A HYBRID LEARNING ENVIRONMENT: On the subject of design-thinking for non-design students.

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Abstract: *This paper describes the implementation of a hybrid learning environment (HLE) through the creation, deployment and administration of a large-enrollment course on the subject of Design Thinking. The challenge illustrated by this on-going case study is the one of meeting the learning objectives for a population of novice learners from heterogeneous background through a creative articulation of state-of-the-art instructional technologies. As an additional challenge, given current financial constraints in higher education, the implementation had to address limited funding in the development of the learning environment, the instrumentation provided by the students, and its delivery to large groups of students.*

Palabras clave: Design Thinking; Hybrid Learning; Blended Learning; Design Education; Instructional Technology

Motivation

Professional designers know that most of the general public tends to underestimate or overestimate the merit of our services. For some, design is a form of art that is delivered by a priesthood of individuals dressed in black turtlenecks and wearing designer glasses that deliver products that only the most privileged members of society can afford (Brown, T. 2009). For others, design is a parasitical marketing gimmick that is device for members of society without an opinion or taste of their own and at the end of the day it is not more than just good old common sense, but overpriced.

Professional designers know that historically there is some truth to both extreme perceptions, but we also know that for the most we provide added value to the products and processes we deliver. It is evident that design professions have not done a good job in educating the general public on the value of design and if not addressed the more extreme stereotypes tend to dominate the perception of what we do. It is of great importance for the design disciplines to educate society in general and our future clients in particular about the true nature of what we bring to the table as design thinkers.

Our need to educate society about the design process has been met over the last ten years with a growing interest from other disciplines towards the use of design methods in their own professional fields. Because of that "pull and push" dynamic on design methods in particular and design thinking in general we are experiencing today a great opportunity to demystify at the same time that we value what designers do. The time is right for professional designers to explain in simple terms what we do and how it is critical in adding value to our life. For the authors that opportunity came through the addition of design to the core curriculum of Ball State University (UCC-21. 2010) and the opportunity to reach a very large group of students with a 3 credit hour course that will educate them on the nature of design thinking, design process, and design product. To the best of our knowledge this is the first time that a course of this nature seeks to target an audience as massive and diverse as the one anticipated by this implementation.

Challenges and Opportunities

For more than a decade a substantial amount of effort has been invested in the study of on-line education for higher education. Through those studies we have learned that certain subject matters and learning styles are more difficult to address through traditional on-line delivery formats. Now it is clear to us that in the world of on-line education we cannot assume that one size will fit all. Subject matter, learning style, and delivery format need to be carefully articulated in order to achieve effectiveness in meeting the desired learning outcomes.
Art and design domains have been moving very slowly into on-line education because our learning styles pose greater technological challenges for on-line deployment.

In particular, our need for media rich learning environments is very challenging as well as the need for constant feedback through desk critics and design reviews. Our working hypothesis is that a hybrid learning environment (HLE) may fit well in the art and design domains opening opportunities previously unattainable.

A HLE also called "blended" or "mixed" learning environment combines different modalities of face-to-face and online learning with synchronous and/or asynchronous interaction. This type of courses is increasingly offered at colleges and universities across the United States with growing evidence that they can enhance student learning. In general terms, hybrid learning is advantageous because is learner-centered; it has a more flexible format of implementation; it can promote active learning and therefore student engagement; and it fosters student participation and collaboration through interaction with other students and the instructors. In specific, there are hybrid on-line implementations that can be considered effective in addressing design subject matters among experienced design learners.

