

Course analysis carried out by (name, e-mail):

Ylva Fernaeus, fernaeus@kth.se

COURSE DESIGN

Briefly describe the course design (learning activities, examinations) and any changes that have been implemented since the last course offering.

Changes made since last course round:

- Individual project (instead of group). This was since almost all of the issues brought up in the previous rounds had to do with the nature of group work, which is not an ILO in this course.
- New theme: autobiographical design (this to align with research interests in the teaching group, as well as with the individual project)
- Instead of exhibition we had to do presentations one by one (due to individual projects - with groups they could have a person standing by their exhibit while group members mingle)
- Three weeks of material knowledge and general theory before large project (instead of 2, to allow more project-independent workshops and introductions before project)
- Biomaterials workshop (Nadia)
- Passive tangibles workshop (Andreas)
- Soft robotics (with Caroline)
- Drones demo/workshop (with Joe)
- Demo of Rowing in VR
- Low-fi sketching workshop to also include some paper mechanics (by Nadia)
- To give space to all the above workshops, the previous theory lectures are provided as videos.
- Extended theory quizzes, structured in three themes, using OLI to support direct feedback
- Pictorial replaced by individual miro board as "workbook", plus more structured hand-in with title, summary, video and image handed in on canvas
- Reading seminars texts updated to fit theme and include some recent texts by teachers
- Possibility for students to book 30 min supervision slots via calendly
- Detailed overview schedule on miro, with descriptions of hand-ins etc
- All physical classes were in Middla or 4618 (this since almost all classrooms were canceled anyway last year, or had to be moved for various reasons, not accessible to wheelchair etc)

The strengths of the course based on the course evaluation and the teacher's reflection, even in relation to the changes that were made before the course round

- Individual projects resulted in a lot of engagement, and a sense of better and broader learning outcomes

Comment by student: "The fact that it was an individual project was really helpful for me to learn what I wanted to learn and to get some hands-on experience. Normally in bigger groups, you usually take on tasks for which you already have the experience making it harder for you to learn something new."

- The theme worked well, it was engaging and resulted in varied and interesting projects
- Students appreciated the combination of practical work and theory (see comments by students below)
- The three weeks of feasibility studies worked well (despite being tight and intense), the students got the chance to get to know each other and basic technology for the large project

(See comments from students at the bottom of this document)

The weak aspects of the course based on the course evaluation and the teacher's reflection, even in relation to the changes that were made before the course round

- Shift to individual projects increased teacher workload re supervision and crits
- The new labs added further workload on top of this (should probably not be done at same time as we shifted to individual)
- The shift to individual projects also made course more material intense. As stated by one student: *"I think we were a bit too many people for doing an individual project and the lack of materials and the time constraint definitely had an impact on the quality of the final works."*
- Reading seminars were conducted by students presenting the papers and leading the discussions, which worked really well. Some were overwhelmed by the amount of readings, while it was ok to only "skim" the papers they were not presenting. A suggestion in the evaluation was to just have to actually read one of the texts/seminar: *"Maybe lessen the readings? I myself found it hard to keep up. I would prefer keeping the presentations in but make the readings non-mandatory or make it so that you only have to read 1 paper of the 3 that interests you most."*
- Since all lecture sessions had been replaced by workshops, the 2 min "introductions of the week" that usually was part of the lectures fell out. These need to be inserted again, at beginning of weeks first meetup. All students did not read/receive announcements sent out, which stole time from workshops when students asked questions.
- Student assignments were handled on miro, on canvas or as "live" presentations. At the final reflective session a suggestion raised was to make a template miro board, where students see each of their assignments and where to hand them in. General impression was that people liked that idea.
- The schedule on miro caused some frustration as the KTH schedule lagged behind, some students had problems with lagging on their laptops. The students who used the miro schedule said they liked the overview, and the use of Miro was raised as a positive in the reflective session. Since it was a lot of work inserting the schedule in miro and not everyone used it, we should resort to the open field in the KTH schedule, as we did before, as its more efficient and convenient.
- 8 new students started the course after the first week, and two of the supervisors were away the first week due to illness. This caused confusion and stress as they missed the introduction. Also several students and some teachers missed out because of illness and har trouble catching up. Because of the individual projects this was relatively easy to manage with extra catch up sessions.

