

A DECLARATION OF INTERDEPENDENCE: Cooperative Learning in Independent Design Projects

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ABSTRACT

This paper describes an interaction design course that combines the flexibility and self-direction of an independent project with the cooperative learning and social constructivism of the design studio. A small group of second-year interaction design students created a course curriculum in which each week they shared a design challenge, yet individually selected tools, artifacts, and approaches to respond. Through crit sessions, they gave and received feedback, and revised their designs for inclusion and reflection in a design workbook, with the goal of increasing skill and knowledge and producing portfolio-quality designs. This paper elaborates on the process of creating and managing the course, as well as reflections on its effectiveness for student development, recommending the approach for other interaction design students.

Author Keywords

Cooperative learning; curriculum design; design and evaluation methods; living curriculum; interaction design; participatory design; peer review; rapid prototyping; social constructivism; studio approach

ACM Classification Keywords

H.5.2 Information interfaces and presentation (e.g., HCI): User Interfaces: Evaluation/methodology, Prototyping, Theory and methods; K.3.2 Computers and Education: Computer and Information Science Education: Curriculum, Self-assessment

INTRODUCTION

Interaction design encompasses a wide variety of disciplines, and IxD degree programs rarely offer courses in every subject matter possible. The interaction design program at Chalmers allows students to create a 7.5 ECTS-credit independent project course so they can dive deeply into subjects that spark their interest and develop their skills. Yet such courses reduce the feedback and interaction that students gain from working with other students. And independent work can also be solitary, isolating experiences for students, as they study, learn, and work on their own.

Collaborative group work, on the other hand, has been shown to improve learning, social skills and cooperation [2,4]. However it can devolve into group members dividing the work up according to existing skill or experience, so

group members don't actually learn new abilities [4,6]. Some students may also decide they can do less in a group because the others will cover their lack of effort [4].

It was in this context that the seeds for this course began. In the autumn of 2016, nine second-year master's students wanted to individually increase various skills—such as mobile development, front-end scripting, and aesthetics—and become better acquainted with interaction methods—such as animation and conversational design—and were unable to match comparable courses to their schedules. Yet they also wanted to work together on a project they've conceived of collaboratively.

The blended solution was to share the same assignments, learning materials, and literature review sessions, and to have the actual project work be performed independently. The group would then review the individual work in shared critical review sessions.

THEORETICAL BACKGROUND & METHODS

This hybrid course—with shared group understanding and critical feedback alongside independent project work—incorporates important theoretical elements to benefit student learning, as follows.

Studio Teaching Method

While many interaction design courses include projects where students are required to create complete interfaces, this work often takes place in conditions that do not reflect a real-world design process, such as when the design is only truly evaluated at the conclusion of the course as a capstone project. In the studio teaching method, students work through frequent design sessions in a shared, informal working environment. They individually approach a design problem in an iterative fashion, with design reviews conducted weekly (or more often) guiding their designs toward a final artifact, as would happen in a real-world working scenario. The instructor takes an active role in adding criteria as time progresses, with feedback coming from the instructor or fellow students. [7,9]

Cooperative Learning

In cooperative learning, students work together to solve a problem or learn a subject, while at the same time also required to understand the entirety on their own. Specific tasks may be delegated, but each student is accountable to understand what others have done as they all work together [1,4]. Cooperative learning has been shown to increase student achievement and improve learning attitudes [10].

Design Crit Sessions

In a design crit, students assemble to present designs and receive feedback from their instructor and fellow students [7,9]. The presentations are focused on the design artifacts themselves and how they address the design problem, not on the students' presentation skills.

Design Evaluation Criteria

When giving design feedback, the tendency may be to just focus on aesthetics or functionality. Yet students can offer better feedback (and the designer can subsequently learn more) when it is guided by additional, more targeted criteria [8,9]. For example, paying particular attention to hierarchy in one crit session and affordance in another allows the designer and critics to focus on particular aspects of a design without being overwhelmed, not to mention reducing the amount a time a crit session takes. For greatest effectiveness, these evaluation criteria should be established at the onset of a design project so that students can be focused on those aspects as they design [9].

Design Workbook

Design workbooks are open-ended explorations of design ideas that emerge over time, consolidated in a single collection [5]. While intended for print, they can otherwise include sketches, mock-ups, collages, design comps, and/or textual explanations of designs. As described by Gaver [5], design workbooks are both a method and methodology as they focus on developing concrete ideas rather than theory.

