LMC 6213 Educational Applications of New Media **Spring 2020**

Tue, Thu 12-1:15
Kendeda room 118
3 credit hours

Teacher: Michael Nitsche
michael.nitsche@gatech.edu
office hours Tue 10-11 (TBC)
in TSRB 316B
p 404 894 7000

Course Outline

This course asks how selected educational theories can inform tangible media design to support informed action on environmental challenges. We will ask how to use such approaches to support creativity, engagement, and education on issues such as pollution, waste, and recycling. The goal is to combine physical computing and material design as applied educational technologies to educate and activate response to specific environmental challenges. We will focus on challenges on the Georgia Tech campus and problems we face every day as students or staff. To help us identify such problems, we will work with the Sustainability Office at Georgia Tech, gather information about their needs and pick opportunities for an intervention. The final project will ask students to design and prototype interventions that educate the campus community about those local challenges and possible solutions.

Students are expected to read and discuss underlying theory, present related work (projects as well as papers) in class, design and critique, prototype, and ultimately work in groups to iteratively design and implement final projects that answer to this challenge.

This class might be interesting for students who are interested in applied educational approaches, physical computing, and material culture in an environmental context.

The class will require some technical knowledge but will itself not present or introduce particular technologies. Expect to work with sensors and Arduinos as well as cloth, wood, and other materials. You do not have to be an expert but be ready to learn independently and in groups. Teamwork and communication will be crucial.

Learning Outcomes

The projected learning goals of this course are:
for MS:

- Demonstrate the ability to analyze and critically evaluate existing digital media artifacts, services, and environments using formal knowledge, and to explain and defend one's critical evaluation.
- Demonstrate the ability to devise, design, create, and assess prototypical digital media artifacts, services, or environments and to contextualize them within recognized traditions of practice.
- Demonstrate use of digital media to create prototypes

- Can compare, critique, and appraise digital media artifacts, services, and environments using formal terminology

additional for PhD:

- Students have knowledge, comprehension and ability to apply historical, cultural, and theoretical concepts to the study of digital media.
- Apply theoretical concepts to specific digital media works

Workload

The course will combine critical reviews of theory and related projects, design, and prototyping approaches. Students should expect additional visits to campus-based locations and communities, as well as work in any of the maker labs on campus to deliver on the prototypes.

Schedule

(note that changes are bound to happen)

	Background	
1/7	Intro to course: How did we get here?	
1/9	What is Situated Learning?	Lave
1/14	What is the difference between constructivism and constructionism?	Papert/ Harel
1/16	Critical Making vs Speculative Design	Ratto/ Hertz; Dunne/ Rabie (Bogers/ Chiappini)
1/21	**DUE**: Student presentations (samples)	
1/23	**DUE**: Student presentations (samples)	
1/28	New Materialism and feminist approaches	Bennett; Barad; Haraway
1/30	Sustainability at Tech II **Guest talk**: Sarah Neville	
2/4	**DUE**: Sustainability at Tech III: Practices (student presentations)	https://sustain.gatech.edu/sustainable-programs-and-practices
2/6	**DUE**: Sustainability at Tech III: Practices (student presentations) Design discussion: initial takeaways (identifying the problem)	https://sustain.gatech.edu/sustainable-programs-and-practices
	Craft session: IPaT panel	
2/11	HCI and sustainability	Sengers/ Boehner/ Knouf Bates et al.
2/13	Tangibles: Intro and frameworks	Ullmer/ Ishii; Mazalek/ van der Hoven (Klemmer/ Hartmann/ Takayama)

2/18	Materials and material practices	Buechley; Rosner; (Peppler; Paulos/ Torres) (Barad?)
2/20	Ideation I Students pitch their idea of a concept how to use TEIs in sustainability on the Tech campus (connect to the problem fields that were identified before!)	
2/25	Ideation II Assembly of ideas/ Discussion / Identify cores	
2/27	Design session (individual group project ideation/ research and contact your target group) **Guest talk**: Rebecca Hull from SLS	
3/3	Work on project	
3/5	DUE: final group project idea presentation in class (include feedback from target population/ connect to initial problem identification/ lay out clear technical ways for implementation/ present work distribution, time line, and resources)	
3/10	DUE: final group project idea presentation in class (if needed)	
3/12	Catch up session	
3/17		
3/19		
3/24	Work on project	
3/26	Work on project	
3/31	DUE: prototype presentation in class	
4/2	Work on project	
4/7	Work on project	
4/9	DUE: reflection paper v1	
4/14	Work on project	
4/16	DUE: Final project	
4/21	DUE: documentation	

