

IMPORTANCE OF THE NGSS 8 PRACTICES FOR STEM STUDENTS IN JAPANESE UNIVERSITIES

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THEME:

Engaging students in STEM education

BACKGROUND AND AIMS

Next Generation Science Standards (NGSS; NRC,2013) posit eight practices for K–12 education. First-Year Experience (FYE) programs support students' transition from secondary to higher education; this is particularly significant for increasing the numbers of science, technology, engineering, and math (STEM) graduates (PCAST, 2012). Therefore, clarifying how students in FYE programs perceive the NGSS practices is essential for effective connection between school and university education. This study's research question is "What are STEM majors' perceptions of the eight NGSS practices, and are there gender differences in these perceptions?"

METHODOLOGY

The participants, 232 first-year science majors from Japanese universities, rated the eight NGSS practices using a five-point Likert scale. *T*-tests were conducted based on the responses by gender.

RESULTS AND CONCLUSIONS

All items received approximately 80% positive responses, thereby confirming that most participants recognized the importance of the eight practices (Figure 1). Table 1 summarizes the results of *t*-tests conducted for gender, and no significant differences were found for any item.

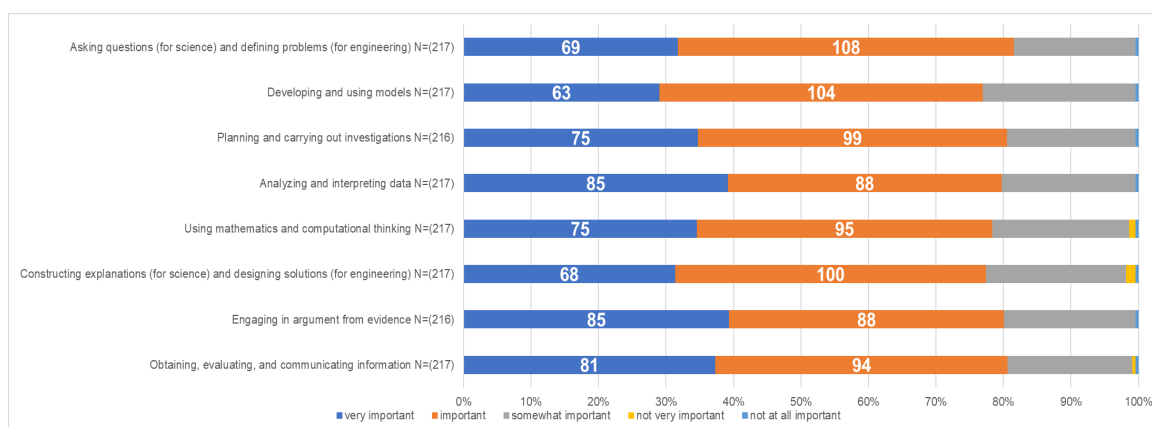


Figure 1 Results on importance perceptions (All respondents)

Table 1 T-test results for NGSS eight practices by gender

	Male Mean(SD)	Female Mean(SD)	<i>t</i>	df
Asking questions (for science) and defining problems (for engineering)	4.15(0.699)	4.09(0.779)	0.521	214
Developing and using models	4.06(0.735)	4.05(0.773)	0.132	214
Planning and carrying out investigations	4.19(0.739)	4.06(0.762)	1.15	213
Analyzing and interpreting data	4.21(0.753)	4.14(0.821)	0.615	214
Using mathematics and computational thinking	4.12(0.741)	4.11(0.879)	0.120	214
Constructing explanations (for science) and designing solutions (for engineering)	4.07(0.783)	4.08(0.791)	-0.0784	214
Engaging in argument from evidence	4.21(0.758)	4.14(0.802)	0.687	213
Obtaining, evaluating, and communicating information	4.19(0.754)	4.14(0.802)	0.443	214

The results indicate that students majoring in STEM fields recognize the importance of the eight practices listed in the NGSS regardless of gender. Future work should include data from a large number of undergraduate and college students, surveys of multinational students, and qualitative research on how students perceive the practice items.

ACKNOWLEDGMENTS

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