STEM Vs Traditional Education
published by Dhaval Jadav

Over the years, education has drastically evolved due to the adoption of new technologies in the classroom and significant changes in curriculum. Going to school no longer involves traditional classrooms with books and a chalkboard. Classrooms today are upgraded with interactive smartboards, and oftentimes technology initiatives that provide students with an electronic such as a laptop or tablet (i.e., iPads, Chromebooks, etc.). However, tech is not the only thing that has gone through an evolution in education. Curricula across the education sector have also experienced major changes over time, from traditional to Common Core, and in most recent years, STEM (Science, Technology, Engineering and Mathematics). So, how is STEM different from a traditional education curriculum?

Traditionally, education was about learning by way of knowledge and memorization, or in other words, relying more on the information you retain rather than the information you apply. For example, quizzes and tests used to be based on memorization. Studying consisted of trying to retain the information you would be tested on. In a STEM setting, knowledge retention is important; however, the way students apply that knowledge is just as important. STEM focuses not only on teaching a student about a subject, but also showing the student how the subject applies to real life, and how they will be able to utilize it in the future. For example, a traditional math course may teach a student an equation, but the student may not know how to apply that equation to real-life situations. A STEM program would teach a student a math equation, and how it could be used in different fields such as science or engineering.

STEM education is known for sparking an interest in subjects such as science, technology, math and engineering, because it gets students more involved in doing, rather than just learning. Traditional education covers a general spectrum of subjects without focusing directly on, or diving deeper into, a select few. A traditional lecture is also much different than a course in a STEM program. Going back to the concept of learning vs. doing, a traditional curriculum lecture involves an instructor speaking about a topic in the classroom, students taking notes and then applying the learned knowledge to a test or exam. For certain individuals, traditional classroom structures and lectures can be monotonous, causing students to lose focus quickly. A STEM program gets students involved in activities that can be directly applied to the subject at hand, ultimately peaking student interest, and limiting redundancy.

Additionally, traditional education tends to be more structured, with set rules on how subjects should be taught. STEM breaks that mold and limits repetitive lessons. “Traditional education is focused on replicating the correct hypothesis, while one of the most important pillars of STEM module is to build creativity,” according to a recent Times of India article. “STEM is focused on stimulating the brain and giving it a free reign to create, rather than simply replicate what is already known to the world.”

Traditional Learning Vs STEM (Project Based Learning)

EDUCATION ASPECT	TRADITIONAL LEARNING	PROJECT BASED LEARNING
Curriculum	Content	Comprehension
	Knowledge about facts	Understanding of concepts and principles
	Learn "building-block" in isolation	Developing skills on complex problem solving
Scope and Stage	Follow the curriculum strictly	Follow learners' interest
	From block to block or unit to unit	Larger units are formed from complex issues and problems
	Centered, based on discipline	Diverged, interdisciplinary
Role of lectures	Lecturing	Provide source of learning materials and participant in learning
	The master	As partner
Assessment	Product	Process and product
	Score from tests	Real achievement
	Comparing one another	Standard performance and development from time to time
	Reproduction of information	Demonstration of understanding
Learning Materials	Text, lecturing, presentation	Authentic sources, textbooks, interview, documents, etc.
	Activities and worksheet developed by teachers	Data and materials developed by students
Technology Used	Supporting, peripheral	Main, integral
	Teacher centered	Student centered
	For extensive teachers' presentation	For extensive students' presentation or strengthen learning
Classroom Context	Students work by themselves	Students work in groups
	Competitive	Collaborative
	Students get information from teachers	Students construct, contribute, and synthesize information