- This year we had only “internal” guests (Joe & Caroline) which were both really appreciated, but it would be nice with an industrial guest (previously we had e.g. someone industry visiting each year, either a head of design or a recent master student conducting work with a company, or both)

THE STUDENT'S WORKLOAD

Does the students' workload correspond to the expected level (40 hours/1.5 credits)? If there is a significant deviation from the expected, what can be the reason?

For a 50% course, the students are expected to spend 20h/week on the coursework.

According to the course evaluation, the workload looks much better than previous years (when they reported to spend only a fraction of 20 hours/week). Some reported that the workload was intense, but also that they spent time because they had fun and wanted to work on their project.

THE STUDENTS' RESULTS

How well have the students succeeded on the course? If there are significant differences compared to previous course offerings, what can be the reason?

The practical work of the course, both in the introductory projects and in the final presentations, generally held very high quality. Compared to previous course rounds, the designs were in general both more fully developed as working prototypes, and also more thought through at a conceptual level, in terms of physical design, contextual factors and embodied engagement. This was probably much helped by the individual supervision, and the theme of the project, as framed in the project brief, but also the ability to engage personally from their own interests. In discussions after the final presentations we expressed surprise that several of these individual projects were clearly on par with what we have seen in group projects of 3-4 students in previous years.

Testing and evaluation with peers was a bit difficult, as some did not want their work tested yet. Some therefore got tested by other friends outside the course, which is fine. It is part of the course goals to engage with methods for evaluating physical interaction, so good if this could be improved.

The personal reflections made theoretical connections, and most miro boards also included related academic works, but not to the same extent as present in the pictorials from previous years. Theoretical concepts were however covered through extended theory quizzes and very active engagement in the reading seminars.

The videos could have benefitted from another round of iteration, but in general of good quality and gave a good depiction of the projects. The personal reflections by the students also showed good results in terms of engagement in conceptual as well as practical matters of the course.

OVERALL IMPRESSION OF THE LEARNING ENVIRONMENT

The general impression is that the learning environment worked well, the student feedback on their experiences leaned strongly to the positive side. The group of students were very diverse in this course, with a majority being international, and female.

Many positive comments concerned the learning environment specifically. Some comments by students:

(Paste in some from below!)

ANSWERS TO OPEN QUESTIONS

What emerges in the students' answers to the open questions? Is there any good advice to future course participants that you want to pass on?

Overall the impression is that the students enjoyed the course and most did not have suggestions for improvements. All suggestions have been inserted into the "weak aspects" above.

PRIORITY COURSE DEVELOPMENT

What aspects of the course should primarily be developed? How could these aspects be developed in the short or long term?

Summary of suggested improvements for next course round:

Clearer split course responsibilities:

- Ylva - theory, reading seminars, examination (final presentations), attend some crits, admin related to the adobe
- Andreas, Nadia, (Dee) previously 4.5%, now 6-10%? - workshop content, crit planning, scheduling, canvas/miro, communications with students, preparing & ordering materials

Main points:

- Scale down content, as students report on stressful schedule, by Take away the final project
- (Instead: Follow-up individual project course 7.5 credits, with preset project brief and deadline. Set a specific period of time when this happens. (could re-use the brief and milestones developed for this course))
- Develop and extend the hands-on workshops to cover all ILOs
- Final deliverable: collection (annotated portfolio) of physical interaction explorations
- Theory part updated but kept in similar format (reading seminars, video lectures, quizzes, to complement the hands-on workshops and physical design explorations)

Other:

- Create a course plan that adapts to different numbers of students - max 40? No official cap
- Budget cuts are needed, no room for student TAs
- Scale down content, as students report on stressful schedule, by taking away the final project
- Instead: Follow-up individual project course 7.5 credits, with preset project brief and deadline. Set a specific period of time when this happens. (could re-use the brief and milestones developed for this course)
- Final deliverable: collection (annotated portfolio) of physical interaction explorations (MID-FI)
 - For the fall: split up examination for each lab / quizzes etc.
- Other PhD students as guests
- Crits: teach how to crit so they can easily crit each other without us
- More careful double check of schedule and canvas before the start of the course (all teachers do this, and have right to make edits)
- Add short intro slide "This week" for first meeting each week (email didn't work)
- Revert to KTH schedule for info about each session (skip miro for this)
- Make template miro board for student projects, including all handins
- Be explicit about OK to just skim papers for reading seminars (unless doing the presentation). (we suspect this is what most students do anyway)
- (Possibly reduce the ambitions of workshops, or reuse materials we have (or at least not invent several new workshops at once))
- Crits felt very tight - extended to 3 hours. Maybe have 4 parallel supervision groups? (instead of 3). Could Dee take on one? Or a student TA? Could we explore doing some "teacher-free" crit sessions?
- Format of final presentations got too long. Split into two or three sessions on different days?
- Guest lectures?

OTHER INFORMATION

Is there anything else you would like to add?

Overall, the feedback received from the students leaned strongly to the positive side, as mirrored in the personal reflections uploaded on canvas.:

471649: What do you see as your main take away from this course? Any particular knowledge, skills or insights that you will bring with you?

I realised/confirmed my growing love for physical interaction. I could definitely say that the concepts we discussed and the hands-on exercises helped me a lot and improved my skillset a bit. I had 3D printed and I used an Arduino before so I did not use it in that course, but I learned to solder, and work with conductive materials or make hard-soft connections in circuits. I understood a bit better how things work on the inside and the idea for example of incorporating craft in technology will stay with me. I am glad I learned to use the embroidery machine. I did like the biomaterials workshop, the e-textiles and the introduction to soft robotics, but I wish I also had time to explore them more.

I think there are two main takeaway points: Firstly, the practical process of entity interaction design. As listed in the previous answers, through this course, I have better mastered the thinking and methods of developing physical interaction projects. Secondly, through more meta thinking and learning through the discussion content of the course seminar, I have gained a wider range of exposure and learning, covering various diverse contents such as Soma design, natural materials, solar punk, etc.
I am pleased with the new skills that I learnt and how I was able to spend time considering what was meaningful to me about sound. This introspection was valuable to me both personally and academically. I enjoyed the autobiographical nature of the project in part because of this, but also because I feel I was able to learn a lot from the course.
The main skill I learned in this project is the ability to do a full design cycle with a functional prototype at the end on my own. Before I only did these kinds of projects in groups, the experience of performing each task myself helped me feel more confident in my ability to design with results.
I think it took me until more or less the last week of the course to grasp what physical interaction design could be and how it could be conducted. My main take away is how important the explorative parts are throughout the process. That exploration is easier to perform if you make early prototypes that focuses just on the areas you want to explore, without any ambition of being a product. A quite trivial but important take away is also that the feelings and experiences I get when performing an interaction can be quantified and expressed. I've always had a strong instinct on what I like and what I don't like in my surroundings, but this course has helped me to explore that by giving me a language and space to do so. My feelings and experiences now therefore have a value that's bigger than being just my sensation, giving it substantial weight in a design process.
A lot of knowledge on materials and different ways of ideating and building - especially from the lectures, labs, extra resources, and from what my friend have built!
The most significant lesson I'm taking from this course is the art of blending technology with physical objects. I've learned how to create sensors, connect them, work with motors, Arduinos, and circuits. This practical experience has expanded my comprehension of designing and bringing physical products to life, showing me the potential of being able to integrate technology into tangible creations. This newfound knowledge and skill is my main take away from this course and will incorporate this in future projects.
There are several takeaways from the course 1. The practical experience of applying design thinking to a Physical design project, and getting to know the techniques that in different design stages can be used. 2. The introduction of soft robotics, and the first touch with Arduino which is very valuable for me.
* Autobiographical design method: Through this course, I discovered that my own life can contain a lot of inspiration. * Velostat: I played a lot with this material and I knew that if next time I want to make a pressure sensor, I could use this material. It's really useful. * I learned how to use arduino and python to trigger some automatic pop-up web pages as a result when some action changed. I used to be afraid of programming, but after taking this class, I understood that there is no such thing as being able, only whether you want to. If I really need this skill, I can learn it anyway, just like coding. * Physical interaction is truly an interesting topic. I have a deep understanding about physical interaction forms and technologies. This course helped me find new research interests for my future study. * In addition, I feel that my mind has become stronger, and I have learned things that I once found difficult, such as circuits and designing a sensor. I enjoyed learning new things a lot and became more independent.
I think that for me the course helped in bridging the gap between physical interaction and the virtual world. How to actually create a sensor, use this to shape an interaction and how such interactions can in turn make things happen in a virtual setting. Additionally, the course also broadened my scope of how to facilitate such interaction (not just through simple buttons but also more experimental designs). Regarding knowledge and skills, the course gave me an opportunity to work with 3D printing, which I had long wanted to explore. In addition, it also gave me an opportunity to try laser cutting, which I also found to be really cool to work with and I'm glad I got to try.
My main takeaways from this course are: don't be afraid to work on something you have no experience with. Oftentimes things look more difficult than they are and you can do more than you think. Trust the process, it doesn't have to be linear.
Though I knew before this course what broad research area I wanted to go towards, i.e tangible interfaces to promote embodied awareness, this course has helped me identify one possible niche that I would like to explore within that, that is more environmental computer control interfaces for non-desk contexts, such as a home living space. Being autoethnographic, the design I explored here was strongly themed around play and nature, and was fairly whimsical or surreal in style. That limited exploration has just piqued my curiosity about how the outcome might change with fewer thematic constraints, or a stronger emphasis on embodied metaphors and mapping, or a rigorous soma design approach.

