

Pilot: Autonomous Cohorts and Emergent Learning

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Project Summary

Project Description

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Project Summary

autonomous cohort: a large group of students moving *asynchronously and independently* (without an instructor) through a pre-designed learning experience.

This project will establish and evaluate an *innovative educational approach* where a diverse group of students develop their general creativity using a web-based, online learning environment as a *creativity enhancing tool*. The proposal specifically addresses questions 2 and 4 in the CreativeIT Program Solicitation, NSF09-572. (see II.A.i).

Unique to the proposed learning environment is that it provides automated quantitative *and* qualitative assessments and meta-assessments (the grading is graded), while engaging students (primarily non-art majors) in a discipline-based fine arts curriculum. The environment will be designed to handle very large classes and to move students through the course content autonomously, automatically and asynchronously within a schedule of content delivery and creative assignments. The methods and techniques involved will be easily scalable and “tunable” to accommodate a variety of disciplines and learning experiences (including aspects of creativity that are domain-specific, whether in the arts, sciences or engineering).

The project builds from these established assumptions:

- creativity is a general skill, learnable through channeled practice and exposure to good examples
- quality is discernible (to learners as well as teachers)
- peer-grading and collaborative filtering are effective assessment *and* learning tools
- large student numbers can assure high diversity and a more effective learning experience
- “all boats rise with the tide”

Specific features of the online learning environment include:

- 1.) a faculty designed curriculum—content, project assignments and assessment rubrics.
- 2.) iterated creative exercises (written and digital media products), graded using online peer review.
- 3.) all peer-assessments are randomly and anonymously assigned, ensuring diversity and fairness.
- 4.) peer-assessments are also graded using peer-assessment (meta-assessments).
- 5.) a student cohort moves as a group through course materials, on a regular assignment schedule.
- 6.) On the completion of project assignments, students will have access to all completed assignments from the class, ranked and sorted based on the peer-reviews (collaborative filtering, providing models of success in preparation for the next iteration of assignments).

Intellectual Merit of the Proposed Activity: This proposal builds on the understanding of general creativity as an individual process and skill that is learnable. It models a learning cohort as a complex adaptive social system. A learning management system can be designed to include features of adaptive systems—diversity, randomness, local interactions, decentralization and pattern matching, all moving towards an emergent behavior of learning and creativity. The PI is an interdisciplinary artist with an extensive background in IT, digital media and the fine arts. Courses developed for this project will be designed by faculty experienced and successful in teaching creative practice to large numbers of students.

Broader Impacts of the Proposed Activity: This project provides a structured method for managing the process of student engagement with any knowledge-base. It will establish and evaluate a method for automated and scalable qualitative assessment, applicable to any collection of online content, and implemented in a well supported, open source software environment.

This new approach to education will establish a method of teaching and learning that could completely change, in some instances, the landscape of accessibility and availability of education. All that is required is a community of learners agreeing on participation (enrolling) in a pre-designed and broadly scheduled educative process (thus becoming a cohort). Autonomous cohort learning is one solution to the burgeoning growth in learners across the globe, and a way to guide large groups of learners to realize their individual creative potentials.

Project Description

I. Results from prior NSF Support

none / not applicable

II. Introduction

A. Objectives and Significance

This project's specific goal is to establish and refine a methodology where students develop and foster a creative "habit-of-mind" in an academic setting using IT-based tools. The methodology involves a structured, autonomous and automated learning experience that is scalable, designed for large numbers of students. (Large numbers ensure diversity and actually improve the effectiveness of the process.) Students as a group (a cohort) will leverage their current language and digital media skills, using an online learning environment and computer-based peer assessment, in the practice of creativity, and the expansion and realization of their individual creative potentials.

We need to become more efficient and effective in our efforts to innovate. Arden Bement, Director of the NSF, highlighted these concerns in the NSF FY 2007 Budget Request to Congress: "Our nation's future depends more and more on the quality of our new ideas, the vitality of our science and engineering workforce, and the innovative use of new knowledge generated through our research and education enterprise." (Schunn, Paulus, Cagan and Wood 2006).