The opportunity and trigger for this implementation is provided by the need of delivering a very large class on the subject of Design Thinking as part of the new core curriculum of our university. The estimate is that we will need to deliver instruction to about 1,000 students per year on this subject. If delivered traditionally it will require the creation of more than 20 sections of 25 students each every semester. Unfortunately we do not have the infrastructure or manpower for adding 20 classes more to our already full schedule of classes. A hybrid course may accommodate this large enrollment. Since, there is no single, authoritative model for designing and developing a hybrid course, our strategy in the application of instructional technology will rely on a broad and relevant offering of interactive multimedia tools and applications to handle course content. We expect that these tools will enable the learners to apply opportunistically their diverse learning styles and corresponding sets of skills and knowledge. In addition to a pervasive learning management system and a strong network of communication between instructors and learners, we will implement tools that encourage reflection in action, social interaction, collaboration, student-generated content, dialectic and questioning, and synthesis and evaluation. Tools will be relevant to both the face-to-face and the online components of the course.

Course Catalog Description

CAP200.- Fundamentals of Design Thinking: Introduction to the fundamental characteristics and practice of Design Thinking. Students will learn to use design methods to match people's needs with what is feasible and viable in a creative framework that provides alternatives problem-solving and/or decision-making strategies.

Core Curriculum Justification

Students will articulate knowledge from several areas*, apply design methods, and use diverse media to present and defend project results that demonstrate satisfaction of discrete needs within a creative framework. Written, oral, and visual media will be used to provide evidence that the student was able to successfully engage the cognitive skills described in the rationale for inclusion of this course in the core curriculum (problem definition, research, ideation, prototyping, solution selection, implementation, and refinement). It will always include environmental awareness and/or sustainability concerns. The students will gain awareness, build understanding, and fundamentally apply an innovation philosophy based on the intersection of desirability, viability, and feasibility. In the proposed system, the desirability established by a target group is to be intersected with the feasibility provided by technology and the viability resulting from the application of a business model. At bilateral level such relationships may allow for prototyping processes that test functionality, acceptance, and commercialization. Illustration 1 shows how the different components of the innovation philosophy are articulated.

Upon completion of CAP200, successful students will be able to:

-Describe (making use of written, oral, and/or visual media) the task to be achieved and process to be followed.

-Describe (making use of written, oral, and/or visual media) the proposed solution.

-Review and critic (making use of written, oral, and/or visual media) the proposed solution.

-Describe (making use of written, oral, and/or visual media) the refinement of proposed solution.

In such a framework students will be assessed on their ability to define problems, generate solutions, critically evaluate alternatives, and improve on original solutions.
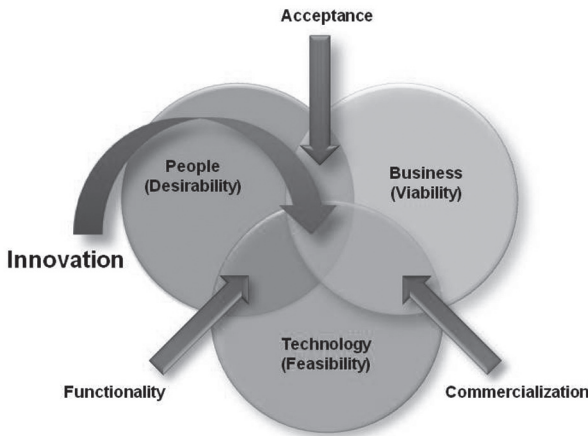
Illustration 1.- Design Thinking articulation of innovation.

Format

Several lectures will be provided in order to address topics that define the nature of Design Thinking, the cognitive skills necessary in design processes, and how creativity can be transformed into innovation holding measurable added value.

Several projects executed at individual and collaborative level will provide an opportunity for experimentation with design processes and cognitive skills aimed towards the generation of innovative solutions that satisfy discrete needs.

Beyond lectures and projects that address the fundamentals of design knowledge, design process, and associated cognitive skills, the course will be largely modular. Every module may include a lecture, a project briefing, a project development session, a project presentation event, a peer review process, and an exercise of introspection.

The course will be technology mediated making use of digital networks. Some components of the course will be fundamentally synchronous and other components will be fundamentally asynchronous. In most cases a hybrid format that allows for some students to interact on a synchronous way at the same time that others may chose to do so on an asynchronous way may be the most common dynamic.

