

**AC 2008-381: MEETING STUDENT AND INDUSTRY NEEDS THROUGH
EXPERIENTIAL LEARNING AND SOFT SKILLS STUDY IN COMPUTER
GRAPHICS**

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Meeting Student and Industry Needs through Experiential Learning and Soft Skills Study in Computer Graphics

Abstract

Students in a Computer Graphics (CG) degree program need a variety of “real-world” portfolio projects and experience before graduation to prepare them for their careers. One way to incorporate “real world” experiences is to use experiential learning (EL) components in the CG curriculum. Faculty within a CG degree program would benefit from an understanding of the experiential learning instructional methodologies to pedagogically develop curriculum for an EL course in computer graphics.

Generally, employers who hire CG graduates want proof of “real-world” experience and often ask for a minimum of three years experience in the field. Real world experience, to employers, often includes not only the technical skills but also the “soft skills” of teamwork, appreciation for diversity, and communication. Traditional classroom learning, as well as traditional classroom simulations of real-world portfolio projects, may not always fully prepare the learner for the CG work environment. Conversely, immersing a student in the “real-world” CG work environment may not always provide the needed pedagogical structure that will fulfill EL requirements or standard course and program requirements. Incorporating “soft skills” classes into a CG plan of study can help provide the other component of “real world” skills that employers seek.

This paper addresses how experiential learning can be implemented in the CG course or program structure, which will provide a significant transfer of learning through involvement with real-world projects.

Introduction

An appropriate identification of EL methodologies and criteria needs to be accessible to faculty, as well as, assessment methods for evaluating the EL course. Luckner and Nadler¹ defined the EL process in the Book *Experiential Learning: A Handbook of Best Practice for Educators and Trainers*:

This type of learning occurs when students participate in some activity, reflect upon the activity, use their analytical skills to derive some useful insight from the experience, and then incorporate their new understanding(s) into their daily lives. What experiential learning does best is capture the interest and involvement of the participants, but most importantly it contributes significantly to the transfer of learning.

Instructional Intervention

To implement EL learning in a degree program, faculty need to be made aware of the experiential criteria so they can design an appropriate and effective EL course. Faculty at our institution gain insight about EL through workshops and criteria provided by the National Society for Experiential Education (NSEE).² Once the National Society for Experiential Education standards of practice for EL have been defined within the course, faculty can share

pedagogies for best practices through syllabus and introductory materials. The pedagogical communication among faculty will help to elicit best practices and program assessment methods for an EL course and program objectives.

Benefits of Experiential Learning

The real-world experience is reflected in the learner EL portfolio. The EL portfolio goes beyond the traditional classroom assignments reflected in a student portfolio and provides an insight to potential employers about the student's real-world experience. This EL portfolio insight tells the potential employer that the learner has practiced specific CG technical and soft skills on the job. This EL course opportunity also permits the EL learners to apply teamwork, appreciation for diversity, communication and CG copyright law considerations to real-world CG on the job experience.

If learning Need Is Not Addressed

If the learning need is not addressed, students will not have a defined or recorded EL experience course within the degree program, nor have a working knowledge of the legal and ethical situations related to computer graphics profession, nor quality "real-world" exposure upon graduation. By implementing experiential learning in various courses at various levels an effective program-wide assessment method can be established and faculty will have the opportunity to learn and implement the EL standards both in coursework and throughout the program.

Communication Benefits

The students benefit from the multifaceted learning experience, which is strengthened by peer-to-peer interaction, employer-to-learner interaction, and teacher-to-learner interaction. The teacher-to-learner interaction takes place in scheduled face-to-face meetings and through weekly logs submitted by the learner. The instructor has the opportunity to respond to logs for more clarification. The learner, through log submissions, has the opportunity to synthesize each workweek and reflect on his or her EL experiences. EL work-related problems could be discussed with the instructor on a weekly basis to help the student address any on-the-job issues which might arise. The learner is required, through logs and final portfolio reflections, to reflect on work-related problems and successes.

The classroom peer-to-peer interaction takes place through weekly blogs where students share experiences with one another within a course setting. Students within a course setting may be working on different types of EL projects, but share the requirement to reflect on those various experiences. By sharing the experience learners have the opportunity to learn from one another about similar and different work experiences. These reflections go beyond the classroom-learned experience and provide experiential reflections to aid in the educational experience. Peer-to-peer interaction also takes place when students work together on an EL project as a group. The make-up and organization of the learner group as well as the experience of working with real-world clients goes beyond the classroom group project simulation. The client involvement adds to the dynamics of communication within the work place. Working well with others is a common job

requirement and the triangulation of group communication and client-group communication is a valued soft skill needed for CG graduates. Blogs are used by learners to define their roles within the EL project, as well as report weekly progress within the EL group project. Each group member is still required to submit a weekly log to the instructor as well as meet with the instructor to reflect on and discuss experiences. This gives the instructor an insight as to the individual student's progress. Another benefit to the peer-to-peer group interaction is the opportunity to learn and update CG knowledge, since technology is ever changing. Instructors and learners have the opportunity to address complex issues and suggest alternatives. The EL learner then has the opportunity to synthesize information from multiple sources as well as contribute to the resolution of an issue.