Innovation is a corollary to creativity, where from the "creation of a new idea...[follows]...its implementation, adoption and transfer." Innovation follows from a realization of creative potential. This proposal hopes to grow the creative capital within our educational systems in order to bring more new and useful ideas to bear on the problems we face as a nation and a society.

i. Research advances, areas and questions addressed (#'s 2 and 4 in NSF 09-572)

The project's goal is to nurture and grow an individual's personal creativity. To this end a new theoretical model is posited and a *new educational approach* is investigated. The approach builds a scalable IT-based system that enables the automated learning of creative practice, exploiting and exploring the gestalt that can occur when the following independent trajectories are synchronized in support of individual learning:

- discipline-based art education (taught to primarily non-art majors)
- pedagogy in support of creative practice (making and thinking)
- computer-based peer-assessment and collaborative filtering
- internet-based social media and online learning technologies
- commonplace use of digital media production tools

"Will the research lead to the development of new technologies to support human creativity?"

This project will advance areas that contribute to CreativeIT, as it offers an *innovative educational approach* by developing a computer-based learning environment that expands and enhances general creativity, focusing on a new way of teaching using scalable computer-based peer review and collaborative filtering in autonomous cohorts. The project will build, evaluate and disseminate an *educational approach that encourages creativity*. This approach is domain-general and provides a means for diverse groups of learners to discover, practice and grow their individual creativity skills.

"Will the research lead to innovative educational approaches in computer science, science or engineering that reward creativity?"

This proposal responds indirectly to this question. It *supports creativity with information technology*, taking advantage of social media, digital media production tools and asynchronous online learning environments. The project will engage a cohort of learners, allowing them to evolve as a group into

an emergent behavior of learning, manifested as individual creativity, regularly practiced and developed.

The approach develops *creativity enhancing tools* allowing individuals to engage in all aspects of a creativity system (see B.ii), allowing their own inherent creativity to develop and establish itself as a “habit-of-mind.” The project is designed to develop and reward creativity in general, and to foster an attitude of innovation. These processes and abilities are general and transferrable to all domains including the sciences and engineering.

ii. Intellectual Merit of the Proposed Activity

This proposal builds on the growing understanding of creativity as an individual process, a domain-general skill that is learnable. Building on methods and successes in online learning, computerized peer-assessment and collaborative filtering, creativity can be developed, practiced and mastered. This approach models a learning cohort as a complex adaptive social system. A learning management system can be designed to include features of adaptive systems—diversity, randomness, local interactions, decentralization and pattern matching, all moving towards an emergent behavior of learning and creativity. The proposed learning environment models features of online communities that foster emergence through computer-based self-assessment and self-correction—where the community iteratively creates and evaluates original artifacts.

Online communities such as *slashdot.org*, *Wikipedia* and *digg.com* show what can happen when the “wisdom of crowds” is brought to bear on filtering information for quality (usefulness). This “crowdsourcing” of assessment should be just as effective in a well-structured learning activity. The proposed project will codify a practice, evaluate results and disseminate findings that integrate this approach into a well-defined and structured learning experience. The PI is an interdisciplinary artist with an extensive background in IT, digital media and the fine arts. This project will be undertaken by faculty experienced and successful in teaching creative practice to large numbers of students.

iii. Broader Impacts of the Proposed Activity

This activity will establish a method that opens the doors to knowledge to a diversity of learners. Taking full advantage of the massive amounts of information freely available over the Internet, this project provides a scaffold for large groups of individuals to form as an online community, to engage a body of knowledge, and to learn. The proposed techniques are scalable, robust and malleable. The project will be developed in a well-supported open source software environment and made available to anyone who might be interested in exploring the teaching model.

While the focus of this project is to build a learning system that enhances personal creativity, a prime component is a computer-based peer review system that provides automated and scalable qualitative assessments. It should be effective for any learning experience that is dependent on qualitative and quantitative assessments, as *both* can now be automated using digital tools. Learners working together as an autonomous cohort can be (and indeed should be) a large and diverse group. The more cognitively diverse the members of a cohort, the richer the educational experience will be, and the higher the probability for an emergent creativity in the learning process.

