

# The Graphics Teaching Tool for Non-Technical Students

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## 1 Introduction

Just as basic grammar skills underlie writing in all fields and basic math skills underlie virtually all the sciences, so an understanding of computer graphics fundamentals is becoming a basic “literacy” requirement for a wide range of tasks in IT-based jobs and beyond, from graphics and industrial design to engineering and business. George Lucas has said, “If students aren’t taught the language of images, shouldn’t they be considered as illiterate as if they left college without being able to read or write?” [Daly 2004]. The Graphics Teaching Tool (GTT) is a Java-based program designed to address this need for graphics concepts literacy by offering a pedagogically-driven, constructivist environment for non-Computer Science majors. It has been used in a university course on visual literacy and aims to be integrated into courses from business to multimedia to Web design.

## 2 Pedagogical Orientation

The Graphics Teaching Tool is a free<sup>1</sup> media-creation Java application that reconsiders “art and design software” interface traditions and puts the focus on the user’s document, not different application environments. The expansive and complicated functionality offered by professional graphics software such as Photoshop, Illustrator, and Maya have been distilled into pedagogically-oriented 2D Raster, 2D Vector, and 3D Geometric modules within the GTT. Instead of changing programs to work in 2D or 3D or with raster or geometric graphics, the GTT user sees only a single, layered work space and the tools available shift seamlessly depending on what type of data representation the user want to manipulate. This paradigm lets students rapidly learn about, compare, and contrast key aspects of computer graphics. The GTT is not meant to replace professional graphics software but rather, by providing the core functionality of each data type, students learn *general digital literacy* instead of skills specific to a single version of a specific program.

Pedagogically-oriented dialogs and information exploring fundamental concepts in computer graphics pervade the GTT interface. Dialogs provide a means to “look under the hood” of the data types and their tools without requiring technical knowledge of programming. A “Data Inspection Tool” allows the user to click any visually represented object and examine the underlying data generating the image. Many tools require the user to experiment with the nature of the tool before being used. For example, instead of coming with the standard circular brush tool common to paint programs, the GTT requires the user to design the alpha footprint of the brush

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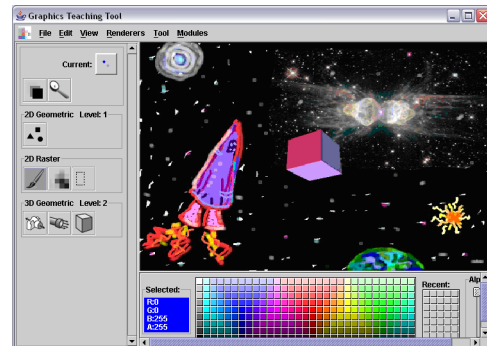


Figure 1: The Graphics Teaching Tool Environment

thereby creating their own custom tool to use for “painting”. Hypertext document areas are presented in tandem with tool dialogs to facilitate exploration of the application and basic graphical concepts without direct classroom instruction.

## 3 GTT in the Classroom

The Graphics Teaching Tool was used by Professors Andy van Dam and Anne Spalter and twenty-five predominantly nontechnical students at Brown University this spring in a no-prerequisites course entitled Visual Thinking/Visual Computing. As a studio class, students used the GTT *during* lectures on raster graphics and 2D geometric graphics. During the first raster lecture, students quickly mastered the software. Anecdotal evidence (class observation and feedback forms) showed a high level of enthusiasm and satisfaction with the pedagogical approach. Within minutes, students were creating their own natural media effects by designing alpha masks and selecting compositing techniques.

## 4 Conclusion

Today’s application-specific tools and resources for learning about computer graphics do not adequately address the “graphics literacy” need. Tutorials available for professional graphics packages present the how but not the why. Algorithm visualizations and mathematical tools useful to CS majors are too technical for most other students. Standard texts in computer graphics have been published for both technically proficient audiences and artists but do not take advantage of the interactive learning possible with today’s computers. The Graphics Teaching Tool provides a middle ground between these various forms of graphics education; one in which a small feature set is combined with pedagogical instruction to teach graphics fundamentals.

## References

DALY, J. 2004. Life on the screen. *Edutopia Maazine* (Sept./Oct.).

<sup>1</sup><http://graphics.cs.brown.edu/research/gtt/>