The Future of Computer Animation Education

Tereza Flaxman
Rochester Institute of Technology
tflaxman@shell.gis.net

1. Introduction

In the last few years, many institutions of higher education have begun to offer programs in computer animation. Programs have sprung from computer science, traditional animation, fine arts and film departments. Today hundreds of schools in the U.S. and abroad offer programs in computer animation. Yet despite the variety of programs available - or perhaps because of it - there is widespread concern about the current state of computer animation education.

There appears to be little consensus about which core artistic and technical skills a computer animator should possess upon graduation, and few trusted means of assessment beyond the all-important demo reel. Despite a growing market overall, some students graduating from current programs find themselves unable to obtain paid professional employment, and hiring managers report that they must sort through hundreds of demo reels before finding a single qualified applicant. These problems effect students, academics and professionals, as well as the industry as a whole. However, there is little available research to offer guidance on which approaches work well and which do not.

We are proposing a SIGGRAPH forum on these issues in order to bring into the open several controversial topics. These include the appropriate balance and sequence of artistic and technical courses. These topics are usually discussed in isolation by professional animators, faculty and students. However, we feel that a public forum addressing these issues would be productive, and interesting to a wide variety of participants.

2. Overall objectives

1) To elicit SIGGRAPH conference attendees' opinions and views on the teaching of computer animation.

2) To encourage discussion between faculty, students and supervising animators about what works best in the current system of computer animation education, what needs improvement, and how best to implement desirable changes.

3) To address issues of core standards for computer animation programs. Should standards be developed and - if so - what should they be?

3. Panelists

We have deliberately chosen five panelists with widely varying views and experience. From the world of commercial production, we have one panelist from a large West coast production environment and one from a small East coast studio. Our educators include one professor from a computer graphics research background and another interested in arts and independent film. Finally, we have a book editor with broad understanding of the field.

As is already evident in their initial position comments in this proposal, these panelists are not likely to come to easy agreement about the topics addressed in this forum. This should lead to a spirited discussion.

4. An Outline of the Session

The moderators will introduce each topic with a series of questions to the panel. After the panel has commented, the moderators will engage the audience, encouraging them to voice their own opinions and to challenge the panel's positions. The moderators will have an agenda and a list of prepared points to ensure that the discussion progresses forward.

Although the main purpose of this session is to allow panelists and audience members an opportunity for public discussion, several topics will be planned to keep the session flowing and on track. These topics include:

I. The Goals of Computer Animation Education

Professional animators will be asked what they expect of new hires; educators will discuss the goals of their programs.

II. Assessment of Current Curricula

How well are the current programs meeting their goals? Are there particular types of programs which are good examples to learn from?

Do current students have the knowledge and skills necessary to find their first paid job in the animation industry by the time they receive a baccalaureate degree in animation? If not, why not?

III. Towards Better Computer Animation Education

Defining the Field: What should constitute core technical and artistic skills?

Generalization versus Specialization: Should specialization be organized by industry, or by job role? For example should Technical Directors and gaming animators have a different animation education?

IV. Outcomes Assessment

The National Association of Schools of Art and Design (NASAD) publication "Outcomes Assessment and Arts Programs in Higher Education" states that "*outcomes assessment in arts education must adopt an artistic approach, not a technological one.*"
Do the participants agree, and if so, how would they implement such a directive?

V. Institutional Issues

How can animation educators keep up to date with current industry practices?
Providing for continuing professional development of animation instructors is a major challenge, particularly because there are limited opportunities for faculty to periodically refresh their commercial production skills.

5. Expectations

This forum would be of interest to SIGGRAPH attendees in the field of animation, including students, faculty and professional animators. We believe this session is important because it will address a major concern of all of those who work in this field, and provide an opportunity for meaningful audience participation. We expect this session will increase interaction between animation educators and professional animator and result in a more formal, focused outcome. Improving animation education requires balance in meeting the expectations and requirements of institutions, students and industry.

6. Time-frame

We suggest a session length of 90 minutes to allow time for audience participation.

7. Facilities and Equipment

A room with capacity for 75-100 audience members.
A lectern for the moderators, and a cordless microphone so that moderators can walk among the audience.
A table with microphones for the panelists.
Two microphones for audience participation.
A computer with large screen projection and screen.
A large white board with markers.