This is a method of teaching and learning that builds on several established techniques and systems, combined and enhanced to create a new overall learning experience that completely changes, in many instances, the landscape of accessibility and availability of education. All that is required is a community of learners agreeing on participation (enrolling) in a pre-designed and broadly scheduled educative process (thus becoming a cohort). A cohort can be a group of high school seniors, a group of new Army recruits, an online community of home-schoolers, a group of senior citizens (or any life-long learners), or any combination of these. Once proven effective, one could envision a variety of open source courses developing around the explosive amount of content now freely available. Autonomous cohort learning is

one solution to the burgeoning growth in learners across the globe, and a way to guide large groups of learners to realize their individual creative potentials.

B. Creativity

i: Defining creativity

Ruef defines creativity as “the act of noticing patterns...making them visible in some kind of model, or theory, or poem, or sculpture, so that the insights gained don’t just float away. Recording is a necessary step.” (2003) Patterns are noticed across some conceptual divide, and those that are considered significant and meaningful are “recorded” in some manner.

Plucker and Beghetto remind us that we are in the realm of the *new* and *valued*, “Creativity is the interplay between ability and process by which an individual or group produces an outcome or product that is both novel and useful as defined within some social context.” (2004) In education we can enhance abilities and practice and expand processes. Creativity is the ability to generate new ideas and manifest them as something of value.

Boden classifies two cases of creativity, “psychological” (P-creativity) and “historical” (H-creativity). “P-creativity involves coming up with a surprising, valuable idea that’s new to the person who comes up with it. It doesn’t matter how many people have had that idea before. But if a new idea is H-creative...(as far as we know) it has arisen for the first time in human history.” (2004)

This project focuses on P-creativity, where the “P” could also stand for “personal.” As an individual learns (and so moves in the direction of mastery), their personal creative space expands and deepens to allow for the innovations society might consider H-creative. A creative habit-of-mind developed through P-creativity will transfer, as “H-creativity is a special case of P-creativity.”

Thought another way, of Perkin’s “three intelligences,” creativity situates in “reflective intelligence,” which is the control system for “experiential intelligence.” (1994) “By cultivating awareness of our own thinking, asking ourselves good questions, guiding ourselves with strategies we steer our experiential intelligence in fruitful directions. This steering function is reflective intelligence.”

Mastery in a domain deepens the experiential and moves the reflective up the creativity continuum from the personal to the historical. Whether or not a creative act is valued as historically significant by society is irrelevant to the fact that creativity has occurred. The goal of this project is for individuals to effectively practice and expand their personal creative abilities and processes, with the belief that the creative habit transfers through all levels of one’s experiential intelligence and across domains.

ii. Creativity as a system

Csikszentmihalyi’s systems model of creativity provides a good base from which to construct a pedagogy designed to enhance a learner’s creativity. (1996) The model proposes that creativity manifests through the interactions of three fundamental components;

1. *domain*: similar to the academic idea of a discipline, consisting of “information—a set of rules, procedures, and instructions for action.”
2. *field*: the arbiters, “the individuals who act as gatekeepers to the domain [deciding] whether a new idea or product should be added to the domain.”
3. *individual*: the one making changes, bringing novelty to the domain

Creativity occurs when an individual “has a new idea or sees a new pattern, and when this novelty is selected by the appropriate field for inclusion in the relevant domain.”

Most of our students are already literate and have degrees of skill in domains that directly involve creative action. These literacies are points of leverage in building a learning environment designed to enhance general creativity and to realize creative potential through the making of things that can be seen (or heard, or read, etc), interpreted and assessed.

This proposal focuses on “domains” of creative practice that are commonplace. Starting with language skills, for creative and critical writing, and broadening to include “the information arts,” now a part of our media culture with the proliferation of, and ready access to, digital media tools for production and distribution. Students today are already working as members of the “field” in these domains. They vote for their favorite “American Idol,” they link and comment on their favorite videos on YouTube, they “friend” a band on Facebook and they comment on photos they like (or dislike) on Flickr. A discipline-based art curriculum can employ these domains in both the making and the interpreting of art, and the exercise of personal creativity.

