Snap to the Familiar: Using Virtual Lego to Teach form•Z

by **Graham Clarkson**

I am a teacher of Drafting and Design at St.George's School in Vancouver, Canada. I teach **form•Z** as our design platform for grades 10-12 with a focus on product design. Since **form•Z** has so many options and so many features with only one term to get the students to the point where they can create their own virtual products, they need a certain degree of fluency in operating the interface. **form•Z** has a very intuitive interface, but to be able to tap into this, students need to develop a solid comprehension of basic possibilities of the program within a condensed frame of time.

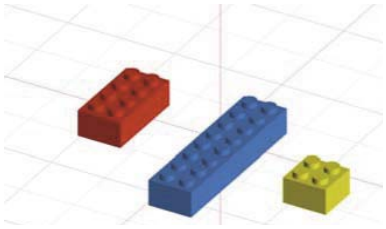
In order to teach something that for most students starts out as completely foreign, one must find a bridge of familiarity to cross from something known into something new and unknown. I began to think about what students could identify with outside of 3D modeling. I thought that Lego would be the perfect tool for this for many reasons. Firstly, Lego in the western world is synonymous with an early understanding of construction and manipulation of interlocking objects. Lego teaches dexterity to children who are just learning to hold and move objects in their hands. Since it teaches this sort of physical learning why couldn't this translate into what one may think of as a type of virtual-visual dexterity? Also, building with Lego lends itself to basic comprehension of building with prefabricated and modular components. This is not only a characteristic of Lego, but also a convention of modern construction and architecture. The most important part of choosing Lego as the basis for a **form•Z** project is that Lego is seen as being "really cool" by most young people or anyone who has a passion for designing and constructing models.

It is Lego's affiliation with all things cool that gets a positive response from the students when they first hear about the project. It is the students' immediate identification with "playing Lego" that gets them foaming at the brain with the possibilities of what they are going to create. Immediately, they are tapping into their creativity and interests.

The contextual padding of the assignment begins with a lecture on modular design which is essentially what Lego is. The lesson features examples of architectural marvels like "Habitat 67" by Moshe Safdie along with some lesser known examples of domestic, modular construction. Modular and interlocking design is also found in every day products from tea cups to ipod docks. In this case Lego is a pedagogical launch pad helping students move to a deeper understanding from a familiar context to a new one. The same applies to using the interlocking toy for learning to design with **form•Z**.

The Lego Project

The assignment itself is quite simple: build anything you can think of using virtual Lego. I begin the project by prefabricating some virtual blocks including very basic Lego pieces. The pieces are the visual verbatim of real Lego and come in a package of three. I distribute the pieces in the form of fmz files on a CD. The students bring the file into the program and immediately the game is on. I give those students who don't already know what they'll make class time to research and surf the net for ideas.



Virtual Basic Lego Pieces

This assignment connects the students with something they already understand and also removes complex modeling from the equation of the assignment which can be quite intimidating for first time modelers. This allows the students to focus on tools in the palette that are centered with movement such as the "geometric transformation tools". It is also a really good starting point for teaching object movement along active plains incorporating the "perpendicular lock". Accuracy is important and is emphasized as a key part of the assignment. The blocks must be as seamless as possible and appear as though they are "snapped" together (It is of course that satisfying 'snap' that working with virtual Lego lacks).

Since the students are only given three prefabricated blocks, they are forced to create more by using the "copying tools". With so many pieces to move around and snap together it then becomes important that the students learn to use the "Boolean union" function to unite pieces into solid walls or rely on the "group" function to name certain completed walls or components.

Moshe Safdie's Habitat '67, Montreal, Canada

As the students become rapidly virtual-Lego-savvy, they get more interested and more complex ideas begin to evolve. The three pieces become not enough to sustain the volume of their ideas. This forces them to learn to cut, combine and alter the blocks to become customized pieces. For instance, this student needed to make many customized pieces to complete his Lego shark. Another student needed to make a specialty piece for the tires and hood of his car. Of course the building of cars leads to the building of Lego drivers. Modeling Lego people leads into full blown modeling using "sweeps" and "revolves" or other tools. Teaching the students to use the "decal" tool also becomes necessary for them to put specific images onto their pieces. They use the decal tool to add characteristics like facial features, numbers or other details that help to define the students' projects.