I think using the 3D printer and an Arduino would be my main take aways from this course. There are so many other things that I've learned and want to explore more such as soft robotics and making different sensors, and I hope that there will be more opportunities in the future for me to use and learn more about them in my other projects.
This course introduced a lot of different physical interactions and taught me a lot about circuits through some hands-on procedures. The final project taught me a lot of skills in pop-up bookmaking.
My main take away from this course is the importance of interdisciplinary collaboration in design. I have gained knowledge and skills in areas such as materials science, and interactive technology. This experience has broadened my perspective and equipped me with a holistic approach to design, considering both technical and human-centered aspects.
During this course, I have gained so much new knowledge about areas that I was not earlier familiar with. To start off, learning about electronics and the possibilities of combining components has been a great learning experience. I will definitely bring this knowledge with me in the future and also hope to improve the skills that I have learned. The course has also introduced me to the possibilities of combining materials such as textiles with technology. In relation to my project, I have also gained skills in relation to embroidery and insights regarding how the pattern of the embroidery can influence the sound that the speaker can produce. Working with a physical design has also made me reflect over how the characteristics of a physical object can influence the user experience. I believe that these insights will be possible to apply in the future. Overall, I see it as a main takeaway that the course has opened my eyes to physical interaction design which has been such a fun experience.
My main take away is that it is important to create meaningful physical interactions. E.g. how we have interacted previously will affect how we will interact with future things. I will bring with me a more comprehensive understanding of the possibilities of physical interaction design and the technologies that can be used. I will also bring with me some knowledge about electronics and perhaps more confidence to explore it even more in the future.
I've learned (finally) how I learn and work best – try shit. Play with the materials, try different ideas, get inspiration from others. It's been wonderful. I'm bringing the arduino experience with me. I'm excited to perhaps get into doing projects in my free time, if I can buy some nice starter kit.
I have learned a ton of new skills in this course, from different design methods to practical skills in working with electronics. Also actually working hands-on with prototypes was something which I had never done before and which I really became to appreciate.
The main takeaway from this course is that I have tried something new, like laser cutting, 3D printing, and velostat, to create the sensor. Actually, I have experienced working with Arduino before and created prototypes from different electrical modules with weird outlooks (a lot of wires and not functional to use in real life). However, in this project, I failed to make it work properly. However, I don't regret it since I have done something new by making it look more pretty. The design process knowledge helped me a lot to organize and work on it properly.
The most important realization I had during this course pertains to my understanding of the role of HCI and user interfaces, how much more complex, dynamic, and layered the processes between a system and its users truly are, and the many ways in which the deep entanglement between cognition and embodiment influence these mechanics. In particular, I have really developed an appreciation for the value and importance of offline actions, and the need to design for them. This course has taught me to think and design with my hands, in a truly iterative way, feeling and exploring each step of the way. I am also left much more hopeful about the possibilities that design offers to imagine and bring about alternative futures at a time when my faith in the discipline has been shaken, not to mention a host of techniques to help me design, test, and build physical interactions going forward. I still have a lot of work to do to really sharpen my skills in this area, but I feel this course may have set me on the right path to eventually get there.
My main take away is: It is important to take the time to explore. Not everything is as hard as it seems on the first sight. And one of the new skills that I learned: Arduino/Raspberry Pi
Physical interaction, despite its implementation challenges and significantly higher development efforts, holds a valuable place in today's society. I believe that physical interaction can and should be utilized to address the problems we face today. Moving away from a solely digital approach to problem-solving can help us embrace the physical nature of our existence. Most tools and techniques were already thought in different course. New to me was the Bio-Materials lecture.
This course has been completely new to me. During the last 5 years, I have been more in contact with technology, I have done everything with my computer, tablet or mobile phone. I think that this course has attracted me a lot of attention for that very reason: after such a long time, I have come out of that monotony and I have had the chance to combine the two things that I like the most: crafts and technology. I have been able to understand aspects that I had never considered before, such as sensors, etc., and it has taken me out of my comfort zone on many occasions. All this has been a learning experience, not only because of all the theory about electronics that I now take with me, but also because it has helped me to get to know myself better.

