Museum Matters

Adding tactility enhances the learning process

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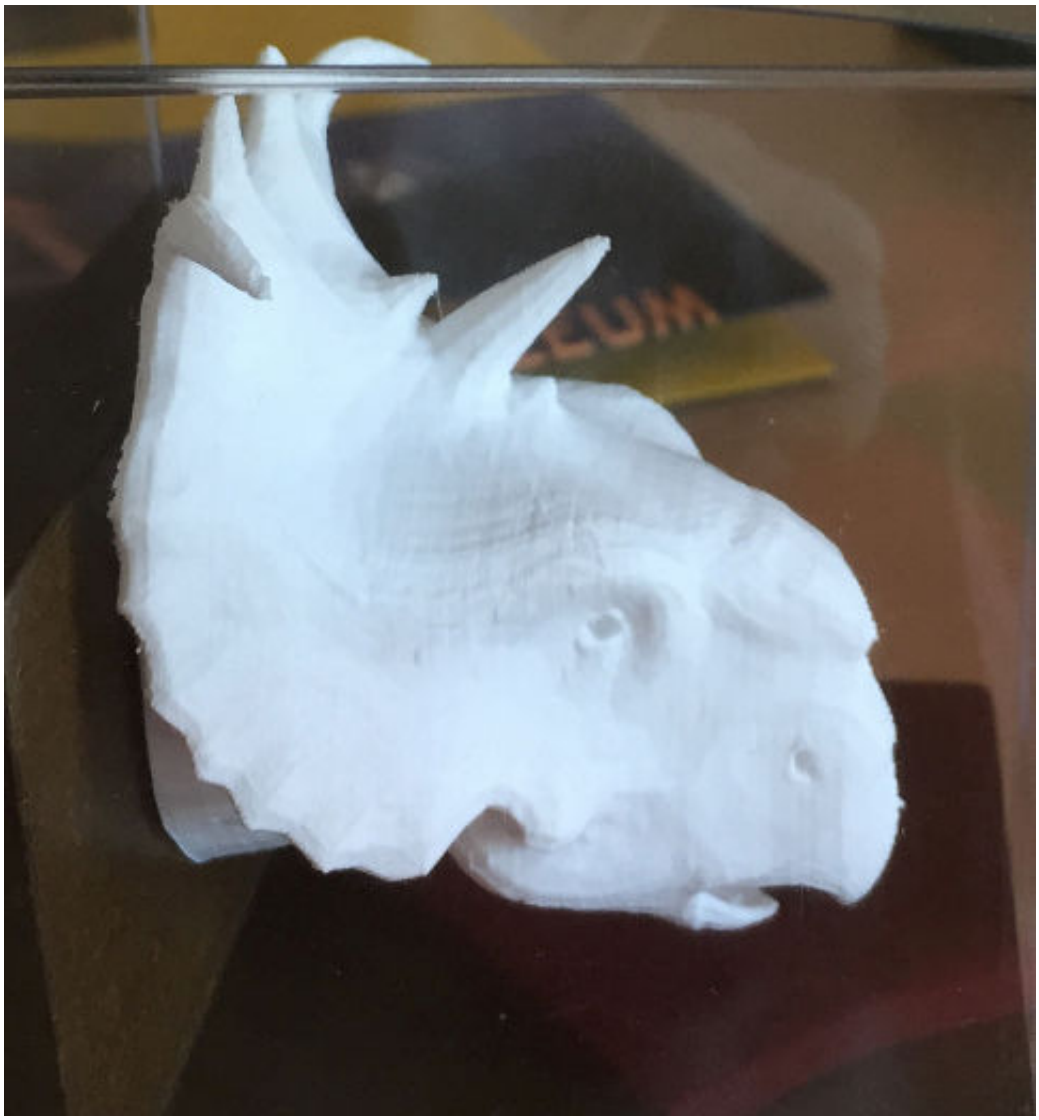

Pachyrhinosaurus 3D model

3D Printing has been making waves in multiple fields including engineering, bio-medical research, orthopedics, architecture, industrial prototyping, jewelry design, apparel, aircraft, cars, bridges, and model making, among others. Its incredible applications beckon limitless possibilities and induce spatial thinking and interface. In 2013, Chinese scientists began printing ears, livers and kidneys, with living tissue. Researchers in China have been able to successfully print human organs using specialized 3D bio printers that use living cells instead of plastic.

3D printing or additive manufacturing is a process of making three-dimensional solid objects from a digital file. The additive layering process allows for a continuous strand to create an entire object. Each of these layers can be seen as a thinly sliced horizontal cross-section of the object being rendered. The bio-degradable corn-starch based filament weaves a hollow combed structure to minimize material waste and maximize structural strength.

Invented in the 1980s in Japan, using photo-hardening polymer, it evolved into stereo-lithography and eventually into today's additive manufacturing technique.

The Philip J. Currie Dinosaur Museum will be using 3D Printers and scanners to recreate miniature dinosaurs. Not only would it add to the fun of interactive learning for school children, but would expose them to new technologies, spur their imagination and allow them to seek creative applications and encourage spatial thinking.

The museum intends to offer a unique tactile experience to kids with visual impairments to feel the contours of a dinosaur head and body and associate names of species with the way they look. From fully developed 3D models to raised relief recreations can allow for an interesting tactile-based learning experience. They can even take 3D printed the models home as a souvenir!

The long-term objective is to develop, prototype and design 3D printed learning kits that can be used by the museum in-house as well as become a significant part of producing outreach teaching material for children with visual impairments in Alberta and across Canada. There are very few institutions that have explored the potential of this option in the museum realm. The modern technology would be augmented with conventional Braille-driven text and other props that would be incorporated into the learning experience. Research suggests that when sensory input, including tactile input, is embedded within a learning exercise, it adds meaningful data to the sensory neurons triggering visual cues on contours, textures, forms, structures and positioning of features in relation to form and functionality. In an ideal world, development of motor, tactile, and visual skills, language acquisition, and concept development happen at the same time through infant and early childhood experiences

Given the potential of 3D technologies to enhance learning in myriad ways, this prospect should seek and find more voice in school curriculum and museum education programs worldwide as well as policy based funding within the province. With advances in technology, the cost of 3D printers and user filaments are extremely affordable with rapid delivery times. The museum has experimented with the head of pachyrhinosaurus rendered through 3D printing and intends to add more local species into the software development process in exciting times ahead!

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