Lego Shark by Simon Tseng, Grade 10

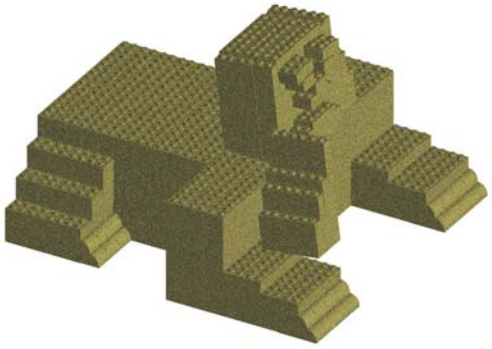
Lego Car by Albert Chan, Grade 10

I found with this project, one thing leads to another and their learning snowballs. It is the freedom of the assignment without harsh structural parameters such as what the students should build that lends itself to the quality of learning through being engaged with the assignment as a form of play.

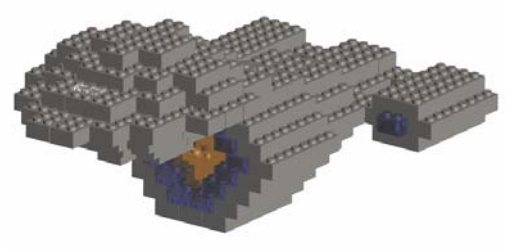
Placing restrictions on the project such as dictating what the student should create inhibits their creativity and the natural flow of learning. This also goes against the nature of Lego itself as a toy of seemingly infinite potential. I believe it is also import for this assignment to have a certain amount of autonomy from objects of design such as furniture or product design. If a student is inspired to make a Lego MP3 player or a Lego couch that's fine, but later in my course the students are expected to design hand held products and furniture. I see this assignment as a mere springboard or introductory assignment for the students to gain confidence and understanding of the interface its tools and processes.

Giving the students creative carte blanche over what they make is equivalent to letting a child sit in blissful solitude with a new box of Lego and watching their ideas realized a brick at a time. With each brick and the interplay of objects (pre-built and newly created), the interest in the project deepens. I believe that this reflects the nature of discovery of actual Lego. Kids get lost in the magic of those simple little blocks and are moving from houses to castles, and from cars to rockets. The toy itself evolves as its creator becomes more skilled and in effect more creative.

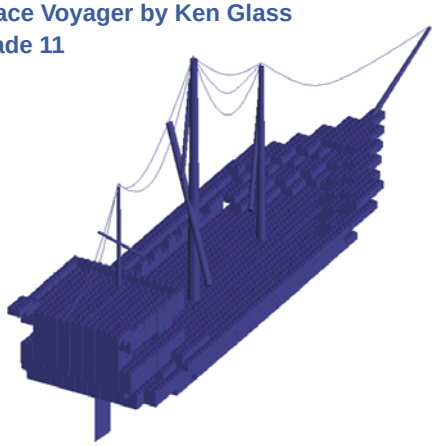
I found that the Lego project was successful for learning technical aspects of form•Z and sparked the imagination of those who may not otherwise be inclined. I have no doubt that the rate of learning is directly proportionate to the depth of one's personal interest in any project. Many of us are reluctant to learn and create in a medium that we don't understand. The familiarity of Lego as a tool makes for a comfortable context in which one can learn the essential tools that make form•Z an equally comfortable interface for 3D modeling. Once form•Z becomes as familiar as Lego it can be a platform for the deeper understanding of design. The Lego assignment is a steppingstone to other forms of design, further learning and the discovery of new possibilities.



Lego Sphinx by Stephen Mah Grade 10



Space Voyager by Ken Glass Grade 11



Lego Ship by Jun Taek Oh Grade 10

Graham Clarkson lives in Vancouver, Canada, and is an instructor of ceramics, sculpture, drafting, and design at St. George's School. He is also a freelance graphic designer. Graham received his BFA from University of Regina Canada and holds a Masters of Visual Arts from The Australian National University in Canberra, Australia. Before becoming a school teacher, Mr. Clarkson worked as a product designer in Sydney, Australia, for a porcelain manufacturer. His work was selected by the Australian Trade Commission along with nine other designers to be featured in a UK international trade expo in 2003. During this time he was also featured in Graphic Design publication's "Education Resource Guide 2003" in Australia as a new designer. Previous to this he worked as an instructor of Digital Media at the Tuggeranong Art Centre in Australia where he was awarded a certificate of excellence for teaching visual arts. Email: gclarkson@stgeorges.bc.ca