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## **Building Design meets the Future At Miami Senior High School and Miami Dade College**

The design of a building used to be represented with 2D floor plans and elevations, and a 3D artistic representation of perspective in water-color or other visual media. "Those days are over," says Hector Camps, adjunct faculty at Miami Dade College and instructor at Miami Senior High. 3D CAD solutions that used to be used only for designing mechanical objects are now allowing Miami students to develop increasingly sophisticated buildings.

In the building industry, architecture, design, engineering, fabrication and construction all rely on separate building information data. Each of these members of the project team typically uses different tools. Hector's vision is to unite these efforts under a common building information model ("BIM") based on mechanical CAD technology. "Mechanical engineers, building cars and airplanes, have already figured out how to collaboratively design complex assemblies," he reasons. At Miami Senior High students are employing these same processes for building design.

The basics of mechanical engineering are taught in Miami Senior High School's Introduction to Drafting Class. When Camps inherited the program in 2007, he quickly sought out advanced 3D CAD technology. That's when he was introduced to ENGINEERING.com, the North American Academic reseller for Dassault Systemes PLM technology. David Livingstone of ENGINEERING.com provided Miami Senior High with CATIA V5, the same 3D CAD technology that has been used to design virtually every commercial aircraft built in the past 10 years and over half of the world's automobiles.

Rather than inhibiting the students, this sophisticated environment played to their strengths. The school recognizes that their students today arrive with a more complete technology toolkit than their predecessors, so it makes sense to adopt a philosophy that encourages students to jump right into advanced tools.

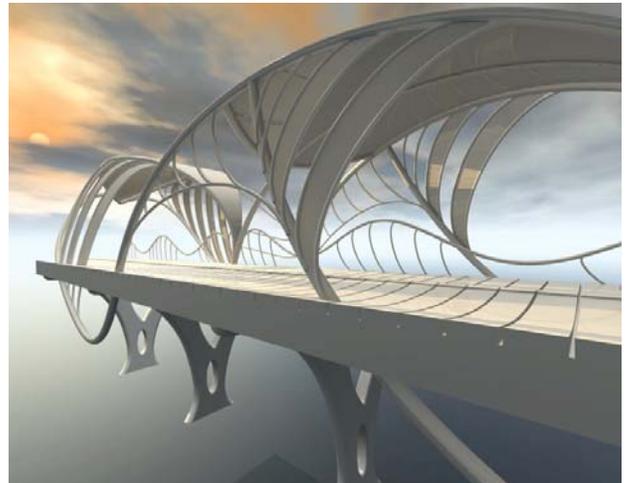
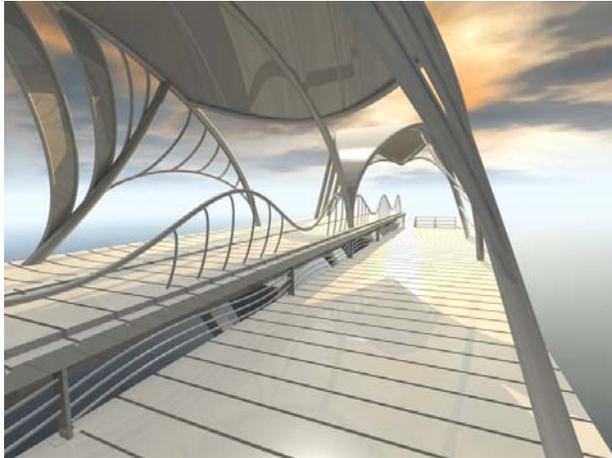


Image provided by Hector Camps, student work by Hector Ceballos- Baywalk Project

In fact, Camps argues, this approach allows for a faster development path from the time the student grasps the engineering fundamentals to the time that they are able to use the technology to express their design intent. The students are demonstrating that they are capable of reaching a level of sophistication far earlier than the school previously expected. "Hector's high school students are exploring areas of design that are more advanced than some college programs," says Livingstone. And this adaptability with the language of technology will be with them throughout their post graduate and professional careers.



At Miami Dade College, almost half of Mr. Camps' class is populated by mature students, who come back to school to learn new skills. Their response to the technology is enthusiastic. As one student, Robert Dominguez said, "I can't believe we've been working in the building industry so long with 2D tools when this kind of technology was available." Miami Dade College is the only public institution in Florida offering this advanced software training. The College is adding three new courses to their curriculum to expand instruction on this rapidly changing technology.

Image provided by Hector Camps, student work by Hector Ceballos- Baywalk Project

Through a relationship with ENGINEERING.com, Camps first brought CATIA V5 into the College followed shortly after by introducing DELMIA

One of the key reasons for using CATIA V5 is that it provides a complete design environment. Extending the curriculum to include DELMIA allows the students the ability to virtually construct their projects from the ground up. Following are a few examples of how important it can be to use this software to teach core concepts:

### 1. Sustainability

In order to design green buildings, it is critical that students begin to analyze energy consumption early in their design process. Energy consumption can and should influence their design intent. Through the CATIA V5 suite of tools, students are exposed to analysis tools that allow for more sophisticated decisions.

### 2. Constructability

CATIA V5 and DELMIA allow students to virtually design the building at the level of detail necessary to understand constructability issues. In addition, many components of modern buildings such as curtain walls and HVAC systems are manufactured. Camps points out that the other tools commonly used in industry don't support the concept of assembly modeling or design to fabrication.

### 3. Collaboration

Students of different disciplines need to learn to work together on large assemblies, and buildings are exactly that. Through the use of the collaborative tools within their toolkit, students are able to understand how changes in the design of their component affect changes to areas being designed by others. This teamwork builds the skills that students will need to manage supply chains, distributed teams or construction trades when they graduate.

A number of Camp's students from the High School have already graduated and progressed to college. From there they will take the skills they have developed and hone them even further in industry as an asset for their future employers.

