

Engineering: The Unifying Skill in Early Childhood STEM Education

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Introduction

It is believed that engineering design is a unifying skill in STEM education. I believe this is because students are able to explore how math, science, and/or technology skills are used in real life. This paper will analyze three sets of standards and how they incorporate the skill of engineering to help boost student understanding within the early childhood setting, meaning grades Kindergarten through Second Grade. The standards that will be analyzed are the Next Generation Science Standards, the Common Core Math Standards, and the Standards for Technological Literacy.

Next Generation Science Standards

The Next Generation Science Standards (NGSS) have created a variety of science standards for various disciplines ranging from physical science to Earth and space science. Each grade level also contains standards for engineering design. When exploring this set of standards, it is easy to see how a variety of disciplines have been woven together to create a seamless integration of STEM skills.

Within the standard, one can see that disciplines such as physical science have been embedded in the engineering standards and vice versa. It is this integration that allows teachers to create lessons that allow students to explore science using engineering as the glue that bonds the concepts together. Within the context of early childhood education, students are eager for hands-on experiences that put their creativity to work rather than being lectured on a subject and not exploring how it applies to the world in which they live and their lives.

Common Core Math Standards

Everyone has heard the good, the bad, and the ugly regarding the Common Core Math Standards. Regardless of your position, it is worth noting that this set of standards has also addressed engineering, even in its simplest form. When reading through the Kindergarten standards, one notices that they have been split up into domains based on the various disciplines of mathematics. While several of the domains, such as counting and algebraic thinking, do not specifically address engineering, the domain of geometry does. Within this domain, students are encouraged to build shapes using a variety of tools, use engineering language such as “angle” and “attribute,” and explore their world through the eyes of an engineer.

As students progress through the grade-levels, the concept of engineering becomes more evident in other domains as well. For example, in the Second Grade standards, when one explores the domain of measurement and data, students are engaged in learning about standard units of measurement.

While the Common Core Math Standards provide some exploration of engineering, there is not as much emphasis on it in the early childhood setting as in the Next Generation Science Standards.

Standards for Technological Literacy

The Standards for Technological Literacy are the most integrated set of standards I have read with regard to engineering. Each standard focuses on how technology is present in every facet of our lives. The concept of engineering is present in every grade-level including Kindergarten. The standards focus on the use of tools (technology) to be able to explore and manipulate our world (engineering).

Conclusion

While each discipline infuses some engineering into its standards, I found that the Next Generation Science Standards and the Standards for Technological Literacy put much more emphasis on using engineering as a way to study the various domains within their disciplines. I was surprised that the Common Core Math Standards did not explicitly provide a way for educators to make the connection between math and engineering in early childhood education.

It is evident that engineering design is a unifying concept/skill. Students are able to see how science, math, and technology can be explored and used in real life through engineering. This helps student achievement overall because they are able to relate to the skill on a deeper and more personal level.

References

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