The project works from the assumption that engaging art is a creative act. Interpretation in the broadest sense requires creativity as much (if not more so) as the making of art objects. This assumption is the basis of developments in art education over the past three decades and is established in the current teaching and learning of art, creative practice and, with the addition of digital creative tools, the “information arts.”

Information arts are seen as “artistic practice to manage and interpret information at the cusp of technological and scientific research.” (Mitchell, W. J., Inouye A. S., and Blumenthal M. S. 2004) Today that technological cusp includes 8 megapixel cameras in cell phones, HD video cameras in iPods, social media spaces and online photo and video distribution hubs accessible to all. We are all producers of media. Especially our students—“the digital natives.” (Prensky 2001)

Courses developed in the project will implement production activities and interpretive activities, and include the thinking of things and the making of things, exploiting the easy access and ubiquity of creative digital tools. Our students are already arbiters of the domains of language (creative and critical writing) and digital media (photo, audio, video and text). This can be brought to good advantage in developing a learning environment with an emphasis on creative practice.

iii. Metaphor and analogic thinking

This proposal views creativity as an exercise of analogic thinking and conceptual metaphor, building from the idea that metaphor “the mapping across conceptual domains” is fundamental for creative practice and knowledge building. (Lakoff and Johnson 2003) “Analogical thinking lies at the core of human creativity.” (Goswami, 2001) And “creative people don’t just express themselves in metaphor, in analogy, they see and think in metaphor and analogy...” (Ruef 2003)

Hofstadter tells us that, “in regards to cognition [and so creativity, as it is a cognitive process] analogy is everything.” (2007) Thus analogy and metaphor will be foundational in the development of content for courses in this project, especially in the project assignments. To develop creativity requires effective practice, and good models of analogical thinking.

In developing “the creative habit...Metaphor is the lifeblood of all art, if it is not art itself.” (Tharp 2003) Not just for art making, this can be also understood in the context of art appreciation, where one engages art as audience by connecting the domain of the art object to the domains of self and of culture. Finding meaning and making sense, is an activity of connection (mapping) across conceptual spaces. It is a creative act that moves from description to interpretation within art critique and art

history, where we have “... creative options and confront many of the challenges typically assigned to artists” (Weintraub 2003) “Interpreters do more than uncover or discover meaning; they offer new language about an image to generate new meaning...[done through] metaphor...an implied comparison between unlike things, [where] qualities of one thing are implicitly transferred to another.” (Barrett 2006)

iv. A pedagogy for creativity, and Discipline-Based Art Education (DBAE)

Runco defines personal creativity as something that is “manifested in the intentions and motivation to transform the objective world into interpretations, coupled with the ability to decide when this is useful and when it is not.” From the position that everyone has the potential to be creative Runco holds that “ the interpretive and transformational bases of personal creativity are universal...” (Runco 2004)

Perkins outlines an approach to realizing our creative potential (our reflective intelligence) through active engagement with the art object. (Perkins 1994) The idea is a part of the movement towards a Discipline-Based Art Education (DBAE) as championed by the Getty Foundation in the 1990s— primarily designed for K–12 instruction. (Dobbs, 1998)

DBAE is an approach to instruction and learning in art that involves four foundational art disciplines:

- art making—making objects, using tools and techniques of various media
- art critique—interpreting, evaluating and theorizing about art objects
- art history—inquiring into historical, social and cultural contexts of art objects
- aesthetics—raising questions about the nature of meaning and value of art

The main divide here is between making and thinking. Other authors have developed variations of the approach. See table 1.

Table 1: Ways of classifying the object and the interpretation in creative art practice

DBAE (Dobbs, 1998)	Barthes (1977)	Barrett (1994)	Abrahmov (2008)	Patterson (2004)
art making	denotative	description	factual	observe
art history				
art critique	connotative	evaluation	interpretative	express
aesthetics		interpretation	conceptual	imagine

Again this project stresses the idea that seriously engaging art, as maker or viewer, is a creative act. Interpretation is a process that starts with the object and requires the viewer to find meaning. Meaning is found through exploring connections, discovering new associations between the object and the individual’s knowledge and experience.