The course is designed as a singular subject, managed by a single professor of record, branching into a network of identical sections under the supervision of adjunct instructors or graduate teaching assistants.

The content / format correlation is illustrated by the following table (Table 1). Only 2 projects (out of 3 to 5) are included in order to illustrate the possibility of individual and group projects). In addition to Object/Product Design and System Design the course will po-

tentially explores subjects related to Conceptual Design, Organizational Design, Strategic Design, etc.

CONTENT	FORMAT
Design Thinking Theory, History, and Practice	Webcast of Signature Lecture(s) Review of On-line Archival Material and on-line interaction
Project 1 (Object/Product Design)	
-Project Briefing (may include lecture)	Webcast + On-line Chat
-Project Development (individual)	Virtual Individual Work Space
-Project Presentation	Student Website
-Peer review	Blog Associate to Student Website
-Introspection	On-line Journal
Project 2 (System Design)	
-Project Briefing (may include lecture)	Webcast + On-line Chat
-Project Development (group)	Virtual Collaborative Work Space
-Project Presentation	Student Group Website

Table 1.-Course content/format correlation.

It is most likely that the last assignment, potentially the third project, will address the subject of the course itself as a design subject. At that point the students will have understood the critical function of prototyping in the design process and the opportunity for addressing prototyping as a sustained dynamic that is imbedded in the design processes. By looking back into the semester and realizing that they have been performing within a prototyping environment themselves will empower them to experience the freedom that design offers and the richness of information that flows into a design process. Our hope is that through the process of redesigning the course that they just took the students will achieve a very high level of intimacy with the design subject and experience the empowering opportunities offered by design thinking.

Assessment of Student
Learning Outcomes

Learning outcomes will be assessed through three different processes. Every project will provide opportunities to assess the ability of the student in generating creative ideas as a result of a design process (usually through a project presentation), the ability of the students to provi-

de constructive review and criticism on the ideas of their peers (usually through a project review), and the ability of the student to exercise introspection on their own performance (usually through a personal journal). Environmental awareness and/or sustainability concerns will be demonstrated in the presentation, review, and introspection assessment associated to every project in the course. The format and media used in the presentation of projects, their reviews, and subsequent introspection may be written, oral, and/or visual. The following table (Table 2) illustrates a potential correlation between cognitive transformations, assessment methods, and percentage contributing to overall grading.

COGNITIVE TRANSFORMATION	ASSESSMENT METHOD	% OF GRADE
Problem Definition (or redefinition)	Essay	15%
Problem Solution (ideation + prototyping)	Project Pin-Up	40%
Critic (review of solution)	Peer Review	30%

Table 2.- Correlation of cognitive transformation, assessment method and grade value.

It is evident that the grading is substantially loaded towards the ideation, prototyping, and review of solutions. It is our understanding that the students are exposed to other courses that address issues of problem definition, such as research methods, where similar content is addressed, assessed, and graded. Same is the case with introspection and the maintenance of a journal. Many on-line courses use journals as part of their assessment instrumentation and this will not be the singular opportunity for this group of students to make use of such an assessment method. On the other hand, we are aware that this may be the only course in their curriculum where they are called to perform a project pin-up and review process and it is therefore important to concentrate their attention on those tasks.

Conclusions

The course was scheduled for initial implementation during the fall 2011 semester. Given its unprecedented content and format it was decided to delay its implementation to the following spring 2012 semester. At the time of editing the final version of this paper the course instrumentation is complete and it is possible for us to confirm that our current state-of-the-art instructional technology has served us well in instrumental terms. All the software needs have been addressed through the central student management system of the university, namely Blackboard, and free software that the students can download directly into their individual computers. Dry runs of actual delivery have been successful and we look forward to the actual delivery of the course which will merit a follow-up publication in this same forum next year. At that time we will be able to address our findings in reference to the actual implementation of the course and disclose the first set of improvements that the prototyping process embedded in the course has dictated.

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