8. Feedback Mechanisms

The main purpose of this session is to obtain audience feedback. This will be gathered and recorded in two ways. First, during the session moderators and audience members will speak in a town meeting style of conversation. Secondly, there will be a secretary to record detailed notes. These notes will be summarized and posted on the web. Participants will be informed of the web address during the session. In addition, there will be short post surveys to ascertain how this session may have changed participant views of academic computer animation education, and to evaluate this session and its format.

9. Moderator:

Tereza Flaxman
Visiting Assistant Professor
School of Film and Animation
Rochester Institute of Technology (RIT)
70 Lomb Memorial Drive
Rochester, New York 14623-5604
tflaxman@shell.gis.net

Tereza Flaxman has been teaching computer animation for the past four years at both undergraduate and graduate levels. She has more than ten years of experience with high-end 3D animation software.

Prior to coming to RIT, Mrs. Flaxman taught at both Harvard's Graduate School of Design, and at the State University of New York (SUNY). She has also worked as a freelance character animator. Her work has been published in several books and magazines, and exhibited in shows throughout the U.S.

Mrs. Flaxman has an MFA in Computer Animation from the School of Visual Arts in New York City and a BFA from the University of Oregon. She also earned a BA in

Journalism from the Alcantara Machado School of Communications, Sao Paulo, Brazil.

10. Participants

We feel that appropriate balance between educators and industry professionals will be key to an interesting discussion. The participants below have confirmed their participation.

Rachel Falk
Director Artistic and Technical Development
PDI/DreamWorks
1800 Seaport Blvd
Redwood Shores, CA
Rachel@pdi.com

Rachel Falk has fifteen years of experience creating Computer Graphics for feature films. She now heads up the Artistic and Technical Development Department at PDI/DreamWorks overseeing all Production Training programs. Rachel came to PDI in 1995 working as an Assistant Animator and was promoted to Animator and Completion Lead on commercials and feature films including *Antz* and *Shrek*. Prior to that, she held various production positions at Industrial Light and Magic working on films including *Terminator 2, Hood*, and *Death Becomes Her*. Rachel began her Computer Graphics career at New York Institute of Technology (NYIT) Computer Graphics Laboratory where she worked as a Recordist and CG Artist on the animated feature film *Strawberry Fields.* Ms. Falk has an MA from NYIT and a BFA from Parson School of Design.

Panelist's Perspective

Rachel Falk: The topics outlined are valuable and worthy of further discussion. It important to hear from educators as to what their goals are for their students and their thinking behind the design of their degree programs. This information, combined with input from industry veterans discussing their criteria for entry-level positions will be a useful exchange and should begin to address the intention of the panel discussion. We need to look at the balance required to maintain NASAD assessment outcomes while keeping an eye on current and future industry hiring standards. Your call for a closer relationship between educators and industry is timely and important.

Perry Havoras
Supervising Animator
XVIVO Digital Animation
2360 Main Street
Rocky Hill, CT 06067
perry@xvivo.net

Co-author of the Amazon.com best-seller "Mastering Maya Complete 2.0" (Sybex) and voted one of the "CGI Rising Stars" by Animation Magazine for 1998. Harovas runs a production company in Rocky Hill, CT, called "XVIVO Digital Animation," that specializes in the creation of compelling cinematic quality animations for both medical and non-medical clients. He project managed and was lead lighting TD and renderer of a fully computer generated series for kids called "The Super Snoopers." He has 6 feature films to his credit and more than 30 commercials such as The Discovery Channel's 'Shark Week', Disney Channel's 'Winnie the Pooh' pilot, Nintendo of Japan's 'N64' ads, McDonald's 'Bubble' ads, History Channel 'Global Promos', Gillette 'Mach 3' intro, print and animation pieces for Avid Technology, and a fully CGI animation open for the Boston Celtics, among others.
Perry has also taught at Emerson College in Boston, MA.

Panelist's Perspective

Havoras**:** *The Goals of Computer Animation Education* is of particular interest to me. This topic encompasses all three elements of the equation. As a former CG instructor and current employer (and one-time student) I feel that this area needs understanding from all sides so that times and resources are not wasted.

