Blending Art and Technology: Two Courses and some MAGIC

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Abstract – Universities generally separate art and technology, erecting physical and administrative walls between them. This division is artificial and was not always extant. Leonardo Da Vinci found no division between art and technology, and neither do we. We blend them in both the classroom and in our scholarship. Developing technology requires creativity and art requires understanding technology.

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1 Introduction

Mixing **Right-Brain** and Left-Brain is а longstanding tradition at the Rochester Institute of Technology. After all, we are a polytechnic institute with a world-renowned college of imaging arts and sciences as well as one of the largest and most diverse technical colleges in the United States. Within our faculty ranks within the College of Computing, we have colleagues with a range of backgrounds from Computer Science, Information Sciences. Education, Photography, Painting, Animation, Library Sciences, Medical Sciences, Animation, and Mathematics. Degrees range from the Sciences, Humanities, Education, and the Arts. We also have faculty that have a range of experience from academia, industry, and from entrepreneurial endeavors. So it should come as no surprise that in a field as precise and technical as computing, we believe there is an important place

for art and interdisciplinary study. We believe that through a rich intermix of backgrounds and diverse experiences, we are able to show our students the application and societal good that computing can enable and perform. Simply put, we see such mixings of diversity and perspective as the modernday reinvention of the Da Vinci's Renaissance approach to the sciences and the arts.



There are several contexts in which we can see the interplay between the arts and the sciences within the college of computing. One of these areas is the minor sequence in Web Design and Development, and the other is within RIT's new center for Media, Arts, Games, Interaction, and Creativity (MAGIC).



2 Two Courses

While one of Vullo's goals in creating the minor in Web Design and Development for non-computing majors was to offer technical skills to students in non-technical majors, the other was to bring nontechnical majors into the college of computing and foster the interdisciplinary conversations that we believe are essential to a superior education.

Some of these conversations happen in the hallways, some in the college's atrium Ctrl-Alt-Deli over sandwiches, and some in the open lab where students work on their projects. But while several of the minor's classes are closed to computing majors, two of them are open to them. These two courses are not counted toward their computing degrees, but are instead considered free electives. Despite that, these courses are popular and enrollment often consists of about a third computing majors. The courses also attract students from such diverse programs on campus as Marketing (E. Philip Saunders College of Business), Psychology (College of Liberal Arts), Media Arts and Technology (School of Print Media), and Professional Photographic Illustration (School of Photographic Arts and Sciences). These two courses are also among the most gender-neutral courses within the college of computing with 50% or greater of female student enrollments. These two

classes are Digital Image Creation and Digital Video Creation.

GCCIS-ISTE-205 Digital Image Creation

The focus of this course is the creation and manipulation of digital images to be used for the web. The course covers topics such as basic digital photography, acquisition of images, and intermediate image manipulation.

Students taking this course are exposed to a range of arts and technology perspectives. From the technology side, students learn about the underlying digital concepts related to digital image generation and display. Also, they learn about the technologies required to manipulate images and deploy those images to web-based technologies. Furthermore, they learn about the entire digital image production pipeline and the balance between optimization and presentation within a web-based system.

However, the technology is not the only factor in digital image creation. Students must learn how to take pictures and create content that have impact and contextual appropriateness for their web creations. They must also learn to balance technical optimality with aesthetic experience and quality of the image reproduction.

It is only when the aesthetic and technical competencies combine that the student truly embraces a level of creativity that will allow for new and novel digital experiences.

GCCIS-ISTE-206 Digital Video Creation

This course extends beyond image and moves into the world of video. At a technical level, non-linear video editing includes the fusion of technologies to enable video capture, video manipulation, audio capture, audio manipulation, transitions, effects, and media authoring. It also includes the use of technologies such as video cameras, microphones, mixers, lighting, green-screens, and other related video equipment.

Along with the tools, technological concerns include media formats, compression, resolutions,

bit depths, and other concerns that dictate the presentation quality of the media. However, the aesthetics of video creation are also necessary to create compelling stories and media experiences. For example, how to properly frame a scene, how to create audio effects, how to light a scene, and how to set up a composite shot all require a sense of mental composition of the media space. Again, one or the other is not enough, but rather the fusion of these two perspectives is necessary to create the compelling story with video.

