



Award #0953046

CAREER: Supporting Middle School Students' Construction of Evidence-based Arguments

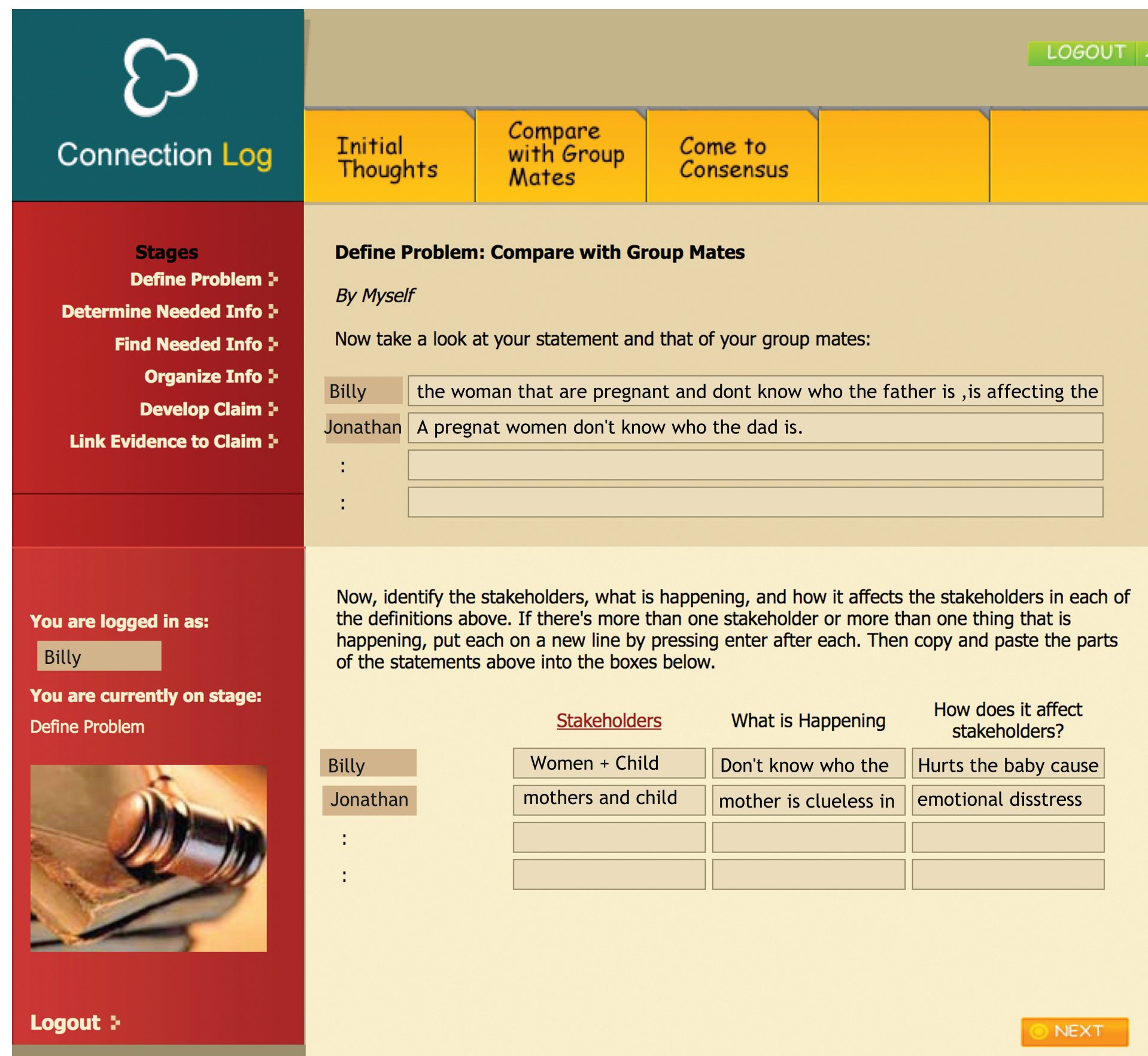
Brian R. Belland | brian.belland@usu.edu