Assessment of Current Curricula is also very important to this while discussion. In reality it comes down to what the students need to walk out of the building with to become a viable candidate at a production facility. If these skills are not narrowed down and the programs changed or modified to reflect that, then the students will always pay the price (literally and figuratively).

Of the last three topics, *Institutional Issues* is of particular importance since we all know how fast this industry is changing. It seems like if you take an afternoon nap, you've missed some amazing new CG advancement... Instructors need to not only keep up with current technology advances, but also keep their hands in real-world production as well, so as not to teach from an insulated perspective, but one that actually resembles real world situations.

Raffaele Scaduto-Mendola
Character Technical Director
Dreamworks Feature Animation
3901 Los Feliz Blvd. Apt 109
Los Angeles CA 90027
raffaele@inch.com

Interested in 3D Computer Graphics since 1988, and professionally active since 1994, Raffaele Scaduto-Mendola first worked as a Lighter/Compositor at Rhythm and Hues. He has since worked on several productions, engineering character rigs and designing//managing production pipeline for Curious Pictures and Nick Digital/MTV. He also implemented an IK-based facial muscle systems to drive automated lipsync for 3D characters from real actor video for Lucent Technologies/Bell Labs.

Raffaele is currently working at Dreamworks Feature Animation as Character Setup Artist on the feature length animation film SharkSlayer

He taught character rigging classes and production pipelines at the School of Visual Arts in New York. At that time he developed some advanced techniques for designing, building and managing complex character rigs.

Rafaelle has a Master of Fine Arts in Computer Art from the School of Visual Arts and a Bachelor of Science in Civil Engineering from Johns Hopkins University.

Dr. William J. Joel
Associate Professor of Animation
West Connecticut State University
181 White Street
Danbury, CT 06810
joelw@WCSU.EDU

Dr. William J. Joel has taught Computer Graphics & Animation since the early 1980's. In 1988, Dr. Joel organized and chaired the 1st Symposium on Computer Graphics Education sponsored by Marist College in cooperation with the ACM/SIGGRAPH. In 1995, he received a PhD. from Syracuse University, with a dissertation titled "A Conceptual Model for Computer Animation". Since 1998, Dr. Joel has been an Associate Professor of Computer Science at Western Connecticut State University, as well as the Director for the university's Graphics Research Group, for which he chaired 1st Annual GRG Animation Festival in April 2002. He has presented numerous papers on the use of alternative strategies in the teaching of computer science. His current research efforts include the development of techniques for non-photorealistic animation, and the use of storytelling in the college classroom.

Panelist's Perspective

Joel: Computer animation, similar to its older sibling, computer graphics, is an area where the aesthetic meets the technical. Just as for computer graphics, computer animation is a true interdisciplinary discipline, encompassing ideas not only from art, design and computer science, but also from such areas as physics and psychology. The breadth of this range of sources for computer graphics education was clearly stated during Educators Forums at SIGGRAPH õ02.

Computer animation adds, to this mix, topics from communications, media studies, etc. The complex, interdisciplinary nature of computer animation is both the strength and the weakness of any related animation curriculum. To be successful in computer animation, students need to be introduced to concepts drawn from a wide variety of fields. These concepts need to be presented to students either as elements of courses in their respective disciplines, or as new courses in the emerging field of computer animation.

Given that the body of knowledge for computer animation is drawn from both the arts and the sciences, equally, students require not only an exploration of the theory behind the image, but also the time to practice the art of animation, both traditionally and using computer applications. This can create a rather intense course of study, but it need not do so. By recognizing that learning is an activity that proceeds twenty-four hours a day, seven days a week, we can augment a studentõs course of study with various co-curricular and extra-curricular endeavors. These additional activities provide the time and environment within which a student can explore at her/his rate the intricacies of computer animation.

At Western Connecticut State University, I initiated a two-fold approach to this task, in conjunction with Professor Abe Echevarria, Chair of the Art department. First, in 1999, I established a Graphics Research Group, to focus on computer graphics and animation projects. As Director for this group, I have endeavored to seek out students and faculty interested in pursuing various projects in computer-based imaging. Second, Professor Echevarria and I have worked at creating interdisciplinary course offerings. For the past three years, we have successfully team taught courses in Computer Animation. We are currently beginning work on a new course in Scientific Visualization, which will no doubt include an animation component, and have begun to work on a new minor in Digital Media. This minor will include at least one new course in Digital Media, and we hope to make the minor available for students by the Fall of 2003.