Pedagogically, Abrahmov’s “three levels of meaning” have already shown effective as a means of strengthening the creativity of art students, specifically by pushing the students to find significance in the art object. How is it “useful” in personal and social contexts? In engaging art his three levels are:

1. *factual level*: objective description, “observing factual details”
2. *interpretive level*: personal connections, “assigning personal significance to the factual details”
3. *conceptual level*: social connections “deciphering the intrinsic (deep, [universal]) meaning”

Abrahmov and Ronen have developed an effective integration of these three levels in a peer review process, teaching a studio course in photography (22-24 students) using a blended approach with non-anonymous peer-review, and assessing the results. (2008) The project proposed here builds on their

work, developing a more general methodology and significantly expanding class sizes. The proposed approach will also automate processes, setting up a layer of anonymity in the peer-review, taking advantage of collaborative filtering as feedback in the system, and developing the courses for non-art students.

There are a variety of pedagogic strategies designed to provide students opportunities to expand their abilities at all three levels of meaning. Several techniques and creative projects, with proven effectiveness, will be integrated into the curricula used in these projects.

Various established creative projects and their basis include:

1. Re-creations (Rico, 2002)
2. Object writing (Pattison, 1996)
3. analogy and theorizing (Ruef, 2003)
4. digital storytelling (Lambert 2006, Ohler, 2008)
5. sound collecting / collage (Schaeffer 1993, Landy 2007)
6. juxtaposition and visual thinking (Roukes 1988)

C. Computer-based peer assessment, collaborative filtering and autonomous cohorts

A comprehensive survey of of peer assessment and peer grading, and its usefulness in an academic setting can be found in Topper. (1998) Computer and web-based peer assessment have also been explored and shown effective in various settings. (Davies 2000, Gehringer 1998) There have been applications of automated, qualitative peer-assessment in a blended teaching approach where it has proven successful in large classes (Ballantyne, Hughes and Mylonas 2002) and in art education with smaller groups (Abrahmov and Ronen 2008). This peer-review process is often called collaborative filtering. (Loll and Pinkwart 2009) For our purposes collaborative filtering also makes available to all students, completed projects, ranked and sorted by peer-assessed grades. This provides students with models of success to consider and study as they prepare for the next assignment iteration in the class. Some patterns and observations from successful computer-based peer assessment research projects include:

- students learn from being graded by their peers *and* from grading their peers (Abrahmov and Ronen 2008, Davies 2000)
- the process of peer-review is more effective if done anonymously (Sitthiworachart and Joy 2004, Russell 2004)
- meta-assessments (reviews of reviews) improve overall quality (Davies 2000, Gehringer, 1999)
- aggregating multiple reviews per project for a grade is better than a single assessment (Reily, Finnerty, and Terveen 2009, Loll and Pinkwart 2009)
- sorting assessed work and making it available to students (collaborative filtering of project outcomes) provides useful models of quality (Cho and Schunn, 2007)

In this project the peer assessment will include the features above, working in tandem with standard quantitative online assessment tools—quizzes, exams, etc. All these will be integrated into a discipline-based art curriculum that iteratively exercises creative practice.

Specific features of the proposed learning management system include

- 1.) faculty designed curriculum, project assignments and assessment rubrics.
- 2.) a student cohort moving through the course materials with weekly assignments and deadlines.
- 3.) students will take regularly scheduled online quizzes and tests to show mastery of the basic materials in the course (quantitative assessments: multiple-choice, matching, fill-in-the-blank, etc)

- 4.) creative exercises (written and digital media products), graded using computer-based peer review.
- 5.) peer-assessments, randomly and anonymously assigned, ensuring diversity and fairness.
- 6.) peer-assessments, also graded using peer-assessment (meta-assessments).
- 7.) On the completion of project assignments, students will have access to all completed assignments from the class, ranked and sorted based on the peer-reviews (collaborative filtering, providing models of success in preparation for the next assignments).

