cgS⬤urce White Paper

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1. Introduction

1.1 Curricular & Instructional Resources

The ACM SIGGRAPH Education Committee supports the dissemination and reuse of computer graphics (CG) educational resources with two instruments, CGEMS and cgSource. Both are chaired by the committee's Curricular & Instructional Resources working group.

CGEMS – Computer Graphics Materials Source is a peer-reviewed online repository providing CG-related curricula, course modules and syllabi, lab notes, problem sets, teaching gems, and student work. CGEMS materials are documented with educational goals, methodology, assessment, and undergo critique by at least three experts in the field. As a Eurographics/SIGGRAPH joint project, CGEMS offers peer recognition worldwide.
http://education.siggraph.org/resources/cgems

cgSource is an online resource for CG-related curricula and materials. It complements the CGEMS resource with a simple, barrier-free collection of online educational materials – without formal submission requirements or formal peer review requirements. Instead, cgSource materials are subject to basic acceptability criteria, public review, and online comments. cgSource materials may also be upgraded for a CGEMS submission.
http://education.siggraph.org/resources/cgsource

This white paper establishes the basis for the cgSource initiative. This first chapter sets forth the project's objectives, history, and project plan. Chapter 2 covers the cgSource policy (scope and licensing). Chapter 3 explains how we plan to accelerate content aggregation with specific material solicitation and reviewing. Chapter 4 proposes how cgSource will contribute to community building via a virtual meeting space, professional help, interconnecting CG communities, and international outreach. Chapter 5 closes with a summary of milestones and a timetable.

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1.2　Objectives

The major goal of the Curricular & Instructional Resources working group is to enhance the public services, offered by the ACM SIGGRAPH Education Committee, by providing free, ready-to-use instructional materials and curricular frameworks. CG educators facing the challenges of preparing their curriculum and materials usually depend on their local social network (Clarkson et al. 2005). These ACM SIGGRAPH Education Committee resources provide a useful tool for planning their course/curriculum, while allowing educators to evaluate what they are currently covering. These resources present related topics that supplement or enhance CG concepts, especially in professional and arts contexts. Furthermore, these online resources enable a dialog between educators and prospective employers, in CG-related fields, to determine essential background training needed to support specific career skills (Morie 2001). The working group will aim at making cgSource a resource that can establish and support such a dialog.

1.3　History

Since the founding of the ACM SIGGRAPH Education Committee, in 1983, its collection of curricular and instructional resources has undergone many developments and updates.

Early efforts in 1991 created the committee's CG Courseware Repository (CGCR, see Owen 1991), a web page offering course notes, slide sets, third-party demonstration programs, images, slides, and overheads. Materials were informally reviewed by committee members and it was planned to distribute the materials with an electronic and hardcopy catalog for a nominal price. The slide sets (1991-1997) are either designed to help teach certain concepts in Computer Science and 2D aspects of Art and Design, or are taken from the annual conference's Education program. Education-related course notes (1996-1999) were taken from the annual conference, and it was planned to cross-reference them by subject. The committee has also made a larger effort to develop a CG hypermedia system for teaching CG, the HyperGraph (Owen 1992) and HyperVis, the latter in conjunction with the working group on Education for Visualization, which worked out a Visualization taxonomy and modules (Domik 1994, Domik 2000). There has also been some donation of materials from other sources.
http://education.siggraph.org/resources/cgsource/instructional-materials

In 1993, the committee started working on a complete statement of CG as a discipline (Owen 1993). A first milestone was reached with the Computer Graphics Imaging (CGI) taxonomy (Morie 2001) that defined basic and advanced CG concepts applicable across many disciplines, from art to engineering. The taxonomy was developed by the Curriculum Working Group (1991-2006) into a distinctive, multidisciplinary CG Knowledge Base (Laxer & Orr, 2006).
http://education.siggraph.org/resources/knowledge-base

During a Eurographics / SIGGRAPH workshop on Graphics and Visualization in Education (GVE'99), held in Coimbra, educators recognized that curricula should focus mainly on creative and technical concepts. Later, in 2002, the goals and approaches for developing a peer-reviewed online repository were identified and outlined (Cunningham

2002). The ACM SIGGRAPH Education Committee and the Eurographics Education board shook hands to jointly support a free and high quality repository for educational materials. At the Computer Graphics Education workshop (CGE'02), in Bristol, the foundations to develop CGEMS were presented (Assunção et al., 2002). CGEMS was further debated and shaped at ACM SIGGRAPH and Eurographics workshops and conferences. Experiences from first submissions were presented in late 2004, at Eurographics (Figueiredo et al., 2004). During 2005, three years of dissemination and submissions, plus the feedback obtained from a survey, led to the definition of CGEMS authoring guidelines and submission examples (Figueiredo et al., 2007).