_____
Òeducatorõs Forum: A Knowledge Base for the Computer Graphics Disciplineó SIGGRAPH 2002, San Antonio, TX.
Òeducators Forum: The Role of Creativity in Computer Graphics Educationó SIGGRAPH 2002, San Antonio, TX.
Ebert, D. and Bailey D.; ÒA Collaborative and Interdisciplinary Computer Animation Courseó ACM SIGGRAPH Computer Graphics, 34 (3), pp. 22-26.

Lorelei Pepi
Visiting Assistant Professor
School of Film and an imation
Rochester Institute of Technology
70 Lomb Memorial Drive
Rochester, NY 14623
lmppph@ritvax.isc.rit.edu

Lorelei Pepi is an internationally award-winning experimental animation filmmaker, receiving high honor recognition in festivals such as Ottawa Animation Festival, Fantoche Switzerland, and the World Animation Celebration. She is currently working as an Assistant Professor of Film and Animation Studies at Rocheter Institute of Technology, as well as holding the Chair position for the Animation Department for Inner Spark Arts Academy in California. Her formal education is comprised of a BFA in Illustration from Rhode Island School of Design and a Masters in Fine Arts / Experimental Animation from California Institute of the Arts. Her professional work has included work as a Creative Director for a New Media development group, a stop-motion animator for a TV series production and CG animation for feature film. She is currently in development on two project: one, her next independent animation film, Òtwixt Earth and Sky,ó which will combine both traditional stop-motion as well as CG 3-D; two, an interactive new media installation utilizing the information from scans made of participantsõ hands to drive a visual music real-time performance.

Panelist's Perspective

Pepi: My response to the proposed topic are first and foremost informed by my roles as (1) a college-level and high school level educator, (2) an independent animation filmmaker, and (3) a recent employee in commercial production work. There are an immense variety of ways in which this topic may be discussed. Computer Animation in higher-level educational environments (colleges and universities) means that a comprehensive learning experience is to be practiced. This is inclusive of filmmaking theory and concepts along with practical technical training.

The college and university level institutions strive to educate students to be able to become visual and intellectual thinkers, to develop their personal voice, learn how to engage with the world, practice filmmaking skills and to learn how to understand and access animation as a unique art which has qualities that individualize it. Technical training happens in order to serve the needs of the vision of the filmmaker. This level of education is focused on developing an individual capable of thinking and acting on a larger, more inclusive and developed scale, ie., as an animation filmmaker. The tools cannot be used to create anything if the user has no vision and understanding beyond technical skill.

If we are to begin to understand how to create an effective curriculum for those with a focus on computer animation, one question that must be asked is: What ÒspecializesÓ the needs of students focusing their studies on computer-based animation in comparison to their pursuit of animation filmmaking as an overall field? We have students who are beginning to learn filmmaking concepts and process, and at the same time trying to learn the technical tool aspects of the various CG programs. It is a tremendous amount of physical and mental time required for most students to achieve any level of facile ability with these CG programs because of the complexities of the tool. This kind of learning curve translates to meaning that other skills are more often than not, left less developed and practiced. There are sacrifices being made in order to serve the needs of this complex and demanding tool. This begs the second question: What can be done to facilitate an animation filmmaking education that incorporates a balanced approach for the student in order to promote a level of skill commensurate with the needs of both their filmmaking vision and professional commercial goals? This is major concern of both myself and my educator colleagues, and is a point of view which I will bring to this panel discussion.

Steve Weiss
Executive Editor
New Riders Publishing
201W 103rd Street
Indianapolis, IN 46290
steve.weiss@newriders.com

Steve Weiss is executive editor at New Riders Publishing, which got its start in the 1980s creating third-party documentation for the AutoCAD doc set and is now a leading publisher of books on creative and interactive technologies. In the past ten years, Weiss and New Riders became the first third-party publisher on 3D Studio, Softimage, and Lightwave, and were among the first to publish on Maya. Weiss co-developed the [digital] series of techniques-driven, software-agnostic books on CG subjects, and was executive editor for Terrence Masson's "CG 101: A Computer Graphics Industry Reference." He spends a lot of his time interfacing with teachers, students, working professionals, and product development personnel, toward developing books that benefit both the academic/training market and the self-teaching-resource market.