D. An autonomous cohort as a complex adaptive social system

This project explores a methodology where an online learning community, using computer-based peer assessment tools, develops as a complex adaptive social system. The goal of the project is to foster an emergent behavior of learning in general, and specifically learning (or re-learning) creativity. One point of interest is just how creativity will emerge as defined from the perspectives of a diverse student group in contrast to a faculty viewpoint. While rubrics will be used in guiding peer-assessments, there is some discussion about whether rubrics constrain novelty in courses with a focus on creative practice. (Garrison 2004-05)

Page and Miller consider features that are likely to lead to “complex outcomes” in a system. (2007) Among them are heterogeneity, adaption, local interactions, feedback and external influences. These features are present in an autonomous cohort approach as follows:

heterogeneity (more is different)—large class sizes and anonymous peer-review ensure diversity

adaption—the goal of a good grade (and hopefully a desire to learn) will steer students towards behavior models that they see as successful, made available by ranking, sorting and posting completed and graded assignments (collaborative filtering). It is expected that students will also adjust their project performance based on the projects that they grade.

local interactions—peer-assessments and meta-assessments happen amongst members of the class, even though anonymous, members of the cohort work in a decentralized and conceptually local space (all following the same iterating assignment schedule and deadlines).

feedback (negative and positive)—peer-assessments and assessments of peer-assessments (meta-assessments) provide individual feedback, along with assignment placement in the ranked, sorted and posted finished projects.

external influences—one possible addition here is to allow outside assessment of assignments as well. This could be done with students from another cohort, or perhaps using a crowdsourcing marketplace such as Amazon’s Mechanical Turk. Faculty will also have the freedom to intervene and assess assignments. And of course students are developing their own ideas about creativity based on past and current exposure to media and culture. These developing ideas will naturally impact the students’ assessing and creative activities.

The system, as implemented in a Learning Management System, should also be tunable, allowing for adjustments and tweaks to optimize performance, and to accommodate diverse content and course structures. Meadows lists several points where one can intervene in a system. (1999) Examples of tunable adjustments specifically applicable to the proposed methodology and implementation, include:

- length of delays
durations for assignments and assessments to be completed

- strength of negative feedback
 - percentage of final assignment grades counted from peer-assessments and meta-assessments
 - percentage of final assignment grades counted from formative peer-assessments
 - formulas for aggregating assessments and meta-assessments into a grade
- gain of positive feedback
 - percentage of final assignment grades counted from peer-assessments and meta-assessments
 - percentage of final assignment grades counted from summative peer-assessments
 - formulas for aggregating assessments and meta-assessments into a grade
- structure of information flow
 - how/when course content is made available to students
 - how many assessors per assignment
 - formative vs. summative assessments
 - single vs. multiple iterations of review per assignment (allowing revisions)
 - variations on reviewer-mapping strategies (Gehring, 2000)
 - anonymous peer-review vs. open critique (via wiki, chat, blog, etc)
- rules of the system
 - number and nature of assignments
 - detail and specificity in the design of the rubrics
 - how group assessments are aggregated
 - faculty intervention allowed/expected
 - grading policies (participation, quantitative assessments, make-ups, etc)
 - schedule

III. Project Plan

A. Overview

Activities for the project will be as follows

1. Construct blended courses that will provide students from the general student population (not just art students) a structure where they can develop and enhance their personal creativity (abilities and processes), in the context of a discipline-based art curriculum. Assignments should be defined with clear rubrics for later student critique and assessment and eventual outcomes assessment of the teaching/learning methods employed. Integrate a peer-review system with standard learning management tools for content distribution and quantitative assessments (quizzes, exams, etc).
2. Establish a computer-based peer review system, in an open source software environment, where each student assesses several members of their cohort, and is also assessed by several members of their cohort. *All assessments are distributed randomly and done anonymously.* Students will not know whom they are assessing or who has assessed their work.
3. Extend the computer-based peer review system to also allow meta-assessments. *All meta-assessments are distributed randomly and done anonymously.* Students will assess several of the peer-reviews for each assignment. (Student grades on a project will be substantially determined by the assessments and the meta-assessments they receive for their creative assignments, and also for the meta-assessments they receive for the peer-reviews they do.)
4. Establish a collaborative filter system so that, at the end of the scheduled assessment period for

an assignment, all completed assignments will be made available to the class, sorted by quality, as determined by the peer reviews. Assignments are listed anonymously.