Soft skills

The importance of soft skills can be seen in the Technology Accreditation Criteria for the Accreditation Board for Engineering and Technology. TAC/ABET Criterion 2 lists the eleven areas of expertise a graduate must possess upon program completion, known as the "a-k" criterion. Under this standard, an engineering technology program must demonstrate that graduates have:

- a. an appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines,
- b. an ability to apply current knowledge and adapt to emerging applications of mathematics, science, engineering and technology,
- c. an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes,
- d. an ability to apply creativity in the design of systems, components or processes appropriate to program objectives,
- e. an ability to function effectively on teams,
- f. an ability to identify, analyze and solve technical problems,
- g. an ability to communicate effectively,
- h. a recognition of the need for, and an ability to engage in lifelong learning,
- i. an ability to understand professional, ethical and social responsibilities,
- j. a respect for diversity and a knowledge of contemporary professional, societal and global issues, and
- k. a commitment to quality, timeliness, and continuous improvement.

Only four of the eleven criteria apply to technical areas. All others cover "soft skills" (i.e., communication, teamwork, problem-solving and appreciation for diversity), and as a technology program these standards have relevance for computer graphics technology. The purpose of the EL process is to allow students to combine their technical skills with these soft skills important to a technical profession. EL requires the students to go beyond the "safe" environment of the classroom and practice their soft skills in a realistic setting.

Current EL Integration within our CG Program

Faculty interested in teaching EL within our CG program have defined capstone EL courses at various levels of instruction. Courses defined at the 100, 200 and 300 levels have an EL

component within the course. This means that the course has a client-based project after specified classroom materials are delivered and assessed. This gives the learner the opportunity to apply newly learned knowledge to real-world application. Students also have the benefit of classroom instruction in conjunction with introduction to work-force situations at the entry level. By implementing EL in a smaller project at earlier levels of instruction, students are able to build EL knowledge and are better prepared for an immersive EL experience in the upper program course levels. The EL 400 level courses are comprised of the full EL experience, where students work individually for employers or participate in individual and group client-defined projects outside of the traditional classroom setting. An online course management system, as described above, is used to aid in the pedagogical delivery of the fully delivered EL course. Course sites can house log submission, blogs, and discussion boards, and can provide a central location for various EL students to share reflective observations.

Process of Implementing an EL Course

The following are key questions to consider as a guide to analyzing the prospect of offering EL courses.

- What are the learning objectives and perceived outcomes of the experiential course and how are they accomplished?
- How can the learning objectives be experience through reflection?
- Where will the skills, practices and experiences occur outside of the university setting?
- What professional groups, businesses or non-profits are accessible to the instructor and student?
- How will the site objectives correspond to the course objectives?
- How will the course objectives relate to the program objectives?
- When and how should the sites be identified and contacted
- What is course enrollment and how many students should be enrolled in one experiential course?
- What pre-site activities will prompt, organize and enhance the experiential learning objectives?
- How will students be assigned to an experiential course to receive credit?
- How will site contract be prepared?
- What reflection activities will best raise student learning from experience?
- How will reflection be evaluated?
- How will the experiential course be validated within the university?

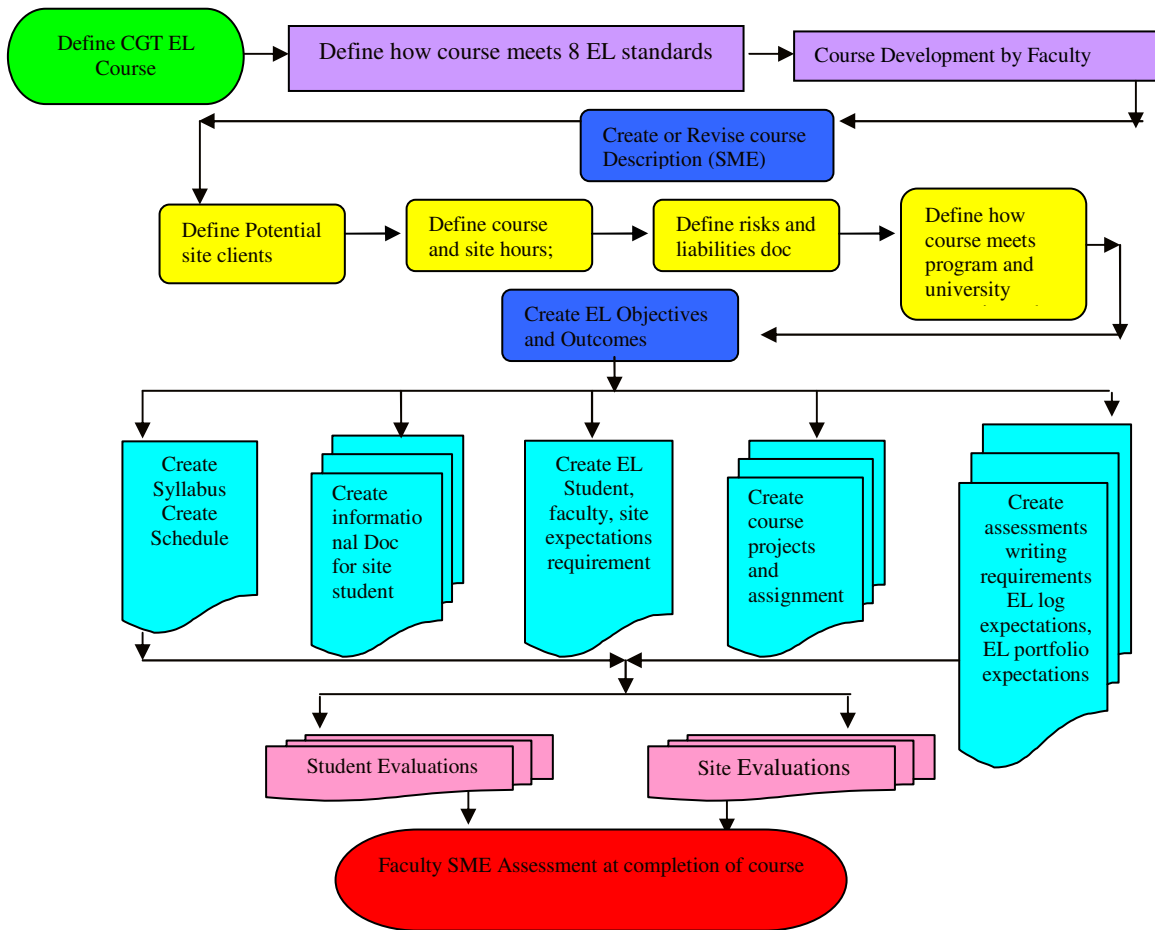
Key point methods to implement EL courses within a program