Besides collecting materials, the committee aims at developing a sense of community among CG educators and professionals. There are several ways the committee has addressed this issue (Owen 2000). Besides a cg-educators listserv that is used for communication, public announcements and discussion, the committee organizes the ACM SIGGRAPH Education booth, special sessions in the conference's Educators Program, distributes committee resources on CD-ROM and on a non-profit nation-wide tour. The committee's Web page is managed with the Plone system and it is planned to employ the built-in Plone communication facilities. The committee further collects information about CG-related academic programs, including contact information, in an Education Database.

2 Policies

2.1 Scope

cgSource will consider any materials with educational use in CG-related fields. Materials will be structured with the current CG taxonomy defined by the committee's Curriculum Knowledge Base (see above). Based on this, keywords will be taken and assigned to all content. Contents may match exactly one category or span several categories; as the taxonomy is structured hierarchically, content may also be assigned top-level keywords to span all included categories. The resulting working framework provides classification and context, which CG educators can use to see how topics relate and fit together, and to find materials via browsing or keyword-based search.

It is important to note that the knowledge base represents only one approach for organizing CG concepts into a coherent whole. We acknowledge that there are many ways of organizing these concepts (Morie 2001). As an evolving index, topics will continue to be added. Other possible structures are offered via CGEMS, which explicitly collects CG curricula (organized by in CG-related categories or focus areas) and will allow for overlap and connection between CGEMS and cgSource materials.

2.2 Licensing

Unless otherwise noted, the cgSource materials will be licensed by the ACM SIGGRAPH Education Committee under the Creative Commons License *Attribution-NonCommercial-ShareAlike 2.5* (http://creativecommons.org/licenses/by-nc-sa/2.5). Creative Commons (CC) is a non-profit organization providing free licenses that

copyright owners can use when releasing their works. The intention is to avoid the problems current copyright laws create for the sharing of information, including online distribution. CC licenses are currently localized to more than 30 countries worldwide. With Attribution-NonCommercial-ShareAlike, users worldwide may copy, distribute, display, and perform cgSource materials and make derivative works – as long as the work is attributed and not commercialized, and as long as derivatives are distributed under an identical license.

We anticipate *attribution* in the following, CGEMS-conforming citation format:

> Authors, Material title, cgSource, ACM SIGGRAPH Education Committee, Year. Material URL.

The *non-commercial* requirement means that users may not directly sell or make direct profit from cgSource materials or derived works. Note that this does not rule out for-profit instructors, as long their attendees are not required to pay for attending the class. Reasonable reproduction costs are permitted as long as the same materials are freely available by some other means. The argumentation is in the line of the MIT OpenCourseWare, which license selected course notes, assignments, and syllabi from MIT courses under the same conditions (http://ocw.mit.edu/OcwWeb/Global/terms-of-use.htm); actually, the CC is part of the OpenCourseWare Consortium.

We choose to require the *share alike* CC policy in order to control further dissemination in other repositories. A worst-case scenario was described by Rob Hallman in a related CreativeCommons thread (Brown 2003): if cgSource materials would not be restricted to share alike, some other organization could advertise both their proprietary content *and* the cgSource content. Since cgSource could only post cgSource content, this would be an inequitable and unfair arrangement. Repositories that distribute their content without that requirement usually have made some technical arrangement to avoid that problem, e.g. the Rice University's Connexions (http://cnx.org), which uses a pure attribution license, applies an XML schema with transformations that is bound to their server.

Note that we do not oblige academic fair use or educational use. Either arrangement would restrict material usage to educational settings. Many valuable instructional materials are created and reused by individuals and other groups who may or may not be formally organized, and may not be self-identified educators. Students who are not part of a formal class in an organized school somewhere would be disallowed access to the cgSource materials because of the definition of academic/educational use.

3 Accelerating Content Aggregation

3.1   Relation to the CGEMS

CGEMS provides an established but rigid procedure of traditional peer-review. While this is a well-established method for ensuring high quality materials, it also limits development. cgSource will therefore complement the journal approach with a

community-based collection. It is meant to quickly spawn content, while preserving the option to upgrade materials for a CGEMS publication.

3.2 Solicitation

Materials in the cgSource will be solicited by committee members. Experiences with CGEMS has shown that this is the most effective way to increase submissions; the Human-Centered Computing Education Digital Library (Clarkson et al. 2005), a project of Jim Foley's group in Georgia Tech, reports similar experiences.

To facilitate addressing potential contributors, cgSource will provide a simple online form. Committee members will be able to suggest materials by entering the author's name, e-mail contact, the material's title and URL; the invitation mail will then be set up and sent by cgSource. If approved by the cgSource administrator(s), suggested materials will be included as cgSource, and the cgSource server will send corresponding e-mail invitations. The cgSource administrator(s) will have the option of requesting from the author that the materials be posted directly to the website.