5. Include other instructors and pedagogy to the process. Using student evaluations and other measures of outcomes and effectiveness, refine methods for the online peer-assessment and the autonomous cohort approach to fostering creativity and learning.
6. Develop online courses that can run autonomously, with all content distributed using various online media and students are assessed with on-line quantitative assessments (quizzes, exams, etc) and computer-based peer assessment as outlined in section C.
7. Evaluate and disseminate results.

B. Timeline

i. Year 1

- **Extend a learning management system (LMS) to allow for anonymous peer-review.**
 - open source resources
 - moodle.org (expand the “Workshop” and “Database” components)
 - develop extensions to allow for anonymously distributed peer-reviews
 - develop extensions to post/filter finished projects by rankings (based on peer reviews)
- **Use the developed system in a blended art appreciation course:**

Introduction to Visual Art (for non-art majors)

(ARH-151 in University of Alabama course inventory), 200 students, taught by Evans.

course description: The purpose of this course is to acquaint the student with the many aspects of the visual arts, and to help students to find their own answers to the questions, “what is art” and “why do we want/need art in our communities and personal lives?” Students will be guided in developing a personal set of standards for interpreting art and understanding the various aspects of art in our lives; the language of art; exploration of the various technical and formal aspects of art media (e.g. painting, printmaking, photography, sculpture, architecture, etc.); and the history of art throughout the world, from ancient times to the present.

The course will include the following:

- live class meetings (recorded for later viewing)
- online quizzes and exams (quantitative assessments)
- weekly interpretative creative projects throughout the semester (projects uploaded to LMS)
- computer-based peer assessments of weekly creative projects (each student will assess 5+ projects and assess 5+ assessments, assessee and assessors are anonymous and randomly selected)
- on completion of each assignment at the close of the assessment period, all finished assignments are posted anonymously, ranked and sorted by ranking (scores aggregated from the peer-assessments and meta-assessments)

- **Gather data and evaluate learning outcomes.**
- **Disseminate early results.**

Year 2

- **Refine learning management system (include other art faculty).**

Use the LMS in a variety of blended courses that require creative engagement through art interpretation and/or a creative practice using digital media and online social media tools. Develop courses such that all content is available online and make attendance optional for students.

open source resources

- moodle.org (expand the “Workshop” and “Database” components)
- develop extensions to allow for anonymously distributed peer-reviews
- develop extensions to post/filter finished projects by rankings (based on peer reviews)

Student assessments (grades) for courses will include online quizzes and exams and anonymous peer-review of assessments and meta-assessments. The classes will include the following:

- live class meetings (recorded for later viewing), attendance optional
- online quizzes and exams (quantitative assessments)
- weekly creative projects (making and/or thinking) throughout the semester (projects uploaded to LMS)
- computer-based peer assessments of regularly assigned creative projects (each student will assess 5+ projects and assess 5+ assessments, assessee and assessor are anonymous and randomly selected)
- on completion of each assignment at the close of the assessment period, all finished assignments are posted anonymously, ranked and sorted by ranking (scores aggregated from the peer-assessments and meta-assessments)

- **courses to be taught:**

Digital Creativity (for non-art majors)

(ART-153 in University of Alabama course inventory, 200 students, taught by Evans)

Course Description: In this course students will explore personal creativity as they survey creative practice from the early 20th century to today. There will be an emphasis on technology-based fine art and music. The course will focus on Western creative practice but will also put contemporary practice within a worldwide context. Students in this class will learn strategies for creative thinking, by making texts, images and/or sounds, and sharing them using current digital technologies (blogs, social networks, etc). They will develop an appreciation of contemporary art and music through engagement with technology-based media practice and a survey of the cultural and historical underpinnings of that practice.

Reboot / Remix (for non-art majors)

(ART-251 in University of Alabama course inventory, 200 students, taught by Marshall)

Course Description: This course examines contemporary art through its relationship to three familiar popular culture phenomena: gaming and simulated environments; popular music; graphic novels and comics. We will examine how and where artists get their ideas, often drawing on other fields of study. We will also examine ways in which information technology has affected artistic practice, and the often ambiguous relationship between the visual arts and the mass media. The course will focus primarily on how artists make art, but students will also learn about the history of visual popular culture.