Regarding this project, I think I proved to myself that I'm able to work and build something physical, which is a first for me. Moreover, I got an extensive understanding of the use of Arduino and the challenges of using the Bluetooth and WiFi features. Moreover, it was interesting to learn to create Arduino applications on my phone

471650: Anything else you would like to add, concerning your participation and learning in this course?

I am super happy this course exists, the team is super nice and helpful, and I love the feminist values and the open-mindedness of everybody involved! I enjoyed the workshop/making part way more than the reading seminars, but I did feel like discussing with some people in the course also helped with the practical project.

I would like to discuss the atmosphere of the classroom. Because most of the projects I worked with before were team projects and rarely focused on physical design. Therefore, I was pleasantly surprised to find that compared to other courses, everyone in this course is more actively breaking away from their "team" circle and communicating more with others, which is definitely awesome!

I had a lot of fun and learnt a lot! Thank you for this course - it was one of my favourites that I've taken during my degree :)

To be completely honest, I was more or less confused throughout the majority of the course. But when I got to the end of it, the pieces just fell into place. And I think the confusion needed to be there, since I needed to change some fundamental assumptions about the design process and my own role in it. So I wouldn't change a thing. Thanks to you all for your support and engagement throughout the course. A special thanks to Andreas for all the encouragement and the patience of a Zen master. I know I will revisit many of the articles being presented in the course and the take aways from the course are now an inevitable part of my design mindset, so big thanks for great course content and the delivery thereof.

I enjoyed everything, and I definitely have a lot of takeaways from here! Thank you very much for your help, your support and your patience Ylva and the entire crew!

Nothing else, thought it was a great course and learned a lot.

Thank you for the teaching, it has been a such nice learning experience.

I just feel that biomaterial and textiles are very promising materials and I also like this part in our course. And through our reading seminars, I also feel that the post-industrial ways of living was an important topic in this course (e.g., the theme of our personal project is solar-punk, introduce many new technologies to us, etc). Therefore, this course contains many future design trends and I think maybe it's nice to add one lab to brainstorming and design something for our future. To imagine what our future would be like in 20 years 30 years, even 50 years and design some physical forms based on the imagination. It would be so much fun to see how people think about the future of humans.

No, can't think of anything :)

I really enjoyed participating in this course. The fact that it was an individual project was really helpful for me to learn what I wanted to learn and to get some hands-on experience. Normally in bigger groups, you usually take on tasks for which you already have the experience making it harder for you to learn something new.

Thank you for all the kindness in this course. Great experience and first "welcome" to KTH for me as an exchange student.

