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PRE-SERVICE PHYSICS TEACHERS' STEM INTEGRATIONS

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One of the most problematic topics for STEM researchers is that there are different interpretations of STEM integration and STEM education. As stated in many studies, STEM education has been described in a variety of ways from disciplinary approaches to disciplinary approaches. Bybee (2013) argues that it is necessary to determine where we are to get details of where we want to go. For this reason, how STEM disciplines, science, technology, engineering and mathematics disciplines are related is important.
Bybee (2013) demonstrates that this integration can be done in different ways to create a STEM curriculum as STEM 1.0 (one discipline), STEM 2.0 (two disciplines), STEM 3.0 (three disciplines) and STEM 4.0 (four disciplines). The study lasted for 13 weeks and STEM training was given to pre-service physics teachers including STEM philosophy, engineering design process, computational thinking and technology. At the end of the 13th week, they were asked to perform a STEM activity from the teacher candidates as micro-teaching. 14 teacher candidates, 10 girls and 4 boys, participated in the study. Pre-service physics teachers' perspectives are categorized as nested, transdisciplinary, sequential, siloed and others through using pre-service teacher STEM Education Survey, developed by Radloff and Guzey. As a result, STEM integration model is related to the perspectives of pre-service physics teachers. For instance, pre-service physics teachers who have transdisciplinary perspective integrated using STEM 4.0 integration model in their micro-teaching. On the other hand, pre-service physics teachers should also be encouraged to use technology such as simulations, WEB 2.0 tools to build STEM 4.0 integration.
(Conclusions will be shared during the presentation of the conference.)

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