

## **STEMization of Physics teaching: Effectiveness and challenges**

Symposium

STEMization of Physics teaching: Effectiveness and challenges

Organizer: Nguyen Van BIEN

**Abstract:** STEM education has been implemented popularly since about 2005. STEM education fosters individuals in learning achievements, authentic problem-solving skills, interests in STEM sub-subjects, and pursuing STEM careers. Nowadays, many countries have deployed STEM education, including Asian countries, to achieve STEM values for students. With the development of STEM education, an ongoing challenge to pre-service science teachers (PST) is developing STEM teaching practice. Therefore, it is a significant concern to develop appropriate strategies for PST training programs in STEM education. We designed and implemented internationally the method course that strengthens modeling-based inquiry and integration of STEM education in Vietnam and Indonesia. The key features of the MII-STEM approach consist of real-world problems, constructing a STEM model, predicting, collecting data, testing solutions, and formulating hypothesis-proposal solutions. The results showed that PSTs positively changed perceptions of models and modelings. Besides, Indonesian PSTs had microteaching at acceptable levels.

However, successful STEM education required national conditions. One solution could be the implementation of specific subjects with the key features of STEM education, for example, innovative Physics teaching with STEM integration. In the following parts, we presented empirical studies of implementing STEM education in Vietnamese classes. Such empirical studies affirmed the successful implementation of STEM education in Vietnam.

Speakers:

Nguyen Thi To Khuyen: Impacts of method courses on Vietnamese pre-service teachers' perceptions and practices: From the perspectives of model and modeling in STEM education

R. Ahmad Zaky El Islami: MII-STEM Implementation in Indonesia: A Pilot Study

Nguyen Anh Thuan: Building STEM teaching materials for the topic "Energy and life" to develop scientific competencies of junior high school students

Tuong Duy Hai: The role of Coach 7 software in STEM education for a primary and secondary school in Vietnam

**Primary author:** TUONG DUY, Hai

**Co-authors:** Mr EL ISLAMI, R. Ahmad Zaky (Untirta); Dr THUAN, Nguyen Anh (hnue); TRAN, Trinh-Ba; Mrs HAI MY NGAN, Le (HCMUE); Dr THI TO KHUYEN, Nguyen (HNUE); Dr BIEN, Nguyen Van (Hanoi national university of education)

**Presenters:** TUONG DUY, Hai; Mr EL ISLAMI, R. Ahmad Zaky (Untirta); Dr THUAN, Nguyen Anh (hnue); TRAN, Trinh-Ba; Dr THI TO KHUYEN, Nguyen (HNUE); Dr BIEN, Nguyen Van (Hanoi national university of education)