

Exploring the Dynamics of the Emotional Energy of Young STEM Makers: An Ethnographic Study Using Wearable Devices

Emotional energy refers to human beings' enduring sense of social cohesion experienced as an outcome of successful social interaction in work, living or learning environments (Bellocchi, 2017). Research into emotional energy is gaining momentum in sociology, psychology, and education, as fostering a lasting sense of social cohesion is vital for effectively addressing complex social, economic, and environmental challenges (UNESCO, 2023). Previous research indicates that the development of emotional energy is dynamic. Yet, little is known about (i) how emotional energy varies in different stages of learning, (ii) how it changes over a chain of learning activities; and (iii) what are the key factors influencing its changes in education contexts. These knowledge gaps have been barriers to systematically designing approaches to enhancing and sustaining the emotional energy of learning groups so as to ensure the long-term efficiency of school curricula. This project will choose to investigate emotional energy in the context of maker-centred STEM (Science, Technology, Engineering and Mathematics) learning, due to (i) its unique cross-disciplinary nature and complex learning process and (ii) the role of emotional energy as a prerequisite for unlocking student group creativity in STEM education (Ding et al., 2024). Based on a pilot study of STEM maker groups and the investigators' previous research of maker-centred STEM learning (e.g., English* & King, 2019; Wan* et al., 2022) and emotional energy (e.g., Davis*, 2021), this project will adopt an ethnographic methodology to investigate the longitudinal change of emotional energy cross in STEM maker activities. To capture the developmental trajectory of emotional energy, the collaborative learning process of 30 pairs of Primary 5 students from 3 schools will be captured by using wearable cameras (as unobtrusive observation devices) for one year over 8 STEM maker activities. Artefact-based retrospective interviews will be conducted to explore the key factors influencing the development of emotional energy of young STEM makers. An innovative aspect of this project is its exploration of the socio-emotional processes in STEM learning. The employment of wearable devices makes it possible to investigate longitudinal changes in the emotional energy of a good number of student groups. Its unique research context will make the investigation into the dynamics of emotional energy more effective and significant. The findings will advance the knowledge frontiers in emotional energy theories by unveiling the variation of emotional energy in different stages of cross-disciplinary learning, outlining its developmental trajectory, and identifying key influencing factors.