- Disseminate information about experiential learning initiatives through surveys gain feedback.
- Faculty are interested in teaching a EL course will attend workshops where EL experts will speak about their experiences and disseminate materials to aid in creating a successful EL course.
- Disseminate surveys to identify faculty that might be interested in teaching experiential

learning courses

- Collect information from potential EL site employers to gain an insight of the feasibility an EL course.
- Identify courses that might have an existing EL emphasis or component within the degree program.
- Identify components within the course where learners will need to have prior knowledge before engaging in an experiential project.

Flowchart for faculty to implement EL courses within a degree program



Conclusion

In the implementation of this concept, several discoveries were made. The following discovery points have led to the recommendations listed below.

Discoveries

- There are faculty who are interested in developing and teaching courses that meet the EL standards.
- EL is a valuable complement to formal classroom instruction. It can enhance learning through the transformation of experience.³
- Six potential EL courses were identified as potential EL courses that can be offered within the CG degree program.
- EL education is a philosophy and a pedagogy⁴
- Faculty within the CG program will be able to help students transform experience into knowledge through EL.
- Through EL courses faculty will be able to assist students in obtaining “real-world” experience and relevant portfolio projects, including soft skill experience

The following recommendations are the result of the planning and assessment process for developing program wide EL, and faculty experiences in attempting to implement EL on a program wide basis.

Recommendations

- The CG degree program needs to define and implement a plan to develop experiential learning into each experiential course.
- The faculty within the CG program need to define the pedagogical standards for each course as it relates to the degree program.
- Pedagogical standards for each course can be defined by using the National Society for Experiential Education.⁵
- An assessment method needs to be established for EL courses.
- Curriculum documents need to be generated for designated EL courses so that they are easily identified in the course catalog.
- Course load for faculty teaching and EL course needs to be established.
- Potential EL sites need to be identified.
- Faculty who wish to develop and teach EL course need to attend EL workshops to gain a better understanding of the EL standards and practice as well as an understand of how to avoid risks and liabilities associated with EL site.
- University strategies need to be developed to avoid mitigation risks, liabilities or any other areas of concern.

Although program wide implementation of EL courses can be a daunting task, the benefits for students are undeniable. The resultant growth in technical and soft skills will yield better-qualified graduates. The online environment has provided an opportunity for offsite communication both peer-to-peer and instructor-to-peer. Many students work within the labs on campus and share their EL experiences with newer students. This helps to build and enrich the learning environment. Students have the opportunity to participate in a professional experience while the teacher becomes the coach and guide to aid in learning. The benefits of the real-life portfolio have already proven to be instrumental in gaining employment after education. Many students gain employment while in school via the EL experience. The official implementation to the EL initiative will begin in Fall 2008 for the university as a whole. Thus far companies in the area see it as a benefit to their businesses and have been cooperative in helping to build the opportunities. The CG program has already partnered with local companies. One such local company has expanded its business based on the CG interns who were hired near or after graduation.

Future Study

This paper has focused on the issues involved in the implementation of EL throughout the CG program. Areas for future study include assessment after implementation of the EL initiative in the CG program, at both the course level and the program level. The program will look forward to assessing the courses with EL components, and collecting data from students with EL experiences as well as employers/clients who have provided EL experiences for students in the program.

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