

Engaging Context Data Integration

Inventions that changed the world

Source #1: https://www.youtube.com/watch?v=AjxNjkg_Zkg

Source #2:

<https://interestingengineering.com/35-inventions-that-changed-the-world>

For my new class, Pre-Engineering II, my students will design and build a project that has a positive impact on our school and/or our local community. In order to prepare my students for a project of this nature, I will begin with a lesson that allows them to develop and present a dream invention or innovation of their own. This lesson will give my students an opportunity to employ the engineering design process while making connections to science, technology, engineering, math and the real world.

A dream invention, no matter how farfetched, can only become reality if the inventor truly believes it can be done. To enhance this lesson I will present my students with influential data ranging from 500,000 BC to modern day. The data will be presented in two formats. One is a short video (Source #1) where students travel through time to view images and dates of inventions that have shaped our world as we know it. The images in this video not only illustrate impactful inventions but they are illustrated in innovative ways. The second form of data is presented in a historical timeline format from Interesting Engineering (Source #2). Interesting Engineering connects likeminded engineers to new ideas, thoughts, upcoming technologies, and engineering breakthroughs from around the globe. This historical timeline, like a history lesson, lets students know where we've been so we know where to go next. We don't want to reinvent the wheel, we just want to make it more functional to meet our ever-changing needs. After engaging in this dream invention lesson, enhanced with historical and current data, students will be inspired to unleash their innermost creativity.

Enhancing lessons with data, whether it's been researched or collected, provides students with new insight. This insight creates an opportunity for students to understand, analyze, reason, and use the data to support their own learning. Students are also more likely to set personal goals and achieve them through the use of data.

This type of data has many interdisciplinary applications in my Pre-Engineering course. Wind technology (Wind Turbine Project) for instance, has had many historical applications such as sail boats, grain mills, and water pumps. Knowledge of this historical data brings innovation and efficiency with faster sail boats and wind turbines for producing electricity. Solar technology (Solar Car Project) is another great example of how historical data can influence the advancement of heat and electric energy generated from the sun. I also plan to

teach a lesson on circuitry (Snap Circuit Project) this year but I will integrate some historical data about the creating of electricity and its progression over the years to set a firm foundation. These interdisciplinary applications also bring about student collected data using Science, Technology, Engineering, and Math. For the wind turbine project, my students used scientific processes to investigate different wind turbine blade variables (pitch, number, size, shape), Technology such as multi-meters to collect data in the form of volts and amps, the Engineering design process to improve efficiency, and Mathematics to calculate the available power in the wind with the use of anemometers. In the solar car project, my students made connections to Science, in the study of photovoltaics, to Technology, by using a renewable energy source to move a chassis, to Engineering, for a process on which to make an efficient racing vehicle, and to Mathematics, to determine the best gear ratio for a balance of torque and speed to move the vehicle. Lastly, the culminating lesson where my students ultimately design and build a project that positively impacts our school and or our local community will be yet another example of how data integration will impact not only STEM disciplines but other content areas such as writing, history, and potentially even art to enhance student learning.

References:

Clarke. "Timeline of the inventions that changed the world." YouTube, 03 May. 2012.
https://www.youtube.com/watch?v=AjxNjkg_Zkg

Punnamaraju, A. (2016) 35 Inventions that changed the world. Interesting Engineering,
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