses (Martínez-Monés et al, 2006; Jorrín-Abellán et al, 2006), teaching strategies (Martínez-Monés et al, 2006) and tools and technological systems (Hernández-Leo et al., 2006; Vega-Gorgojo et al., 2008). This fieldwork experience has turned us progressively toward qualitative/interpretative evaluation where the uniqueness and particularity of each system becomes the ground for evaluative interpretation.

Many of our evaluation facets have been aimed to account for participant needs. And so, even for the evaluation of technological tools, EREM includes a range of data-gathering techniques to generate rich descriptions and to find the panoramic outcomes of the evaluand.

We built our EREM approach from Greene’s multiple methods model (2001) and Stake’s responsive evaluation (1973). We see our EREM framework as fitting Guba and Lincoln’s (1989) fourth generation of evaluation, which named the four generations as: measurement, description, judgement and negotiation. When compared to other program evaluation approaches EREM is oriented more to the activity, the social context, and the uniqueness of the evaluand. Its design is organic, re-adapting the evaluation goals and data-gathering. We have watched the growing interest in interpretative evaluation methods in the CSCL field, noting particularly the work of Suthers, 2006; Koschmann et al, 2005 and Ares, 2008. We know that on many occasions evaluators will need a more quantitative or narrower evaluation. We respond here to occasions calling for comprehensive evaluation review of a CSCL system.

This section has shown some of the needles for the embroidery of evaluation of CSCL systems. These needles suit the threads described earlier and constitute the mind-set for the comprehensive CSCL evaluation model we propose in the following paragraphs.

Table 1: Initial sketch of the characteristics that can be demanded to a CSCL evaluation framework

<table>
<thead>
<tr>
<th>Characteristics that can be demanded to a CSCL evaluation framework</th>
</tr>
</thead>
<tbody>
<tr>
<td>The traditions/perspectives involved in the field highlight the need for a flexible enough framework to give answer to the needs and goals of the many different stakeholders. At the same time it should be robust enough to provide a common evaluation model shared by the CSCL community</td>
</tr>
<tr>
<td>The importance of the social component of learning in the field recommends the definition of an evaluation framework oriented to the activity, the uniqueness and the plurality of the evaluand to be evaluated. It should also be sensitive to key issues or problems recognized by people at the site, giving voice to the participants.</td>
</tr>
<tr>
<td>The many possible evaluands that could be evaluated from diverse traditions reveals the need for a framework that should propose many different data gathering techniques.</td>
</tr>
<tr>
<td>The applicability of the framework as well as the consensus intended among CSCL practitioners highlight the need of an evaluand-oriented framework</td>
</tr>
</tbody>
</table>

The frame to Needlework: CSCL-Evaluand oriented Responsive Evaluation Model (CSCL-EREM)

Evaluation of CSCL systems can be seen as “embroidered patchwork”, a form of needlework frequently done in the past by people around a frame. This metaphor describes the sort of evaluation model we propose in this paper. The EREM is to be a framework for helping in the evaluation of CSCL programs, innovations, learning and teaching resources, teaching strategies, tools, and CSCL institutional evaluations. The aim of the model is to provide clear, understandable and action-oriented guidance to CSCL practitioners involved in the evaluation of a CSCL system. It is deeply focused on the different evaluands that could be evaluated in these settings, and it is framed within the Responsive Evaluation approach. The model is intended to promote responsiveness to key issues and problems recognized by participants at the site. As can be seen in Figure 1, the model’s core parts are: Three
facets (perspective, ground and method) that summarize some characteristics that could be taken into account while conducting an evaluation of a CSCL system; four question-oriented practical courses (pathways) according to the possible evaluands that can be evaluated; a representation diagram with the aim of helping evaluators in the planning stage of an evaluation; and finally a set of recommendations to write the report of an evaluation. Although we are proposing an ambitious model, it does not try to discover anything new in the CSCL field nor "to reinvent the wheel". The aim of this work is to provide clear and practical guidance to those CSCL practitioners that are novice in evaluation, by proposing a particular organization of the complexity of the field. Thus, the model can be interpreted as an effort to minimize the evaluation uncertainty discussed in the beginning of this article.