This course has been exactly what I've been missing so far in my HCI education. It highlighted for me some strengths and weaknesses that previously were only peripherally relevant in projects, but that are very central to my interests and ambitions. I think the main things that allowed this to happen were the brief, which was open but still fairly well defined, the opportunity to work solo, the hands-on work, the flexible expectations and the positivity and support of teachers. Throughout the course I was having to manage and adjust my expectations of myself due to my health, but I felt that the course was extremely accommodating, perhaps the most of any course I've taken so far, which allowed me to stay motivated, interested and encouraged. In this situation I would usually expect myself to feel discouraged about my finished project, but I'm happy to find that my attitude is still very positive about the concept I was working with and I'm excited to do more work within this research area. I hope to be able to take some of the mentality that this course has helped me cultivate into my ongoing work, as I feel that in the long run it could be one of the more beneficial things I've learned here at KTH.

I want to thank everyone, both the course's teachers and the students, since what I've learned wouldn't have been possible without everyone's constant help and feedback. I appreciate the time and effort that everyone put into making this happen and want to thank everyone from the bottom of my heart!

I want to express my love for this class. It exposed me to an area that I don't normally get the chance to try. It allowed me to learn and explore through actual hands-on skills.

I understand that you initially appreciated the individual project format. However, upon reflection, you believe that a group project would be more beneficial. Group projects can provide opportunities for better end product, technically detailed.

This course has really created an environment where it has felt less scary to learn and explore a new area which I think is a very positive aspect of the course. It has been very fun and exciting to take the course. I really feel like the course has taught me about so many new areas, through for instance the lectures and the project. The reading seminars also provided new and interesting perspectives of related research which was interesting. The fact that the project was performed individually was also an aspect that was great from a learning perspective.

I have really liked this course and I will miss it a lot! The teachers and the other students have been amazing. Thank you for being so supportive and nice.

In the future, I would have really liked a broader introduction to electronics. Perhaps just some online tutorials we can watch before the first sensor assignment will make this task less challenging.

I've wholeheartedly loved this course. Never imagined I would like anything on KTH this much. I've willingly stayed ridiculously late to work on this project, and I want to continue to do so. I've learned a lot and, more importantly, rediscovered my love and joy for creating. I truly wish there was a part 2 to this course. I want to build stuff. There are so many things in Middla I haven't tried yet (laser cutting, 3D printing, knitting machine, embroidery machine...).

This course was honestly great and I loved partaking in it :)

I would say that I really like this course. It encourages me to learn something new and get my hands dirty, and I also know a lot of energetic and inspiring people. I found out that the way of grading this course as P/F is the best since it does not pressure me to do the prototype and expects me to create an extraordinary prototype. But the main of the course is to let us learn things by doing it physically, which is really nice. I want this course to cover in 2 periods. Maybe the first period is about the workshop and seminar, while the second is about working on the individual project—just a suggestion, but I still love this course anyway.

I really appreciate the opportunity to take part in a course like this, which in many ways was much more demanding than other courses, but also more rewarding. I feel a course like this would benefit from being taught over two periods to allow for the complex process of arriving at a concept that feels personally meaningful while being able to explore the options presented by different paths and technologies, and still be able to devote the necessary amount of time to realize one's ideas properly, but at the same time, the constrained timeline offers a worthy challenge in itself. I have many ideas of how I could develop my project further, but I'm afraid that without the space that the course creates for this, it might be hard to do. If I were to do the whole course again, the only thing I would change is that I would try to enjoy it more and worry less about the outcome.

Overall, I think the course has been really great add-on to my academic and personal path. I really enjoyed discovering so many new things. And also having experts on these subjects.

Middla could really benefit from an investment in making more parts available and especially having a more tidy workspace that enables you to work efficiently.

I feel that this learning would have been clearer for me if the Miro and Canvas had been organised differently, as it was sometimes confusing for me and made me misunderstand what to do.

I think the personal project gives you more freedom in the choice of the topic and lets you explore something interesting at 360 degrees. However, the time was a huge constraint to choose a specific project and the whole course load felt very overwhelming, considering also the limitation of having to be mostly in MIDDLEA to work. Moreover, halfway through the project the material completely disappeared from MIDDLEA, forcing you to take away everything you needed to test before you were left without anything. I think the course was overall interesting and gave several reflection prompts and material insights but did not allow the time to go deep into everything. I reckon it might be better to have a smaller sample of topics and dive a bit deeper into them