Eye Movement Tracking During an Embodied Collective Activity in Science Teacher Training

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Abstract

Middle-school science teachers who trained in the field of embodied pedagogy for teaching and learning physics, experienced an embodied collective activity for learning the concept of angular velocity. (The teachers were unfamiliar with the concept). Embodied pedagogy maintains that teaching and learning abstract concepts can benefit significantly from integrating bodily movements in the process. Here we explored the involvement of eye movements in the process of collective embodied learning of the concept of angular velocity. Embodied learning was accomplished by the subjects forming a line that rotated around a central object, in this case, a bottle. We tracked the gaze resulting from eye and head movements in 12 subjects, who both actively participated in the collective embodied exercise and passively watched it. The tracking data of 7 of these 12 subjects passed our tracking reliability criteria in all trials and are reported here. During active learning, the learners tended to look ahead of the rotating line (by 35.18±14.82 degrees). The findings show that the subjects looked ahead during the activity, in contrast to their verbal report but in line with studies showing that eye movements can precede body movements. In contrast to the active learning, while passively watching others performing the task, the subjects tended to look directly at the line. We discuss possible differences between active and passive embodied learning that might be indicated by the observed differences in gaze control.