APPROACH & EXECUTION

These elements, along with specific methods used during the design process, such as sketching, rapid prototyping, and user studies, guided the creation of the course.

Course Initiation

The course began with a start-up session to determine how the course would be administered and what interaction design topics and methods would be used. As a student-created course, the instructor-supervisor provided guidance for what would comply with school requirements, and apart from that, the student group designed the rest.

Through the participatory design method of Affinity Clustering, also known as the KJ Method, the students wrote down on post-its what particular design approaches they were interested in pursuing, such as storytelling or customer onboarding, as well as what particular interaction methods they wanted to explore, such as animation or data filtering. These idea notes were then reviewed, categorized, and voted on as the consensus areas to focus on for the course. Additional rounds were performed for potential user groups and scenarios to consider, such as elderly users or event volunteering.

From these separate consensus groupings, the most popular ideas were then randomly combined into project challenges for each week (see Table 1). The students then volunteered

(or were chosen) to be responsible for a particular topic, to perform preliminary research and act as the chairperson for the given week, a chance to practice design leadership.

Weekly Projects & Crit Sessions

The course then followed the same pattern for each week. Each Monday, students gathered in a kickoff meeting to refine the week's design challenge and to discuss critique points, user profiles, functionalities, and examples of deliverables. The student responsible for the week guided the meeting, providing suitable articles, research papers, and examples for the theme, which were discussed as well. With the design challenge identified, the students then spent the next few days creating sketches, paper prototypes, wireframes, design prototypes, working code, or whatever method they chose to present in the subsequent meeting.

On Thursdays, students presented their design progress in a formal critique session. After each presentation, the others present gave feedback and asked questions, while the presenting designer motivated their design choices with the resources as support. To guide the feedback sessions, three people were assigned per presentation to point out positive aspects, negative aspects, and possible improvements respectively for the presented design ("good cop, bad cop, improvement cop"). The feedback was then discussed by everyone and recorded in a shared document for further review by the designer later. Over the next few days, the students improved their designs based on the feedback they received, as well as what they learned from others' designs.

The following Monday, preceding the kickoff meeting for the next project, the students conducted a short session to present and get feedback on their refined designs.

A reflection session followed where the group discussed how the previous week went and what improvements to apply to subsequent weeks and iteratively improve the course itself. This devotion to a living curriculum [3] allowed the class to flexibly change the approach while collectively holding each other accountable to the outcomes they hoped to achieve. Along the way, the students recorded their design process in design workbooks, capturing their individual research, first sketches or approach, initial designs, feedback from the crit sessions, their final designs, and reflections on the challenge.

Final Session

After six weeks, and an additional week finalizing design workbooks, the course concluded with a final crit session. In this meeting, instead of reviewing final designs, the course itself was scrutinized by the students. And instead of being led by a student, this session was conducted by the course supervisor. Final feedback about the course described in the Discussion section below.

Focus	Interaction	Users	Design Challenge
Storytelling	Data visualization	Politicians or citizens	Combine data visualization & storytelling for politicians or their citizens on a chosen issue
Dashboard	Animation	Corporate types	Reimagine the desktop computer login experience for “busy corporate types” using animation & motion
Collaboration	Responsive design	Families, esp. seniors	Design a responsive, touch-enabled trip-planning website used by a multi-generational family
Views & filters	Cards	Event volunteers	Create a mobile application for film festival volunteers using card views and filters
Onboarding	Conversational design	Long-distance couples	Using conversational design, develop the onboarding experience of a web application for long-distance couples
Design with Constraints	Redesign	Prospective students	Redesign an existing website following a predefined style guide and using only existing content

Table 1. The weekly design challenges, derived from random groupings of foci, interaction approaches, users & scenarios

RESULTS

While all the work produced in the course should be considered outcomes, a post-class survey explored the students’ experience with the described model. The survey asked participants to identify their motivations for taking the course and to rate how well the course met those motives. A vast majority responded that their primary motivation was to learn a new skill or tool, or to improve a skill, while their secondary motivation was to create more portfolio-ready designs. On learning a new skill, the participants’ expectations were met or met to some extent, and on creating portfolio-worthy designs, the rating was higher—all indicated the class met or exceeded their goals. Other mentioned goals, such as practicing critical analysis and working on a project alone, also met expectations, according to the ratings.

