**Supporting Networked Collaborative Learning Using Eye-Tracking Technology to Augment Joint Visual Attention**

Bertrand Schneider, Roy Pea

Stanford University, School of Education

---

**INTRODUCTION**

Joint attention is fundamental to any kind of social coordination: young infants communicate their emotions by being in a state of synchrony with their caregivers, which in turn helps them achieve visual coordination when learning to speak (Stern, 1977; Brooks & Meltzoff, 2008). Professors teach by highlighting subtle nuances between students’ and experts’ conceptual understanding of a domain (Roth, 2001). Groups of students rely on the coordination between students’ and experts’ conceptual understanding of a domain.

**PURPOSE**

The goal of our work is to develop new ways of supporting the establishment of joint attention. We use eye-tracking technologies to share users’ gaze in a collaborative learning situation. More specifically, our first attempt involves dyads studying contrasting cases (Schwartz & Bransford, 1998) in a remote collaboration. We introduce a new kind of awareness tool that provides participants with the position of their partner’s gaze on the screen, allowing for real-time mutual gaze perception.

**METHODS**

Participants:
42 college-level students from a community college (average age 23.0, SD = 8.3; 28 females, 14 males)

Experimental Conditions:
• “visible-gaze” condition with the gaze-awareness tool (N = 24);
• “no-gaze” condition (N = 20) without the gaze-awareness tool.

Measures:
• Learning test (3 sub-dimensions: concepts, memory, transfer)
• Quality of collaboration (Meier, Spada and Rummel, 2007)
• Eye-tracking data (fixations, saccades, pupil size)

---

**RESULTS**

1. Dyads learned more and had a higher quality of collaboration when using the gaze-awareness tool (F(1,40) = 7.81, p < 0.01).
2. The number of moments of joint attention is sig. correlated with the learning gain (r = 0.39, p < 0.05)

**DISCUSSION**

Conclusions:
• Our study shows that the role of joint attention is preponderant in collaborative learning situations.
• This process can be enhanced by technological tools (i.e. eye-trackers)

Future Work:
• replicate those results in other settings (e.g. co-located dyad)

---

**ACKNOWLEDGMENTS**

Supported by a grant from the National Science Foundation (SMA-0835854) to the LIFE Science of Learning Center.