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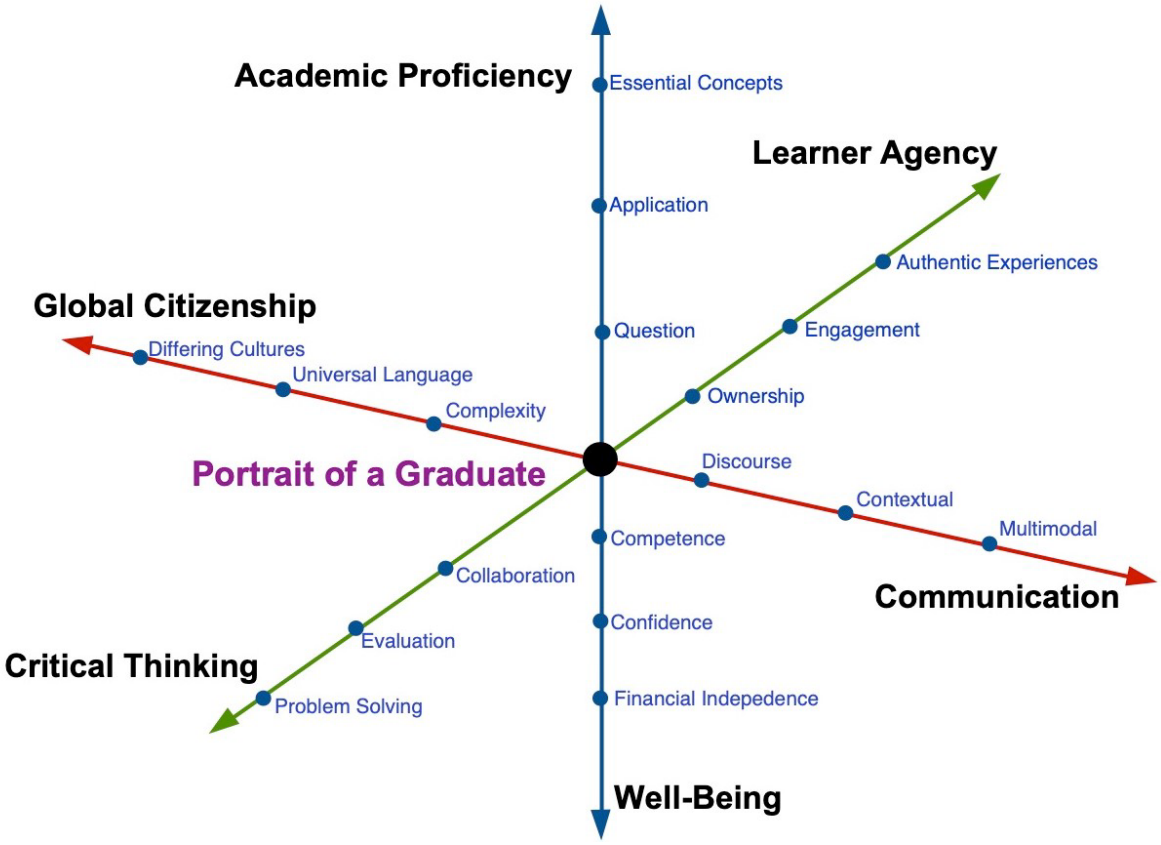
A Vermont Portrait of a Graduate as a Function of Math

In 2010, Vermont adopted the Common Core State Standards for Mathematics. The CCSS for Mathematics provide clear, consistent expectations for students, which define what students should understand and be able to do. The AOE has developed sample proficiency-based graduation requirements (PBGRs) for Mathematics based on the CCSS. These PBGRs are examples of a rigorous proficiency-based graduation framework that students must meet for graduation, under the content of Mathematics, as per EQS requirements. These standards do not dictate curriculum or teaching methods. They are also not intended to be new names for old ways of doing business but rather a framework to support schools as they deliver effective K-12 mathematics instruction and curriculum.

A Vermont Portrait of a Graduate (PoG) was collaboratively developed with educators and students to be used as a tool for reviewing and refining local PBGRs, including content specific PBGRs, as well as a guide for making instructional decisions. The PoG specifies the cognitive, personal, and interpersonal skills and abilities that students should be able to demonstrate upon graduation considering six attributes: learner agency, global citizenship, academic proficiency, communication, critical thinking, and well-being.

The Portrait of a Graduate as a Function of Math

In addition to learning the concepts of mathematics, a student can also address the attributes of the Vermont PoG through the study of mathematics. Below is a version of a PoG that depicts how a student in the study of mathematics will meet the six attributes described in the Vermont PoG. The information contained was largely inspired by the performance indicators of the Vermont PoG's attributes and also from the Equitable Mathematics Teaching Practices found in the book Catalyzing Change published by the National Council of Teachers of Mathematics.



Learner Agency: Ownership, High Expectations, and Authentic Experiences

Students become life-long learners when they develop **ownership** of their learning. While practicing modeling, reasoning, and problem-solving skills during **authentic experiences**, students shape their own mathematical identity and begin to hold themselves to **high expectations**. Creating unique mathematical representations and solutions positions students to become competent in using and applying mathematics to real world scenarios and defending their own decision-making through the use of data.

Global Citizenship: Universal Language, Complexity, and Differing Cultures

To be global citizens, students must be able to use mathematics for communicating and modeling natural phenomena, locally and globally. Mathematics is considered a **universal language** as the structure of mathematical language is the same internationally. However, understanding the **complexities** of how others learn math is critical for bridging culture gaps since the way mathematical ideas are represented is different in other countries. Students engaging in relevant tasks from **differing cultures** interact with diverse ideas and concepts that break down biases, misperceptions and hierarchical status in the learning of mathematical practices and concepts.

Academic Proficiency: Essential Concepts, Application, and Questions

Students that understand the **essential concepts** of mathematics can connect knowledge and skills fluently in order to solve real-world problems. The **application** of these concepts to new and unique situations builds a student's capacity to effectively ask **questions** and engage in mathematical discussions and problem solving in life after graduation.

Communication: Discourse, Multimodal, and Context

To gain a deeper understanding of mathematics and use mathematical skills to make sense of their world, students must communicate through **discourse** among peers using **multimodal** forms of media in their modeling of mathematics, while understanding the perspectives of others by analyzing their arguments and approaches to solving a problem. Students need to question purposefully in order to convey their learning, revise their own thinking, and develop a positive mathematical identity allowing them to present their solutions in **context** and in a respectful manner.

Critical Thinking: Problem Solving, Evaluation, and Collaboration

As students analyze mathematical information and undertake innovative, real-world **problem solving**, they develop the necessary reasoning skills to engage in more complex and demanding situations. Making student thinking public through presentation, both independently and in **collaboration** with their peers, validates their ideas as worthy of **evaluation** and exploration, and builds a positive mathematical identity. This encourages analysis of unknown situations to understand how components work independently and together, allowing the unknown to become known.

Well-Being: Confidence, Competence, and Financial Independence

Connecting conceptual understandings with procedural fluency positions a student to build **confidence** in their ability to know and do math. Students that can navigate economic situations -- personal, local and global -- and engage in responsible mathematic decision-making show their **competence** with mathematics and financial literacy, which in turn can result in improved outcomes such **financial independence**.