Department of Instructional Technology and Learning Sciences | Utah State University

Scaffold Design

Generation 1 (Initial version)



Design

In the Connection Log, students articulate their thoughts in the following stages:

1. Define the problem
2. Decide on evidence needed to solve the problem
3. Find needed information and record it
4. Organize information to make it useful for developing claims
5. Develop a claim
6. Link evidence to claim

Findings

In two previous studies:

- Lower-achieving students performed significantly better than lower-achieving controls on test of argument evaluation ability (ES=.61; Belland, et al., in press)
- Average-achieving students performed significantly better than average-achieving controls (ES=.62; Belland, 2010)
- Students used the Connection Log in various ways corresponding to their needs
- Group with ENL member used it to support group communication (Belland et al., in press)
- Other uses included to get and stay organized (Belland et al; Belland)

Redesign 1 (Currently Implementing)

- Implement object-oriented architecture

- Develop teacher control panel



Redesign 2 (Anticipated Fall 2011)

- Streamline
- Develop version based on dialectical argumentation model (Kuhn, 1991)

Redesign 3 (Anticipated Fall 2013)

- Enhance transfer capacity

Theory Building

How and why do middle school students use scaffolds?

Over ten years ago, Palincsar (1998) lamented that the use of the term scaffold has lost its connection to the socio-cultural theory that undergirds it. This has led educational researchers to commit what James called the psychologist's fallacy, defined as interpreting a participant's experience from the researcher's standpoint and focusing exclusively on the outcomes of an activity to the exclusion of a study of process. Thus, educational researchers produce scaffolds and largely focus on the impact of the scaffolds on performance to the exclusion of a focus on how the scaffolds mediate student efforts. The purpose of this paper is to reconnect the term scaffold to the socio-cultural theory that undergirds it, and use that theory to explain how students use computer-based scaffolds. In particular, we examine the idea that affordances and motives drive student use of scaffolds.

How do scaffolded skills transfer?

Problem solving is an important skill in the knowledge economy. Research indicates that the development of problem solving skills works better in the context of instructional approaches centered on real-world problems. But students need scaffolding to be successful in such instruction. In this paper a conceptual framework for the transfer of scaffolded problem solving skills is presented. First, I discuss conceptions of transfer, and how research has suggested that transfer be promoted through problem-based learning and scaffolding the type of problem solving process that should be developed. Then I review existing scaffolds to support problem solving. Finally, I present guidelines for the creation of scaffolds to support transfer of problem solving skills.

What is the essence of a non-context-bound hard scaffold?

I will work to develop a theory of non-context-bound hard scaffolds. What makes them different from context-bound hard scaffolds? Do they serve similar purposes in units of different topics or problem types? What is their theoretical backing? Are they more likely to lead to transfer? If so, why?

Empirical Studies

Study 1 (Anticipated Fall 2011)

Design

Partially mixed concurrent equal status design (Leech & Onwuegbuzie, 2009)

Research Questions and Data Collection

How does hard argumentation scaffolding influence argument evaluation ability?

- What is the overall influence?
- Does the influence vary among student subgroups?

Argument evaluation ability posttest

How does hard argumentation scaffolding influence group argument quality?

- What is the overall influence?
- Does the influence vary among student subgroups?

Argumentation quality rating of final presentation

How can hard argumentation scaffolds be optimized?

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How and why do middle school students use hard argumentation scaffolds?

Videotape 3 groups during the unit, and transcribe verbatim all dialogue
Retrieve each group member's response to prompts

Conduct prompted, retrospective interviews of approximately 30 minutes each with each group
Engage in informal observations of all students during the entire unit

Analysis

Quantitative (RQs 1 and 2)

Exploratory data analysis (Gelman & Buja, 2004)

Qualitative (RQs 3 and 4)

Data collection, data reduction, data display, and conclusion-drawing/verification (Miles & Huberman, 1984)

References

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