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Tech Trends

The story of the internet thus far has been one of intellectual steps. Web pages have evolved from simple text and pictures into interactive experiences. E-publishing allows frustrated authors to publish their works unfettered by the touch of literary agents and publishing companies. More importantly, with each step, the ideas of internet users have built off one another. Javascript has given way to jQuery, and open sourced, web-based software now replicates the features of many of the more expensive programs. Understandably the progress made and the ideas spawned from the internet and computers in general have been in the two dimensional arena. However, while the first two dimensions have flourished, the third dimension has remained relatively unexplored. The reasons for this are twofold. The first reason is that it is very difficult for human beings to conceptualize the third dimension with a two dimensional medium. The second reason is that it has been, heretofore, difficult and expensive to bring three dimensional ideas to fruition. With the advent of three dimensional printing, those days will soon be behind us. 3D printing will change the world as we know it and will present educational opportunities that have been, thus far, impossible to imagine.

Potential impact of this technology on teaching, learning, or creative inquiry

At first consideration, teachers may look at 3D printing as a great way to create learning tools to share with their students. While this is certainly a possibility, it overlooks the true advantages that 3D printing brings. Student creativity knows no bounds. Their inventiveness and creativity

have provided the drive that has made sites such as You Tube so popular. Imagine if that creativity was brought from the world of bits and bytes into the world of nuts and bolts. This is the transition that 3D printing will bring about. The creative ideas of students will no longer be dependent upon machine shops and manufacturers. A student imagining something will actually be able to create a prototype relatively cheaply. Nothing encourages creativity like seeing a project grow from conception to reality. 3D printing will make this reality possible. School science departments in England have already introduced 3D printing to produce components to create working rockets. (Paton, 2013) As the technology evolves, students will be able to create their own circuit cards and their outside the box thinking could lead to even greater advancements.

Relevancy to my educational area of expertise

As a Nuclear Instructor, I don't have the opportunity to explore the creative minds of younger students; however, 3D printing offers great opportunities in the field of technical training. As a technical trainer, I am limited in terms of classroom budgets. Unfortunately, real world equipment is incredibly expensive and generally quite cumbersome in terms of size and weight. Because of this, a class of four students has only a single piece of equipment with which to work. This results in down time for half of the class while the other half is working on the equipment. A 3D printer would allow me to create scaled replicas of the equipment at one tenth the cost. This would mean that while one half of the class works on the actual equipment, the other half would be able to assemble and disassemble their models keeping them actively engaged in classroom activities.

Current Project

Currently I am using a 3D modeling program to model the component parts of a GE Magneblast circuit breaker. This project will serve two purposes. The first will be to create a virtual model for breaker simulations and breaker overhauls. The second will be used to create a ¼ scale model of

the circuit breaker for assembly and disassembly. It must be understood that these circuit breakers are 5ft x 4ft x 2ft and weigh 1200 pounds. Creating a scale model will allow my students to set the breaker on the desk while I teach the course, and while I describe the breaker operation, they will actually be able to watch the breaker work in three dimensions. Additionally, the real breaker contains dangerous forces as a result of large springs in the operating mechanism. A scale model will use weaker springs, making it much safer to examine.

Conclusion

Three dimensional printing will change the world. Already, NASA is contemplating sending a 3D printer to the International Space Station to create necessary parts. (Li, 2013) One can only imagine the effects such technology will have on manufacturing and industrial companies. In my own nuclear industry, we are encountering difficulties obtaining parts that are now obsolete. While these ideas are exciting and game changing, they pale in comparison of having the young, creative minds of students gather together to change imagination into reality.

Paton, G. (2013, October 18). 3d printers to be introduced into the classroom. *The Telegraph*. Retrieved from <http://www.telegraph.co.uk/education/educationnews/10389489/3D-printers-to-be-introduced-into-the-classroom.html>

Li, S. (2013, September 30). Nasa to send 3-d printer to space station to churn out parts . *Los Angeles Times*. Retrieved from <http://www.latimes.com/business/technology/la-fi-tn-nasa-3-d-printer-space-station-20130930,0,4845948.story>