Case Study: **Art and FreeForm® Modeling Plus™ systems deliver innovative way to teach figure sculpture.**

Customer: **The University of Georgia, Lamar Dodd School of Art**

The Lamar Dodd School of Art is one of the largest university art programs in the nation. With over 1000 art majors, the faculty and staff are dedicated to providing the highest level of instruction in studio art, design, art education, and art history. The School attracts highly qualified and talented students who are seeking to study art at a major comprehensive university. The faculty is made up of nationally recognized artists and scholars who promote a rigorous and lively creative atmosphere conducive to experimentation, innovation, scholarship and creative inquiry.

The Decision to Combine Art and FreeForm Technology

To learn sculpting the human figure, students must first understand the basic concepts of 3D forms beneath the human form, the proportions, and how these basic forms fit together. When Professor William "Rocky" Sapp first saw the FreeForm Modeling system and experienced being able to touch

and sculpt with digital clay just like real clay to quickly create 3D models, he knew the systems would provide an effective and innovative way to teach figure sculpting to his students. Rocky, Professor Larry Millard (Chair of the Sculpture Program) and David Koffman (former Chair of the Digital Media Program) teamed up to submit a grant proposal. Upon receiving the grant, the school purchased 7 FreeForm Modeling Plus systems. They then transformed one of their faculty studios into a digital figure sculpting studio with a spinning chair for the model in the center of the room and the FreeForm systems around it.

The FreeForm digital figure sculpting studio.

The Figure Sculpture Course

Rocky integrated the FreeForm systems into his course as the critical link between lectures on

human form and the physical experience of modeling figures with earthen clay. The classes included 14 Bachelor of Art or Bachelor of Fine Arts degree students; all new to figure modeling, although some had drawing experience. Most, if not all of the students, had some experience with computers. Rocky laid out his course as follows:

Part 1 – Lecture (1 session).
Sketching on the chalk board, Rocky taught the basic concepts of the 3D geometric forms (e.g. spheres, cylinders) that create the foundation of the human form.


Figure modeling student Alexis Gregg working on the FreeForm modeling system.

Part 2 – Working with the FreeForm Modeling systems (6-8 sessions).
Rocky introduced the FreeForm systems to the students with a brief overview and basic demonstration of the digital sculpting tools. Then he encouraged students to discover the power of the tools for themselves. The system's touch-enabled interface made it easy to learn and the students quickly began sculpting and carving with digital clay. Working from a live model, students spent 1 day getting familiar with the systems. Each system was used by 2 students. One student worked on the system for 1 hour while the other watched, and then they changed places. During the course, the students created half-figures (waist-up) and heads, and worked with the FreeForm systems for about 1 month. They could also use the systems on their own time.
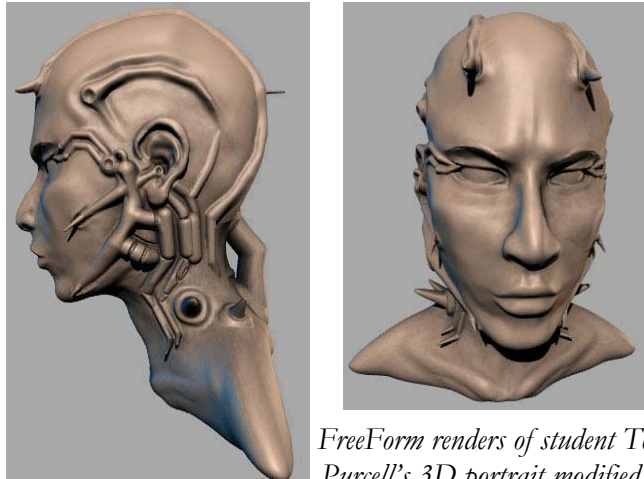
FreeForm renders of student Tom Purcell's 3D portrait modified in Freeform into an alien being.

Rocky found that some students did better in virtual clay than physical clay. He noted that students worked much faster on the FreeForm systems because they could make corrections so much faster in the digital domain than when working with real clay. He also found that because FreeForm models could be turned and manipulated so easily, students were able to quickly learn how to visualize the back of their models. He also enjoyed learning new FreeForm tools or ways of using the tools that his students had discovered.

Some students alternated working in clay, then working in the FreeForm system. Going back and forth from a hi-tech tool like FreeForm, then jumping back to the organic clay resulted in ideas crossing over.

