on certain subjects, but emphasizes the application of concepts in the real world. When practicing STEM in the classroom, the selection of real world problems demonstrates the teacher’s connection to the content knowledge. Teachers who are weak in content knowledge will give confusing examples to students (Jiménez-Aleixandre & Crujeiras, 2017; Kelly & Licona, 2018).

The point of this research is to emphasize that when practicing the STEM approach, teachers need to improve their content knowledge about the topics taught. One limitation of our study was the sample size. Clearly, one university in each country is not enough to generalize. However, the analysis using the online form and keeping the sample with the valid answer supported our hypothesis. Furthermore, students, in-service, and pre-service teachers should be involved to ensure teachers’ content knowledge positively influences students’ achievement.

Conclusions

This paper has shown the energy learning progression among PSTs in Japan and Indonesia. The Japanese PSTs are better prepared to teach energy topics to students than the Indonesian PSTs because they have advanced knowledge to better understand energy concepts. Content knowledge is basic to applying the STEM approach in the classroom. There was a positive correlation between content knowledge and STEM conceptualization. It suggests that content knowledge should be a part of professional development in STEM education.

Reference


