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How University of Florida Researchers are Using 3D Printing and Digital Fossils to Improve Education

by Joseph Young | Jul 5, 2017 | 3D Design, 3D Printers, 3D Printing, Education |

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A recently conducted [case study](#) on the effectiveness of utilizing 3D printing technology to teach intricate subjects within science to young students showcases what researchers from the [University of Florida](#) have been working on in a [National Science Foundation](#)-funded program called iDigFossils that offers curriculum on intricate subjects such as evolution and climate change through the usage of 3D printed fossil replicas.

Over the past few decades, the education industry and its leading institutions have focused on improving and optimizing interactive lessons to attract the interests of young students. The emergence of innovative technologies such as [3D printing](#) has allowed educators to offer unique interactive programs to students.

As a result, the new generation of students have begun to show increased interest in complex topics that were previously avoided by intimidated students. Last week for example, [3DPrint.com](#) [reported](#) that a 14-year-old student created a low-cost cancer detection platform by combining 3D printing, robotics, and computer programming as access to more technologies allows students to learn and create more high-tech projects and real-world solutions.



Megalodon tooth [Florida Museum of Natural History photo by Jeff Gage]

The case study of the University of Florida researchers revealed that the implementation of 3D printing-based interactive programs has had evident effect on the increase in the ability to concentrate and visualize intricate topics such as evolution.

As studied in this instance, the iDigFossils program asked students at middle and high schools in Florida and California to investigate how the fossil teeth of Megalodon teeth can reveal a shark's total body length and how scientists are using data from modern sharks to better understand the nature of the ancient Megalodon that existed 2.6 million years ago.

Using 3D printed replicas of the 46 teeth of a Megalodon fossil from the [Florida Museum of Natural History's](#) digital collections, at first, students reported widely varying body length and sizes as they worked with equations based on great white sharks' anatomy. Revamping the basis for the equation after figuring out that great whites' body proportions aren't the same as Megalodon's, students were able to provide accurate estimates of the length of the Megalodon's body.

Claudia Grant, Florida Museum doctoral student and iDigFossils project coordinator, [explained](#) that the use of interactive program based on 3D printing technology has allowed students to achieve that “Aha!” moment that scientists have.”

One student who was part of the iDigFossils project explained:

“Having access to a 3-D printer allowed us to grasp things differently. Being able to physically hold something in your hand... is definitely very engaging. I have never been to a science class where everyone was so engaged with what was going on.”



Teachers at local high schools in Florida and California noticed a drastic increase in interest after utilizing 3D printing technology and 3D printed models to explain complex subjects and intricate concepts. Previously, students had to endure a difficult process of visualizing a concept or an idea without the assistance of a physical or virtual model. With 3D printing, Megan Higbee Hendrickson, a teacher at the Academy of the Holy Names in Tampa, explained that the integration of 3D printing technology into educational programs has transformed the way students think, visualize and understand concepts.

“Using real and 3-D printed fossils allows me to put a piece of the past into the hands of the students. These collaborations (with UF scientists) and the fossils I have access to have transformed the way we think of STEM in my classroom. The problem-solving and engineering skills that the students used to design and construct (Megalodon’s) jaw would have been impossible to recreate using a textbook or video,” said Hendrickson.

3D printers that can be accessed from a desktop with easy-to-replace filaments have become accessible to the general public and consumer base. Without purchasing professional 3D printers that can be rather expensive to small-scale educational institutions, schools can provide simple desktop printers with various filaments to 3D print models for interactive programs.

The iDigFossils program in specific provides resources in [open source 3D scans and images of fossils](#) that can be obtained by schools and education providers across the US, like those [available from MorphoSource](#). Using those scans and affordable budget 3D printers, schools will be able to provide better education and facilitate the growth of students in a more efficient manner.



“This is revolutionizing how kids interact with fossils by enabling them to have hands-on experiences with specimens they otherwise wouldn’t have access to. Whether you’re in Fargo, North Dakota, or Timbuktu, you can download lessons and fossils from the web. This takes the museum straight into the classroom,” said Bruce MacFadden, professor and curator of vertebrate paleontology and co-principal investigator of iDigFossils.

According to Grant, it is also important to consider that students in the US tend to fall behind students in other countries such as China, Japan and South Korea in terms of science literacy and proficiency. Grant explained that various programs and initiatives including Next Generation Science Standards (NGSS) and Common Core State Standards (CCSS) were released to close the gap between students in the US and other regions but it still remains a challenge for teachers and schools in the US. Discuss in the [3D Printed Fossils](#) forum at 3DPB.com.

[Source/Images: [Florida Museum of Natural History](#)]

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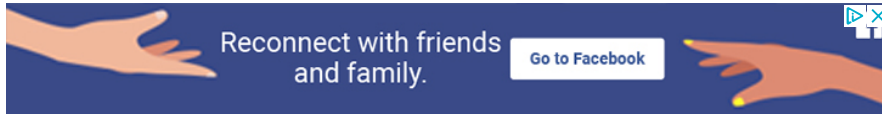
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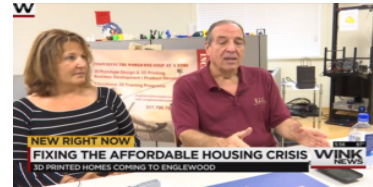
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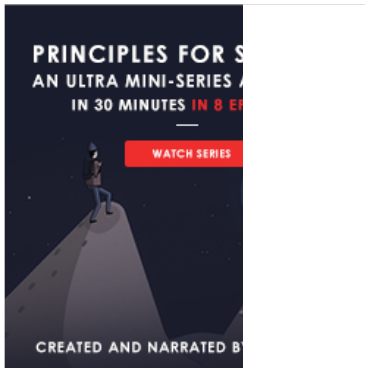
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