The Cone of Learning

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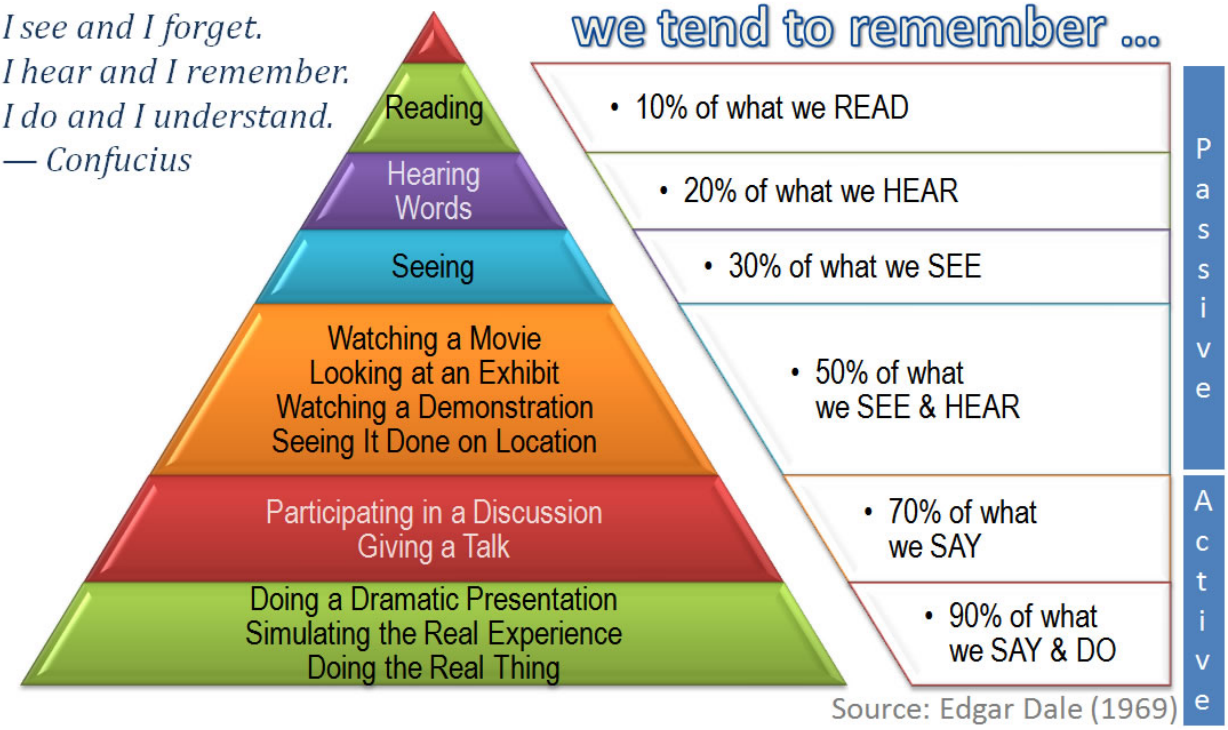
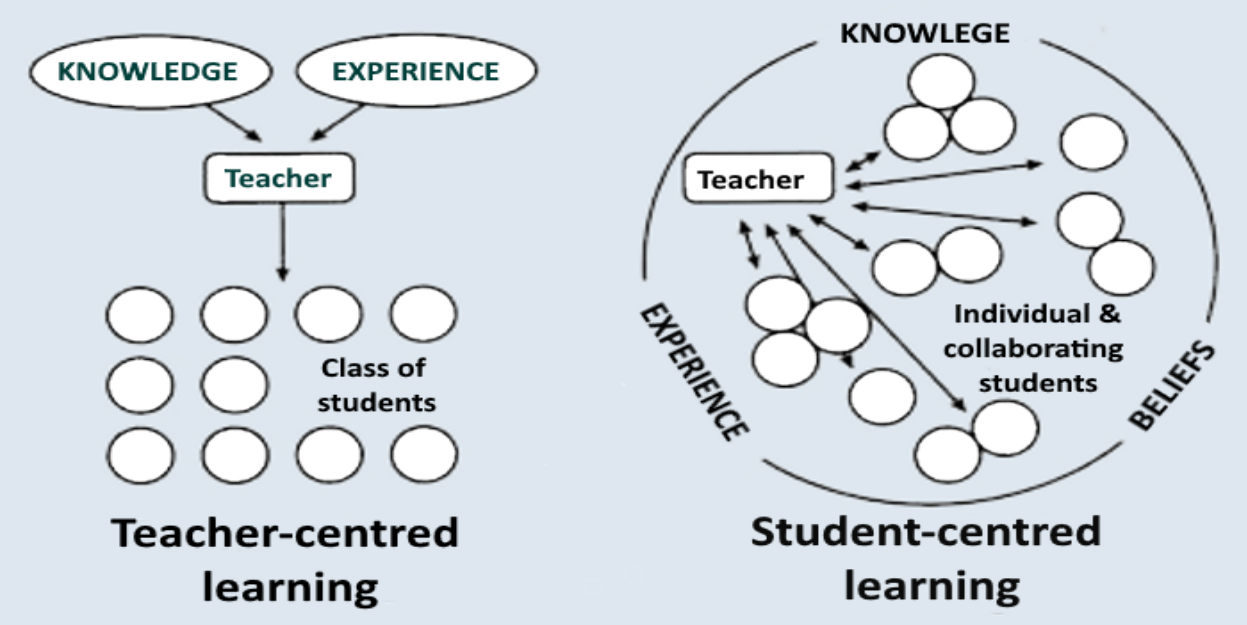
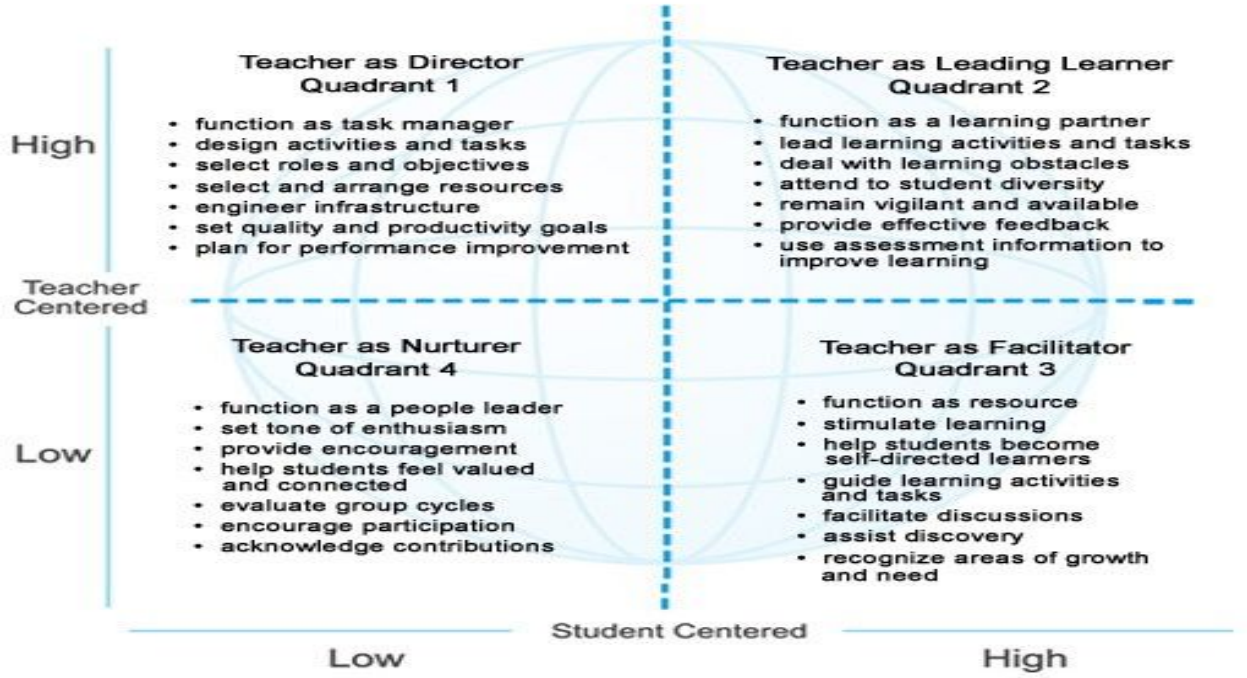
I see and I forget.
I hear and I remember.
I do and I understand.
— Confucius



Source: Edgar Dale (1969)

Teacher Centered Vs Student Centered





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6 WAYS A FACILITATOR IS DIFFERENT FROM A TEACHER

TEACHERS

- Read out concepts
- Provide notes
- Expect children to just listen
- Manage class well
- Don't acknowledge mistakes

FACILITATORS

- Engage in discussion with children
- Design activities to forge collaboration
- Encourage out of box thinking
- Forge collaboration. Create future leaders
- Treat mistakes as part of learning process

STEM ENGINEERING PROCESS

1 ASK

WHAT IS THE PROBLEM I NEED TO SOLVE??

My friends and I need to design a fast bike to ride to school!

2 IMAGINE

WHAT ARE SOME WAYS TO SOLVE THIS PROBLEM?

3 PLAN

WHAT ARE WE GOING TO DO TO SOLVE THE PROBLEM?

4 CREATE

LET'S BUILD IT!!!

5 TEST

HOW WELL DOES IT WORK?

6 IMPROVE

WHAT CAN WE DO TO MAKE IT BETTER?