Although these courses reside in a college of computing, they are essentially art courses. At first this seems strange, but it falls within the broader multidisciplinary mandate of the curriculum. We do not teach these courses for technology's sake but rather as a domain area that utilizes technology as a medium for expression. Bringing students together from such diverse fields of study presents some challenges, but also makes for a vibrant and exciting classroom environment where students learn and experience both the theory and practice of art and technology. The courses are taught "handson" in an Active Learning environment where didactic material is mixed in with a considerable amount of lab work.

In the pre-requisite to these two courses the computing and non-computing majors are taught separately. When coming into these courses from the pre-requisite courses the computing majors are often quite confident based on their technical skills and the non-computing majors are a little bit intimidated. However, it quickly becomes apparent that they each have talents and skills the others will need to learn and develop together. Within the first couple weeks they are working together without giving it a second thought.

3 Some MAGIC

It is this same vision of the value of interdisciplinary collaboration and the blending of art and technology that led Phelps to create the MAGIC (Media Arts Games Interaction & Creativity) Center in collaboration with the RIT Office of the President. It is a conscious and deliberate effort to blur the artificial lines between the arts and the sciences, between technology and expression, between the study of the creation of media and its impact and effect on society and the human condition. MAGIC is a university wide, multi- and cross-disciplinary center in which faculty, staff, and student researchers, artists, and practitioners come together to create, contextualize, and apply new knowledge in a multitude of related fields and disciplines, and as such exists physically and administratively outside of any college at the university.

The MAGIC Center is designed to bridge the gap between research and prototyping, and the ability to bring industry polish and commercial scale and support to myriad projects. This allows these works to have wider and greater impact. For this reason, MAGIC is composed of both a research laboratory (in which many other labs and working groups are housed or affiliated), and a production studio (which leverages our discoveries in ways that broadly disseminates our work to peers and to the public at large). As such, in addition to the academic research, development, and educational side of the MAGIC Center, we have also created the commercial MAGIC Spell Studios, L.L.C. to act as a third-party publisher for student and faculty work. MAGIC Spell Studios is engaged with major distribution networks such as iTunes, Google Play, XBOX Live, etc., essentially providing resources, personnel, and operations for developers in lieu of them having to deal with the complexity and cumbersome nature of setting up their own business

4 Conclusion

Art and technology are not all that different and are much more intertwined than we often believe. They always have been. When artists develop new paints, that is technology, and when technologists design a language for rendering a user interface onto a screen that is art. There is a need for creativity in technology, as the problem solving employed to enhance a piece of software is, at its core, a creative process. In art, there is also need for technology. Understanding how computers render images is fundamental to creating a beautiful image on a computer. This interweaved nature of art and technology is a reality that we have a tendency to fight in education. Separating creativity and understanding into different colleges in a university or different wings of our elementary schools limits the conversations needed for exploring and developing new and improved art and technologies. We need to encourage students across disciplines to work together. In offering courses that appeal to, and mix, both art and technology students, we can facilitate and inspire conversations that bring and strengthen these domains together.

5 References

Phelps, Andrew et al. http://magic.rit.edu/

Ribauldequins - Leonardo da Vinci studies (http://commons.wikimedia.org/wiki/File:Ribaulde quins_-_Leonardo_da_Vinci_studies.jpg).

Leonardo da Vinci - presumed self-portrait (http://en.wikipedia.org/wiki/File:Leonardo_da_Vin ci - presumed self-portrait - WGA12798.jpg)

Vullo, Ronald P., Ph.D., Catherine I. (Irving) Beaton, M.I.T.E.; A minor in Web Design and Development for Non-computing Majors. Polytechnic Summit 2013, Boston, MA (June, 2013).

Vullo, Ronald P. Ph.D., Catherine I. (Irving) Beaton, M.I.T.E. A "Techy" Minor in Web De-sign and Development for Non-Technical Students. Paper presented at the International Conference on Frontiers in Education: Computer Science and Computer Engineering, Las Vegas, NV (July 16-19, 2012).

6 About the Authors

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