FACILITATE YOUNG CHILDREN UNDERSTANDING STEM EXHIBITION VIA PARENT EMBODIED GESTURES AND LANGUAGE IN SCIENCE MUSEUM

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THEME:

STEM education in diverse contexts

BACKGROUND AND AIMS

Museums provide a unique STEM learning environment for children. But how to facilitate young children to understand science and engineering when manipulating STEM-related exhibits is a question. Many museum learning researchers focus on the effects of family conversations and mediated artifacts. Embodied cognition advocates the interaction among body, mind and environment and emphasis the role of the body in the cognitive processing of organisms (Shapiro & Stolz, 2019). Previous research showed that both learners' own embodied behaviors have an impact on their thinking and embodied cognition has the potential in understanding STEM content (Abeahamson & Lindgren, 2014; Sullivan, 2018).

This study aims to explore : (1) How can embodied cognition theory be used to design parental guidance strategies? (2) What are the effects of different parental guidance designed using embodied theory on children's learning of science? Therefore, the two parental guidance strategies are designed: (1) parents using embodied gestures to interact with children and (2) parents using embodied language to encourage children to express themselves through embodied gestures during the interaction.

METHODOLOGY

A quasi-experimental design is employed in this study. 30 families are recruited on site in Shanghai Science and Technology Museum and randomly assigned into three groups: 10 in the control group, 11 in experimental group one and 9 in experimental group two. All study participants are informed of the purpose of the study and signed informed consent forms. Parents in experimental group one are provided with instruction on embodied gestures and parents in experimental group two are provided with embodied language. Embodied gestures relate to scientific concepts such as rotation, while embodied language is used to encourage children to produce embodied behaviors such as 'you make a gesture with your hand'.

The data include the audio and video recording of parent-child interactions, the post-test of children and interviews of children and parents. The parent-child interaction behaviors are coded with Datavyu according to the Parent-Child Interaction Behavioral Coding Scale（ Mcneill, 1993；Willard, Busch, Cullum & Legare, 2019）.

RESULTS AND CONCLUSIONS

The result shows parents' embodied language or gestures could help children learn science in a museum setting. Children's exploratory behaviors increased in both experimental groups. Children in the group provided with embodied language show more embodied behaviors. The analysis of conversations shows that embodied language will lead to richer and more inspiring

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learning conversations. The post-test score shows both strategies helps children understand STEM exhibition and related concepts. Hope this study could provide a new informal STEM pedagogy for parents and museum educators.

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