By the end of this part of the class, students had learned the foundation of geometric forms that make up the human figure and how those forms fit together. Some students printed out their models on the school's RP system (wax), while others printed them out in 2D.

Part 3 – Use of earthen clay (10-12 sessions)
In this part of the course, the students transitioned from the digital world to the physical world. Based on the work they had done on the FreeForm systems, they began modeling whole figures and portraits using clay.

Clay head (top row) and final cast plaster head (bottom row) inspired by FreeForm alien head model. By student Tom Purcell.

Part 4 – Mold making and casting (4-6 sessions)
Using their clay figures and portraits, students created molds and cold-materials castings.

From Figure Modeling to Character Modeling

Exposure to 3D modeling in the digital domain inspired one student in particular, Tom Purcell, to seize the opportunity to go beyond figure modeling and use the FreeForm system for character modeling. He used the FreeForm system to create characters such as "FrogDog" (below). Additionally, he modified one of the original 3D portraits he had created, and then imported the digital file into other software packages and altered it with color, affects, and animation. Subsequently he created a 3-minute movie, complete with sound-track and effects, which featured the FreeForm portrait. When the movie was viewed by experienced professionals, they could hardly believe that the movie was undergraduate work.

Student Tom Purcell using the FreeForm system with the PHANTOM Desktop haptic device to model "FrogDog".
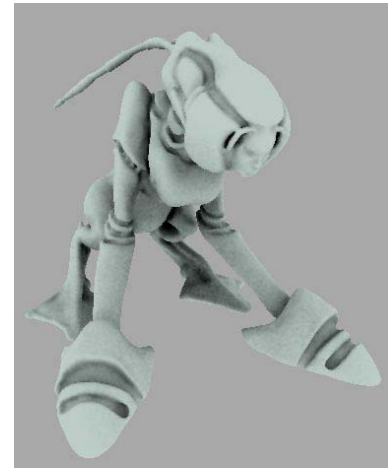
"FrogDog".

Giving Students the Digital Tools to Learn and Succeed

"At the National Sculpture Conference 2000 in Houston, I was introduced to the SensAble Freeform system for the first time through a short demonstration," said Rocky Sapp. "Within minutes I knew that this device was a real interface between the past and the future of sculpture—allowing the human need to 'touch' material, while adding simplicity and speed of construction to the ability to fabricate in 'real' material through rapid prototyping that can be cast into bronze! My role as a teacher who wants to see students succeed seemed clear: give these young artists who already have the basic digital skills, a new tool to make it happen—and they made it happen. Most of these young artists were able to pick up this program easily, with minimal instruction from a 'mudman' like me, and produce amazing work. Tom Purcell did, among others; his first job paid more than my salary after 40 years! Sure, he was an exceptional student, but there were many other students whose work stopped my clock. Move over, Michelangelo."

Exploring New Ways to Leverage the FreeForm Modeling Plus Systems

To date, 126 students have completed the Figure Sculpture course. Having proven value in the figure sculpting course, now the school is considering new ways to broaden the use of the FreeForm systems. Using the systems for visualization and ideation in the Stone Carving course to help reduce the large amount of preliminary work that is required before students start carving in stone; combining 3D models done in FreeForm with the school's 3D relief carving system; using FreeForm models, a stereolithographic printer, and ceramic shell or investment casting to make molds; and integrating the FreeForm systems into Animation courses are just a few of the ideas being considered.

According to Larry Millard, Professor and Sculpture Program Chair, "Rocky Sapp paved the way

for students at The University of Georgia to use extraordinarily sophisticated computer technology within an extremely traditional process. The perceptual acuity required and learned in figure modeling has been diversified for a wide range of students. The advice given by animators to aspiring digital arts majors, "learn to draw, learn to draw, learn to draw" has been incorporated into drawing dimensionally using the ease and sophistication of the FreeForm system. The interface is readily accessible; therefore, students are able to get started working within a short learning period."

Martijn van Wagtendonk, Studio Foundations Assistant Professor, has remarked, "I have thought a lot about using it in the foundations program, it is important to figure out how to use it as a tool to enhance thinking about form. The immediacy has many benefits over other three dimensional modeling systems."

Professor Millard has stated, "Because of Rocky's imagination and vision, we are on the cusp of exploring numerous applications for "FreeForm" to be integrated into the sculpture program and numerous other programs in the Lamar Dodd School of Art.

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