

Join the Digital Text Revolution

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This talk addresses computer graphics teaching, research, and authoring in the age of digital texts. Graphics content is best presented in a high-resolution, color, animated, and interactive medium; its authors are technically savvy and able to create their own tools; and the target audience values presentation quality and technological advances. This is the ideal domain for aggressive innovation in digital publishing. I present selected examples from the publication processes of four digital texts to advocate for that innovation and address concrete topics including:

- Content authoring for an always-online reader
- The economics of digital publishing
- Practical technology for dynamic resolution and layout
- Authoring, editing, marketing, and distribution for self-publishing
- How I integrated web, mobile, and electronic text resources in my own undergraduate graphics course
- Digital rights management and intellectual property
- Free and open tools for managing publication

I disclose actual market data, cost models, tools, schedules, and adoption rates where permitted by publishing agreements.

The projects that I use as case studies span the breadth of current electronic publishing. Undertaken with many coauthors, these are:

Computer Graphics: Principles and Practice 3rd Edition (Hughes et al. 2013, figure 1) is a textbook published by Addison-Wesley simultaneously in paper and standard e-book formats, with significant online content. The new edition of this widely-used book demonstrates the role of the traditional brick-and-mortar publisher and pipeline in digital content creation and distribution.

The Graphics Codex (McGuire 2012) is a computer graphics textbook and reference packaged as a custom mobile app (figure 2). Originally conceived as a simple PDF of lecture notes, under classroom testing it grew into a unique non-linear and interactive book for teaching and research. *TGC* integrates tightly with courseware by supporting links both to and from API documentation, course syllabi, digital libraries, and web pages. It borrows user-interface paradigms from Google, Wikipedia, Facebook, and Twitter based on observation of how industry professionals and students access technical information. <http://graphicscodex.com>

The Journal of Computer Graphics Techniques is an open-access research journal founded in 2012 as a spiritual successor to *Graphics Gems* and the *Journal of Graphics Tools*. It is exclusively published online, uses Creative Commons licensing and only open standards, and operates with zero formal revenue stream. Yet, it maintains quality comparable to other journals with noted authors, reviewers, and editors, and the first volume was downloaded tens of thousands of times. <http://jcgt.org>

codeheart.js: Learn to Program Web and Mobile Games is a new introduction to game development text for high school and undergraduate students that I'm writing on Apple's proprietary standard iBook platform for release as PDF and e-book. <http://codeheartjs.com>

I will also show how the interaction of market forces, technology, target audience, and legal agreements motivated application of the different technologies and arrangements for these projects. For example, two of these texts are restricted to Apple's iOS platform,

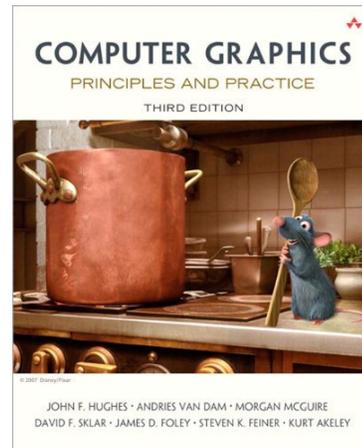


Figure 1: *Computer Graphics: Principles and Practice* will be published in July at SIGGRAPH in paper and e-book versions with significant supplemental online content.

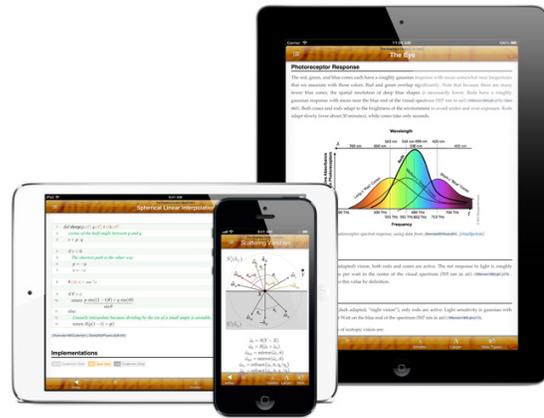


Figure 2: *The Graphics Codex* dynamically adjusts content for device shape, orientation, and font size.

even though there is no technical barrier to releasing simultaneously on iOS, Android, and desktop operating systems.

It is inevitable that digital will become the primary publication method and computer graphics should be a leading application area. The objective aspects of the talk address the practical 'how-to' and the state of the art. In closing, I'll briefly address two controversial topics with subjective arguments and speculation. First, both open, free journals and closed, commercial texts are not only viable counterparts but also equally essential parts of a stable publishing ecosystem. Second, digital publishing and its extension into massive online open courses (MOOCs) lower economic barriers in the education sector for both authors and students, simultaneously enabling a free market and accessibility. However, as has been observed in other content markets with strong first-movers, the economic structure of incentives and digital rights has the potential to create de facto monopolies for the single "best" course and text, which could inhibit diversity and pedagogical improvement.