As for their overall satisfaction, respondents unanimously gave the highest possible rating: “I am very happy I took this course and would do it again.” Even though some expectations were not satisfied completely, participants felt they had practiced many other skills, like time management and giving feedback, which they hadn’t considered a priori. And although there was a wide range of aspirations, the fact that they were invariably addressed—if not fully, then at least to some extent—confirms that the course offered enough flexibility so each student could focus on their chosen priorities, while still improving elsewhere, too.

DISCUSSION

Overall, the course was an experiment, and it wouldn’t have succeeded as well as it did if it weren’t for the students who participated. They were all motivated to work hard and cooperatively in an interdependent environment, which contributed to the success. Additionally, the small group size of nine students was ideal, not so big to be overwhelming, not so small to be boring. Each person’s designs could be appropriately presented and each person’s feedback could be adequately considered in crit sessions without them lasting overly long.

Having so many evaluation sessions so frequently, the students improved in both design and design critiques, presenting ideas and giving clear feedback supported by design principles and literature. Writing down that feedback forced the students to articulate their thoughts better, and made it easier for reflection later. And the design challenges themselves were also rewarding, with themes that reflected real problems that one might encounter as an interaction designer in the industry.

That said, because of the speed with which the course was conducted, the individual themes and interaction methods may not have received the attention they deserved. That’s not to say the subjects weren’t important, rather that many other topics required attention and discussion as well. For instance, a large portion of individual and group time was spent understanding users, developing use cases, figuring out functionality, creating dummy data, and learning new tools—all very important elements of interaction design, yet quite a bit to give thought to and all in a matter of days. As such, when students presented designs, they couldn’t talk as much about the “why” because they had to spend a bit of time to talk about the “what” design first. Nor could they devote much time to learning new skills or tools because of the need to create designs quickly. The pace of the course also meant that refined designs might not have been completed because the next week was beginning with a new challenge to focus upon.

Some students chose to address these issues by opting to continue on a design for an additional week, forgoing the following week’s challenge and instead focusing on further design refinements. In all cases, the decision was brought to and approved by the group, keeping the accountability aspects of cooperative learning intact [4].

Improvements & Future Work

From the final class session, course improvements coalesced around two main ideas: strengthening the design problems and slowing the pace.

Because of the aforementioned time spent determining exactly what to design and for whom each week, the students were less able to focus on the themes themselves. If the challenge scenarios were more narrowly defined to specific constraints or more completely explained problem sets [8], then the students could devote more time learning about the week's topic and exploring multiple possible solutions rather than pursuing their first one.

Slowing the pace so each theme lasts two weeks would also give the students time to immerse themselves in the topics and understanding the design implications of each. Yes, this might necessitate cutting the number of projects, yet that could also allow for more divergent reflection, iteration and comprehension of the themes presented, not to mention further polishing of the designs produced.

With both improvements, the underlying desire is to spend more time on the design subjects and the projects. These could be combined into one approach: a "master" design for the course, with themed iterations each week.

An alternate idea is to fashion the course like the Obstruction Game exercise from the Chalmers' Prototyping in Interaction Design course (CIU 176, HT 2014) where only one element of a design is changed for each iteration. Applying this inspiration, the course would start with a core problem and solution space, self-selected by each student, and each week would add a new theme. For instance, the core problem chosen by one student could be a website for helping long-distance couples, while another is designing a trip-planning app for families. One week, all the students learn about onboarding and conversational design and apply that to their particular designs, while the next week they are all adding animation to those same designs. In this way, the students can focus on the theme itself rather than the "extra" elements. Even the crit sessions would be easier, because the students would already be familiar with each others' main designs, and instead be able to focus only on the changes of a given week.

CONCLUSION

Upon reflection, the course successfully incorporated the strengths of cooperative group work—including peer review and studio learning—with the flexibility and exploration of an independent project. Additionally, for the participating students (including the authors of this paper), while perhaps not all topics were what they would have pursued if given the choice, they were nevertheless valuable exercises to improve interaction design skills and knowledge. This too reflects real-world design scenarios in which the client or project work requires the practitioner to design in a field or area they would not prefer.

As a hybrid of independent project work conducted alongside and with the feedback of other students, this course should be considered a valuable tool for any program seek to support a living curriculum framework in interaction design.

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