Grading

	Percentage	Some relevant elements
Participation	20%	active in text and theory discussions, active in review sessions; active in design meetings, teamwork, homework, attendance
Example presentation (projects)	10%	Argumentation of presentation and critical dissection of paper; form (including slides, fluency of presentation, and use of supporting media); clarity of own argument; relevance and conncetions to other texts
Example presentation (sustainability at Tech)	10%	Argumentation of presentation and critical dissection of particular example; form (including slides, fluency of presentation, and use of supporting media); clarity of own argument; relevance and connection to other projects; referencing texts (written and digital) from the course; argumentation; clarity
Design pitch	10%	conceptual clarity, creativity and imagination, originality, connecting the design and action to discussion in class
Final project	30%	Participation, imagination, courage, technical skills, teamwork(!), work with compromises without losing quality; prototype presentation; documentation (written and visual); NOTE that your group project's grade will serve as guideline for individual grades but your personal grade might vary from it depending on your involvement in the project
Final project documentation	20%	Write up (connection to problem, to HCI, contextualization and use of references, clarity of argument and structure, use of images and additional material); video (explanation of process, explanation of result, clarity in presentation, presentation including titles and credits)

100-90% = A
89-78% = B
77-64% = C
63- = D

Attendance and Late Submissions

Attendance will count towards the final grade: more than 3 unexcused absences will result in failure of the course. All material must be submitted in order to achieve a passing grade
Grading of individual pieces will be in percentage that translates into points on Canvas. Late submissions are not accepted without appropriate excuse. A one day delayed submission automatically has a 10% reduction of the grade; 2 days: 20%; 3 days 30% and so on.

Technicals

This course uses creative practices that are not only digital – be ready to deal with physical materials as much as with code. The digital technologies will most likely focus on the Arduino platform and students are expected to quickly adapt to that.
There are countless tutorials online but a good first start is:
http://arduino.cc/en/Guide/HomePage
A comparable simple introduction text is: “Getting Started with Arduino”
Please note: Students will have supply own materials for the course

Main Assignments

Sample Presentation/ Projects: the instructor will provide a number of sample projects; students find projects that they are interested in (use the provided examples as an first guide) sign up on the course page to present one of them; focus on the main project (less on the authors and the event), its technology, its approach to express some point outward, what worked, what did not? What is your takeaway from the project? you will present a brief discussion of the chosen text in class (10 minutes sharp); do not reduce yourself to a mere retelling but offer a critical discussion; goal: to get a wide and diverse introduction into samples that are related to the course’s final project
you hand in: your powerpoint presentation and media you used/ the selected text on Canvas

Sample Presentation/ Sustainability at Tech: we will form random groups of 2-3 students to tackle each one core field for the sustainability practices at Tech program (see their web site https://sustain.gatech.edu/ sustainable-programs-and-practices); what are key challenges in your particular area? How have they been tackled in the past? What are interrelations between different fields? Try to arrange a meeting with representatives of this area if possible and learn about their perception of needs, challenges, and opportunities in this area; include resources (others might pick up your material and build a project around it)
you will present a brief discussion of the chosen field in class (15 minutes sharp + discussion); goal: we lay out the problem spaces for the final project
you hand in: your powerpoint presentation and media you used/ any text or resource your found on Canvas

Design pitch: you pick one of the developed problem spaces and develop a design sketch for a possible solution; this is an early ideation phase not a final design presentation, design ideas can be rough but should clearly connect to issues outlined in class and should propose a particular approach to address them in a tangible interaction design format; include sketches/ images/ objects that illustrate your idea; what questions

does your idea tackle? Which ones does it open up? format: 10 min presentation in class; goal: a quick collection of design pitches that provides a loose collection of different ideas; please note that students will discuss and alter those ideas! Your idea might very well be picked up by others, changed, and maybe implemented;
you hand in: the ppt presentation in class carries the most weight; if your particular design needs further elements (images, videos, objects); submit what is possible via Canvas

Final project: we will form groups of ~3 students working on final group projects; these projects will use tangible interaction design as a means to address education on sustainability issues on the Tech campus; based on the design pitches presented before, groups will build more elaborate concepts and solidify their designs; projects unfold over three stages:
first you will present your project in a short powerpoint presentation to the group; this will clarify: who does what on the project? What is the project about? What is its name? How will it look and feel and work?
second you will show a running technical prototype that shows your basic concept up and running
third you will present your completed project in class
you hand in: final presentation in class
NOTE: you will grade each other in the group; these grades will serve as indication for the teacher to consider necessary adjustments of individual group members' grades in relation to the overall result of the group

Final project documentation: the documentation of your project; this includes: project design documents, sketches; at least 10 images taken during the process and at least 10 more of the final project; a short video (~ 120 seconds) describing the project for audiences not familiar with the class or the project (including titles, credits et al.); a 3 page critical write up of the project (what approach did you chose, why? Did it work? How does the project relate to other projects? What did you do? What are the results? Include references! Think of it as a first step towards a possible demo submission to a conference; use the ACM style provided online)
you hand in: all materials in a single zipped up folder via Canvas (only one submission per group)

Critical review: (only for PhD students) write an individual extended critical review paper about the group project that was realized; this should include a contextualization of the project within the readings and the background of the course; a critical review of the project itself (using the proper terminology); and an assessment of its qualities and design; use the ACM style template and use references appropriately; this grade will be pass/ fail of your overall grade (all other assignment grades will be adjusted in percentage)

SLS Affiliation

This course is part of Georgia Tech's Serve-Learn-Sustain (SLS) initiative, uniting classroom learning with community action. SLS works with all six colleges to offer courses and programs connecting sustainability and community engagement with real-world partners and projects, allowing students to use their disciplinary expertise related to science and technology to help "create sustainable communities" where humans and

nature flourish, now and in the future, in Georgia, the U.S., and around the globe. More information about SLS can be found at www.serve-learn-sustain.gatech.edu. Visit the website to sign up for the SLS Email List, view the full list of affiliated courses, and find links to Facebook, Instagram and Twitter.