Links to CGEMS materials will be included within cgSource, as a convenience, and marked visually as a peer-reviewed resource. Likewise, there will be a link from the CGEMS page to the cgSource page. Whenever possible, cgSource materials are hosted at the SIGGRAPH server. If cgSource submissions exist on an external server, but determined to be reliable, materials may be linked.

Similar to former projects, further resources might be content from the annual SIGGRAPH conference, e.g. slides or materials from education-related courses. This requires a mutually acceptable arrangement with the ACM Digital Library, and the individual authors.

3.3 Reviewing

As noted, cgSource content will be organized according the Curriculum Knowledge Base (CKB) taxonomy. This will be done via keyword assignment, for search purposes. The CKB contains primary, secondary, and tertiary categories. Moderation teams will be formed based on primary CG categories, each headed by an expert selected by the CKB group. Moderators will agree to check submitted materials against basic acceptability criteria within 14 days, and submissions will be accepted or rejected – without requiring any material revision.

This approach will significantly speed up content aggregation, while ensuring that posted fulfill minimal requirements, has educational value, and is not misleading or false. Once posted, all materials are subject to public review and comment by the CG community.

The public review process will be manifest in two main stages. During the first half of 2007, the website will utilize the built-in capabilities of the Plone Content Management System to enable user-commenting on published items. During the second part of 2007, the ACM/SIGGRAPH SysMgr team hopes to implement a Plone-based rating system

which we will apply to our cgSource. The cgSource coordinators will work directly with the SysMgr team to implement this for cgSource.

Thus, for cgSource, expert peer-reviewing (ala CGEMS) will be replaced by public peer-reviewing, a common approach of today's Web collections, e.g. that taken by the video-blog Journal of Visualized Experiments (http://www.myjove.com). cgSource will seek to encourage such commenting for both its existing and future content. We will begin by enlisting the members of the by ACM SIGGRAPH Education Committee, as well as those subscribed to the cg-educators listserv.

Community ratings are meant to filter out quality cgSource materials. Those can then be forwarded to CGEMS in a simple, convenient manner – the cgSource will establish a process that will permit authors to enhance their submission with the required documentation in order to be considered for CGEMS publication.

Likewise, materials found not to be appropriate for CGEMS might nevertheless be useful for cgSource. Therefore, CGEMS will establish a similar process for forwarding such materials to cgSource; as they have already been peer-reviewed, the cgSource reviewing can be by-passed.

4 Supporting CG Communities

4.1 Meeting Space

Visitors should be aware of the community behind the resource. For example, educators browsing through the same topic could be given communication facilities, or the possibility of seeking professional support. The cgSource team will explore what we can do to better facilitate this community generally, and via our website specifically. This might include, among others, free memberships, username/profiles, messaging, etc. In the long term, ACM SIGGRAPH is looking at the possibility of utilizing the SecondLife or a similar avatar environment or to conduct certain SIGGRAPH activities.

cgSource will be closely linked with the committee's internal Education Database, respectively with a public subset of that database that will be called the Education Index. This is a natural fit since the Education Index is another significant resource for the education community. Instead of educational content, the Education Index will contain useful information about CG-related academic programs, including contact information. Certain other data from the Education Database may be limited to internal education committee use.

4.2 Interconnecting CG Communities

The Education Committee will continue to reach out to Computer Science, Scientific Visualization, Primary/Secondary Education (PSE, or K-12), to the Game Education community, and other communities. cgSource will support these efforts by extending its structure and including appropriate resources.

The committee is further undertaking a new outreach initiative to the Digital Arts Community in 2007. ACM SIGGRAPH has formed a Digital Arts Committee to facilitate the development of the ACM SIGGRAPH Digital Arts Portal, support the genesis of symposia and workshops on Digital Arts, and to generally coordinate and support Digital Arts in ACM SIGGRAPH.
http://arts.siggraph.org/

4.3 International Outreach

The Curricular & Instructional Resources CGEMS, cgSource will be an international resource seeking to serve the global CG Education community. As such, it will seek out content from international sources. To begin this process, the Education Committee's International Reps will be asked to kick-start the process of soliciting such materials.

While cgSource will limits content to the English language, material translations will be supported with CGEMS. CGEMS currently lists reviewers from more than 15 countries and will support translations of already refereed materials with a shortened review phase.

5 Milestones

This white paper introduced the cgSource, a new initiative of the ACM SIGGRAPH Education Committee. The project will first integrate the CKB taxonomy and existing committee materials. After having made first experiences with invited materials, solicitation will start with the annual conference in 2007. Until SIGGRAPH 2008, Plone support for licensing, solicitation and community ratings/comments will be set up and cgSource will become interlinked with CGEMS. Until SIGGRAPH 2009, the working group will work on advanced community support and on integrating other CG communities.

As the amount of materials increases, the ability to locate materials, or even to browse the information, becomes difficult (Owen 2000). The working group or a follow-up project will work out approaches to make materials more reusable and flexible, e.g. allow materials to be reconfigured and delivered in different-sized chunks of information.

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