Art after 1945

(ARH-381 in University of Alabama course inventory, 100 students, taught by Curzon)

Course Description: This course surveys the movements, artists, and aesthetic theories that have informed art production in the United States and Europe from 1945 to the present day. We will approach this wide array of material through attention to specific time periods and/or to various critically defined styles (“isms”) applied to painting, sculpture, performance, installation, and video.

- **Gather data and evaluate learning outcomes.**
- **Disseminate results.**

Year 3

- **run courses online with autonomous cohorts**
open source resources
moodle.org with extensions

Use the learning management system to run courses taught with autonomous cohorts. Faculty will oversee the process, but the classes should run automatically.

- **courses to be taught:**

Digital Creativity (for non-art majors)

(ART151 in University of Alabama course inventory, 200 students, taught by Evans)

Reboot / Remix (for non-art majors)

(ART253 in University of Alabama course inventory, 200 students, taught by Marshal)

Art since WW II

(ARH381 in University of Alabama course inventory, 100 students, taught by Curzon)

- **Gather data and evaluate learning outcomes.**
- **Disseminate results.**

IV. Management Plan

This is a Pilot Program that will involve one PI (Brian Evans) and one graduate assistant who will be primarily involved in the design, coding and administration of the LMS. The current plan is to use the open source LMS Moodle as the core technology (coding primarily in PHP), developing custom features in the Database component and Workshop module (a basic peer-assessment tool), to support the specific goals of this project. (Cole and Foster 2008) Custom features to design and implement initially are:

- a controlled anonymous project distribution system for assessment
- a system of anonymous meta-assessments
- a system for aggregating grades from assessments and meta-assessments
- a system for posting projects, listed anonymously and sorted by grades (collaborative filtering)

During the first year Evans will work with the graduate assistant to build the computer-based peer-assessment component of the project and integrate it into the LMS used in the courses to be taught in this project. The courses will integrate the peer-assessment modules with other LMS modules—online quizzes, all distribution methods for course content, recorded lectures, pdf and Powerpoint files, web-links, and other content to support class readings and assignments. Evans will then develop

and teach a large class (200 students) using the online peer-assessment tools as described, as part of a blended course.

In the second and third years the system and methodology will be refined with the addition and help of two faculty associates who will develop different courses, and test and evaluate the proposed methodology. These will be courses where

- 1.) students engage more advanced conceptual activities in the interpretation of contemporary art, allowing reviews and revisions of larger assignments (Curzon)
- 2.) students use digital media and online communities in a creative practice, working and assessing in small groups, connecting interpretations and creative activities to popular culture (Marshall).

In year two all courses will be blended, with all content available online and attendance optional. In year three the goal is to teach the classes as autonomous cohorts, with faculty oversight.

V. Evaluation / Assessment Plan

Evaluation of the effectiveness of the method in learning will follow several tracks.

- 1.) Faculty and TAs will assess a large sample of student projects before peer-assessed projects are reviewed and posted. Peer reviews can then be measured against currently accepted assessment practice.
- 2.) Students will be allowed to evaluate their individual ratings for fairness and accuracy.
- 3.) At the end of the courses students will evaluate the course with a questionnaire, and with standardized student evaluation forms, measureable against evaluations of the same courses taught in a traditional manner.
- 4.) As in most art-based courses, student work will also serve as evidence of both learning and creativity.
- 5.) Courses will run open wikis, blogs or chats to allow students to provide feedback and post concerns throughout the process.
- 6.) Interviews will be conducted with a sample of students from each class.

VI. Dissemination

The project includes support for travel, with the expectation that results from this research will be documented in papers, submitted for publication in appropriate journals and presented at appropriate symposia in art education, computer-based learning and other venues relevant to CreativeIT. The PI, associate faculty and graduate student will all present and publish results.

The project is planned to be implemented as open source software, and will be available to other institutions, researchers and faculty interested in teaching courses with similar methods. Methods, implementations and results will be documented and made freely available.

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