References (selection)

- Barab, Sasha, and Kurt Squire. 2004. Design-Based Research: Putting a Stake in the Ground. The Journal of the Learning Sciences 13(1):1-14.
- Bogers, Loes, and Letizia Chiappini (editors) 2019 The Critical Makers Reader. (Un)Learning Technology. Institute of Network Cultures, Amsterdam, NL.
- Buechley, Leah, and Hannah Perner-Wilson 2012 Crafting technology: Reimagining the processes, materials, and cultures of electronics. ACM Trans. Comput.-Hum. Interact. 19(3):1-21.
- Devendorf, Laura, and Daniela K. Rosner 2017 Beyond Hybrids: Metaphors and Margins in Design. Paper presented at the DIS 2017, Edinburgh, UK.
- Dunne, Anthony, and Fiona Raby 2013 Speculative Everything. Design, Fiction, and Social Dreaming. MIT Press, Cambridge, MA.
- Ishii, Hiroshi, and Brygg Ullmer 1997 Tangible bits: towards seamless interfaces between people, bits and atoms. Paper presented at the Proceedings of the ACM SIGCHI Conference on Human factors in computing systems, Atlanta, Georgia, USA.
- Klemmer, Scott R., Bjoern Hartmann, and Leila Takayama 2006 How bodies matter: five themes for interaction design. Paper presented at the Proceedings of the 6th conference on Designing Interactive systems, University Park, PA, USA.
- Lave, Jean 1991 Situating Learning in Communities of Practice. In *Perspectives on socially shared cognition*, edited by Lauren B. Resnick, John M. Levine, and Stephanie D. Teasley, pp. 63-82. American Psychological Association, Washington, DC.
- Lave, Jean, and Etienne Wenger 2017 (1991) Situated Learning. Legitimate Peripheral Participation. Cambridge University Press, Cambridge, UK.
- Mazalek, Ali, and Elise Van der Hoven 2009 Framing tangible interaction frameworks. Artificial Intelligence for Engineering Design, Analysis and Manufacturing 23:225-235.
- National Research Council 2000 How People Learn: Brain, Mind, Experience, and School: Expanded Edition. The National Academies Press, Washington, DC.
- Papert, Seymour, and Idit Harel 1991 Constructionism. Ablex Publishing Corporation, Norwood, NJ.
- Peppler, Kylie 2013 New Opportunities for Interest-driven Arts Learning in a Digital Age. Submitted to The Wallace Foundation, Bloomington, IN.
- Ratto, Matt, and Garnet Hertz 2019 Critical Making and Interdisciplinary Learning: Making as a Bridge between Art, Science, Engineering and Social Interventions. In The Critical Makers Reader. (Un)Learning Technology, edited by Loes Bogers, and Letizia Chiappini, pp. 16-28. Institute of Network Cultures, Amsterdam, NL.
- Ratto, Matt 2011 Critical Making: conceptual and material studies in technology and social life. The Information Society: An International Journal 27(4):252-260.
- Rosner, Daniela 2018 Critical Fabulations. Reworking the Methods and Margins of Design. The MIT Press, Cambridge, MA; London

- Sengers, Phoebe, Kirsten Boehner and Nicholas Knouf 2009 Sustainable HCI Meets Third Wave HCI. Paper presented at the CHI 2009, Boston.
- Ullmer, B., and H. Ishii 2001 Emerging frameworks for tangible user interfaces. IBM Syst. J. 39(3-4):915-931.

ADAPTS

Georgia Tech offers accommodations to students with genuine and documented disabilities. If you need such accommodations, please make an appointment with the ADAPTS office. Verification of a disability may be obtained by contacting the ADAPTS-Disability Services Program, 404-894-2563.

Honor Code

Any material in a paper not composed by the author, or borrowed without attribution, will be considered plagiarized. **Plagiarism is a serious offence** and will be dealt with according to the GT Academic Honor Code. **When in doubt, use quotation marks and cite sources**. Sanctions for plagiarism can include receiving a failing grade in the course or, in serious cases, expulsion from the university.

Use of any previous semester course materials, such as tests, quizzes, homework, projects, and any other coursework, is prohibited in this course.

For any questions involving these or any other Academic Honor Code issues, please consult me or www.honor.gatech.edu.