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Original article

From learners' concept maps of their similar or complementary prior knowledge to collaborative concept map: Dual eye-tracking and concept map analyses[☆]

Comment deux apprenants coordonnent les représentations externes de leurs connaissances identiques ou complémentaires pour construire une carte collaborative : analyses des mouvements oculaires et des cartes conceptuelles

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ABSTRACT

The present paper describes the MUPEMURE (Multiple Perspectives on Multiple Representations; Bodemer, Author, Kapur, Rummel, & Weinberger, 2011) model as a conceptual framework for collaborative learning with multiple external representations. Within this framework, a study was conducted to examine how learners working in dyads translated between self-generated concept maps of their own and partner's prior knowledge to create a collaborative concept map. Before individual and collaborative concept mapping (CCM) sessions, prior information on the learning topic was

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distributed between dyad members in such a way that they had either similar (“same/shared prior knowledge” or SK condition) or different but complementary knowledge (“different/unshared prior knowledge” or DK condition). The dual eye-tracking method was used in this study, and eye movement data was examined in two time periods, the first and second half of the CCM session. Eye movement analysis was complemented with the analysis of concept map measures, such as achievement, individual-to-group transfer and group creativity. In the first half of the CCM session, eye movement behavior across the three maps was interpreted as reflecting initial externalization and divergent processes through which learners mutually compare their knowledge and engage in a process of modeling each other. The second half of the CCM session was identified as a convergent phase characterized by a decrease in eye movement transitions between maps, and a convergence of attention on the collaborative map. The results also showed that in the first half of the collaboration, learners of the DK condition transitioned more between their own and partner maps, and therefore had more difficulty coordinating their respective prior knowledge compared to learners of the SK condition. Participants with different/unshared prior knowledge also focused their attention mainly in their own map and explored less their partner map in the first half of the collaboration. This suggests that they worked in a less collaborative way compared to those with same/shared prior knowledge during the divergent phase.

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Cet article présente le modèle MUPEMURE comme cadre conceptuel pour l'apprentissage collaboratif à partir de représentations externes multiples. En lien avec ce modèle, une étude a été réalisée pour comprendre comment deux apprenants construisaient ensemble une carte conceptuelle commune à partir de cartes représentant leurs connaissances initiales respectives. Avant la collaboration, des informations sur le thème d'apprentissage ont été distribuées entre les co-apprenants de sorte à ce qu'ils disposaient de connaissances identiques ou différentes/complémentaires. Les mouvements oculaires pendant la collaboration ont été analysés ainsi que les cartes conceptuelles. Les résultats ont montré que la première moitié de la collaboration correspondait à une phase d'externalisation initiale et de divergence au cours de laquelle les co-apprenants ont comparé visuellement leurs cartes de connaissances initiales, tandis que la seconde moitié de la collaboration correspondait à une phase de convergence au cours de laquelle les co-apprenants ont concentré leur attention sur la carte commune. Nous avons également observé un nombre plus important de transitions oculaires entre les deux cartes de connaissances initiales, et donc une plus grande difficulté à coordonner ces dernières chez les co-apprenants avec des connaissances différentes. Ces derniers ont également porté plus d'attention à leur propre carte qu'à celle de leur partenaire dans la phase de divergence, ce qui suggère qu'ils ont travaillé de façon moins collaborative comparés aux co-apprenants qui possédaient des connaissances similaires.

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