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# Orchestrating Talk for Meaning Making in a Science Learning Community Mediated by CSCL

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**Abstract.** This project looks into the design of a science learning environment that focuses on supporting interactions for meaning making among students mediated by computer supported learning environment. The problem it addresses stems from the lack of interaction in traditional science classrooms and students not acquiring the skills and practices of the science community. From the socio-cultural perspectives, interaction plays an important role in students' in meaning making. However, students may find the process of inquiry learning an uphill task and requires scaffolding. Using the conceptualization of meaning making presented in this paper, a framework for analyzing the interaction in meaning making is proposed. This paper presents my initial ideas in the conceptualization of the project and the analysis framework

**Keywords:** meaning making, collaboration, scaffolding, interaction, CSCL

## Introduction

Science is a human endeavour striving towards a better way of explaining scientific phenomena through experimental and theoretical investigations (Kuhn, 1970). Artefacts of the community embody meanings rooted in the situation in which they are created for (Stahl, 2004). Thus, science education should engage students in the meaning making process in which students interpret and collaboratively reconstruct these meanings in same authentic situation that these artifacts were created for through an iterative process of inquiry.

However, students may find the process of inquiry learning an uphill task. Teachers, familiar with "IRE" type of interaction, may have difficulty in finding the balance between being too directive or too permissive. Thus this project aims to uncover the principles necessary for supporting students' interaction in science meaning making.

The overarching question that guides this project is "When and what kinds of scaffolding strategies are effective for fostering science meaning making among students?" More specifically, the following questions guide the research:

1. What strategies employed by the teacher are effective in scaffolding students in their development of scientific meaning and how are do they change or develop students' scientific ideas?
2. What designs (functions and supports) of CSCL lend itself to support supporting science meaning making?

## 1. Theoretical Framework

Meaning making is a dialogic process in which students bring together ideas and work on them. From a socio-cultural perspective, science learning should involve students reconstructing meanings embodied in the community's artifacts, and constructing refined meanings of these artifacts by using them in authentic situations that they are created for. This process necessitates social interaction among the students and teacher as they work towards reaching a common understanding. This collaborative meaning making helps each student to make an individual interpretation of meanings which is refined as the student participates in iterative process of inquiry.

Since interaction is an important aspect of learning, it has to be well supported within the students' zone of proximal development to bring about deep learning. The teacher and CSCL system are good mechanisms in providing the supports. While the teacher is able to provide the just-in-time customized scaffolding and reacting to students' needs, CSCL is able to cater to the masses in providing scaffolding in the cognitive, social and motivational areas. Hence, the task of scaffolding can be distributed between the teacher and CSCL to provide a good balance of support system for the students.

## 2. Methods

This project employs an iterative approach to studying the effects of scaffolds in a problem-based learning science classroom. Data collected includes classroom discourse and CSCL database to study the interaction patterns and the semantic relations constructed by the students. The data is triangulated by the concepts maps drawn by the students to capture their individual interpretation, interview to confirm observations, and teacher's reflection for designing new scaffolds. The result of the cycles of design, implementation and reflection is used to inform the next cycle of research and refinement of the scaffolds.

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