Figure 1. CSCL-EREM Components

Facets of the model
The first component of the model brings together some of the aspects that can be studied in the evaluation of a CSCL system. We have grouped them into three different facets. The first one is called Perspective and it can be understood as the point of view based on which an evaluation process can be both designed and carried out. Its emphasis relies on the main goal from which we are performing an evaluation. The main goals of a CSCL evaluation can be: To improve the educational practice; to improve the design of a tool; to monitor the progress of something within a CSCL system or; to support a research process. The second facet, called Ground, can be defined as the state of the environment in which a CSCL system exists. It can be considered as the context in which an evaluand takes place or is intended for, taking into account the characteristics of the evaluation we want to perform (extension, number of evaluators, experience in evaluation, etc), the main features of the participants (number, learning and teaching styles, previous knowledge, etc) and the features of the setting in which we are going to evaluate (climate, grade, extension, etc). The third facet, the Method, refers to the sequence of steps that lead the evaluation process, involving reasoning, observations, data collection, data processing, analysis and interpretation. The sort of evaluands that can be evaluated in these special scenarios differ so much; because of this, the model proposes many different data gathering techniques, with the aim of becoming an umbrella model where different traditions and ways of evaluation would coexist. The model encourages the use of mixed data gathering techniques as well as a variety of informants, in order to provide multiple perspectives to enrich the evaluation process. A profuse set of data gathering techniques like observations, interviews, expert reviews, costing techniques, heuristics, cognitive walkthroughs, social network analysis or feature inspections are proposed.

Courses
To bridge the gap between theory and practice, the model proposes four courses or pathways according to the different evaluands that could be evaluated in a CSCL system. Each one is formed by a set of questions that epitomize the aspects included in the described facets, helping evaluators to recognize some relevant issues that could affect their evaluand. The courses are: Evaluation of CSCL programs, innovations, courses; Evaluation of CSCL tools; Evaluation of teaching strategies/learning resources to promote collaboration; and Evaluation of CSCL projects. The model provides not only four different question-oriented paths but also real examples of evaluations performed by using them. Each course is expected to be used by different CSCL practitioners depending on their needs and interests.

Representation Diagram
Sometimes small management artefacts help to better planning an evaluation, thus contributing to improve its quality. The model proposes a representation diagram that supports evaluators to plan an evaluation in a practical
and contextualized way. Figure 2 illustrates the evaluation planning of a blended undergraduate course on ICT to preservice social educators. More details on this evaluation can be found in Jorrín-Abellán & Stake (2009). The representation shows the aspects considered within the three facets of the model, as well as a brief schedule of the evaluation according to the data gathering techniques, the informants and the supportive technologies used. The lower right side of the circle shows the issues that guided the evaluation. These issues serve as conceptual organizers of the evaluation, helping evaluators to focus on the desired tensions of the evaluand.

![Figure 2. CSCL-EREM Practical examples](http://titan.tel.uva.es/wikis/cscl-erem)

**Recommendations to write the final report**
The end product of an evaluation is expected to be a report. It constitutes the joint construction that emerges as the result of the evaluation; its synthesis. Many times the effort required to write it goes further than the quality of the evaluation conducted. As evaluators we are not only asked to provide results but to disseminate them in the best way. According to this, the model also includes a set of general recommendations, emerged from the practice, on how to manage the final report of the evaluation of a CSCL system. For instance, the feedback from responsive evaluation studies is expected to be in forms and language attractive and comprehensible to various audiences. Thus, it should be advisable to consider it in the early stages of the evaluation in order to decide the kind of reports to be made. Other critical aspects such as advocacy, credibility and triangulation are also taken into account in this final component of the model.

**Conclusions and Future Work**
In this article we have presented the Evaluand-oriented Responsive Evaluation Model. It is conceived as a comprehensive evaluation model that could be used to evaluate a wide range of CSCL systems. The model relies on a responsive evaluation approach providing potential evaluators with a practical tool to show evidence on how things work in a particular CSCL system. The model aims to promote mutual understanding among the different backgrounds and perspectives involved in the evaluation of CSCL systems by offering profuse evaluation criteria. Moreover, it has been developed with the aim of guiding the evaluation of a CSCL system as a wholistic and interconnected situation, showing that its effects can not be reassumed along a single variable. Likewise, it strengthens the necessity of conducting evaluand-oriented studies instead of encapsulating evaluations of the particular field of whomever is evaluating. The EREM model is a practical tool that provides four question-oriented evolving courses, a representation diagram, and real examples of yet conducted evaluations, suggesting the steps to be followed by evaluators conducting issue-driven evaluations. We are currently working to provide access to the model as a web-based tool. An evaluator would then select one of the aforementioned courses and the tool will guide her through the evaluation process proposed by the model. Users are also likely to benefit from expertise achieved by other evaluators sharing their evaluation designs. The web-based tool is accessible at [http://titan.tel.uva.es/wikis/cscl-erem](http://titan.tel.uva.es/wikis/cscl-erem).

References

Acknowledgements
This work has been in large part developed under Jorrín-Abellán’s postdoctoral Fulbright fellowship. The authors would like to acknowledge the contributions of the interdisciplinary GSIC-EMIC research group.