Panelist's Perspective

The Goals of Computer Animation Education

Professional animators will be asked what they expect of new hires; educators will discuss the goals of their programs.

Weiss: This should be interesting, especially in the classic-artistic-skills vs. technical-skills debate (if there even still is one). I've been asking these same questions of several people in the industry and academia recently and received wonderful responses. If any theme is emerging, it seems to be that the bar has been raised so high RE aesthetic quality (the tools can do such a great job now) that the pendulum is swinging back toward CG students needing to grow their skills in timeless principles of whatever facet of artistic expression plugs into their area, be it animation, painting, illustration, composition, visual design, etc. Another way to put it is Old school Technique vs. software button-pushing technique (because either way it IS about technique). It's also about softer skills relating to acting and story-telling and directing, since components of these skills help immeasurably in rounding out a CG specialist's (that's funny, did I say "specialist?") abilities to make the projects they work on continually better.

And how does this trend affect training houses e.g. businesses such Gnomon and Mesmer, who focus much more on button-pushing skills; do they experience a boom, picking up on the software-specific emphasis as the larger schools--e.g. Ringling, Sheridan, Savannah, et al--stress these less? Or do they survive on a niche area of retraining and providing skills for the relative few who have special needs and are subsidized by the studios to learn specific skills quickly for special projects?

Among those I've been querying: Jim McCampbell (Ringling's CG Dept head); Dennis Short (Purdue's CG dept); Phil Miller (former PM of software development--especially 3ds max--for discreet); Angie Jones (works fulltime as a FL on game development and animation gigs

with major studio projects, e.g. Sony Pictures Imageworks, Cinesite); many others.

Assessment of Current Curricula

How well are the current programs meeting their goals?

Weiss: It's my sense that there's no clear consensus as to what the goals even are, other than perhaps to break into two fundamental categories: Enable students to get a specific job tomorrow, and Provide students with a fundamental baseline of skills/knowledge that enables them to build and continue to grow.

Do current students have the knowledge and skills necessary to find their first paid job in the animation industry by the time they receive a baccalaureate degree in animation? If not, why not?

Weiss: The answer speaks to my preceding question. Before we ask "how effective are we?" do we need to ask (or at least be able to knowledgeably address) the question "what are we specifically trying to do?"

Towards Better Computer Animation Education

Defining the Field: What should constitute core technical and artistic skills?

Weiss: And are we simultaneously asking for students who will be inevitably pressured to specialize, while at the same time requiring that they possess a broader baseline of fundamental knowledge? (Not that that's an unworkable thesis, mind you...)

Generalization versus Specialization: Should specialization be organized by industry, or by job role? For example should Technical Directors and gaming animators have a different animation education?

Weiss: Exactly. Great question and who gets to decide? (A loaded question, since "gets" implies a privilege that no one has, save for the marketplace, I would argue; but then that raises the larger question of: do CG educators exist merely as voiced programmers of automatons? Or is there benefit to be had by developing CG education at a higher level, with an attendant canon of literature, etc.?)

Outcomes Assessment

The NASAD publication ÒOutcomes Assessment and Arts Programs in Higher EducationÓ states that Òoutcomes assessment in arts education must adopt an artistic approach, not a technological one.Ó Do the participants agree, and if so, how would they implement such a directive?

Weiss: And speaking as a publisher, what kinds of resources need to be developed to facilitate CG arts educators? And shouldn't be talking about taking this down to the secondary school level, if not even too primary?

Also, how do we develop ongoing skills assessment in a such a dynamic area?

Institutional Issues

How can animation educators keep up to date with current industry practices?

Weiss: I'd port my question (proceeding) over to here as well. What can publishers do to help? For example, how viable is a coalition (perhaps under the SIGGRAPH umbrella, meeting annually) made up of reps from industry, education, and publishing? Do we need an annual whitepaper (or series of them) that restates the industry practices, accompanied by a landscape survey of current best resources for refreshing commercial production skills?