CD 114: Children and New Technologies  
Monday and Wednesday 10:30-11:45pm  
Eliot-Pearson Department of Child Study and Human Development

Prof. Marina Bers  
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Office hours: By appointment

Course Description
In this course we will explore the role of technology in education. This semester we will specifically focus on Artificial Intelligence (AI). This interdisciplinary course will engage students in the application of the theory to the design of technology-rich products for children. Through collaborating with engineering students, we will develop and test a new technology for children that incorporates AI. On Mondays we will meet alone. On Wednesdays we will meet with the engineering class taught by Prof. Rogers to work in groups. In the syllabus, these days are marked with **.

Course Requirements
- **Readings.** All students are expected to do all the readings
- **Class participation.** All students are expected to participate in discussions of the readings in class. Readings will be on-line.
- **Empowering Ideas paper** (Due Jan 31) Students will choose a "powerful idea" about technology, that empowered them to think in new ways when they were young. They will write a three-page paper describing what is the powerful idea, a personal recount of how they first encountered it, the struggles to grasp it and the tools, people and related ideas that helped them understand it.
- **One Moving Part Project proposal** (Due February 16): In groups with the engineering class, students will develop and present a mid-term project proposal to the class.
- **One Moving Part Project presentation** (Due March 16): In groups, students will present their mid-terms projects
- **Provocative issue paper** (Due April 11): Students will write a 3-5 page paper describing a provocative issue around AI and education and discussing ethical issues it brings up.
- **Final Project Demo** (Due April 13): Students will demo their Final Projects for the class
- **Final project video and website** (Due April 27): In groups with the engineering class, students will make a final project website and video
- **Final presentation** (Due April 27): In groups with the engineering class, they will do a final presentation in class.

Tentative Schedule

**Class 1, Wed Jan 19: Learning by doing**

In this class we will learn about the major pedagogical framework for this course. Prof. Bers will introduce the course materials and goals, herself, and her DevTech’s research group.


Stager, G (2016) *Seymour Papert*
Activity: Scavenger hunt on Readings and the DevTech website

Class 2, Mon Jan 24: Powerful Ideas

In this class students will explore the concept of powerful ideas and learn how to identify them.


Activity: Identifying powerful ideas in different domains

Class 3, Wed Jan 26: Introduction to Engineering students **

Students will meet for the first time with the engineering students. Course dynamics and expectations will be discussed.

Activity: Get to know each other game with KIBO robotics

Class 4, Mon Jan 31: Artificial Intelligence

Guest speaker: Jeff Freilich, Program lead in AI Literacy at MIT Media Lab

Responsible AI for Social Empowerment and Education

Assignment Due: Empowering ideas Students will choose a "powerful idea" in the areas of technology, that empowered them to think in new ways when they were young. They will write a three-page report describing what is the powerful idea, a personal recount of how they first encountered it, the struggles to grasp it and the tools, people and related ideas that helped them understand it.

Class 5, Wed Feb 2: Videos of kids: group activity with engineering students **

Student will observe videos of children working with KIBO robotics and discuss the developmental characteristics and milestones achieved in the context all of dimensions of human development

Class 6, Mon Feb 7: Personalized learning


Do we really want computerized systems controlling the learning process? - The Hechinger Report https://hechingerreport.org/opinion-really-want-computerized-systems-controlling-learning-process/

AI Grand Challenges for Education (PDF)

**What is personalized learning?**

**Activity:** In class debate

**Class 7, Wed Feb 9 Speed-dating: Forming working groups with engineering students**

Speed-dating: Students will meet with the engineering students choose group partners for their projects by choosing people who share an interest in focusing on specific powerful ideas from AI that are developmentally appropriate for children

**Class 8, Mon Feb 14: Our relationship with Technology**

We will explore our relationship with the technologies in our lives.

Video: Buber in 10 minutes; Sherry Turkle Reclaiming conversation interview

Buber, M (1937) I and Thou Sparknotes


**Activity:** Technograms activity

**Class 9, Wed Feb 16: Project proposal with engineering students**

Each group will present preliminary ideas for their joint project focusing on specific powerful ideas from AI that are developmentally appropriate for children

**Assignment Due:** Presentation of One Moving Part project proposal

**Mon Feb 21: No Class**

**Class 10, Wed Feb 23: Working with engineering students: Acting like a 5-year-old**

Guest Speaker: Dr. Amanda Strawhacker, Associate Director of the Early Childhood Technology Certificate Program at Tufts University

Acting like a 5-year-old activity

Students will meet with the engineering students to work together
Class 11, Thu Feb 24 (Monday substitute): Guest speaker

Guest Speaker: Claudia M Urrea, Senior Associate Director for pK-12 at the Abdul Latif Jameel World Education Lab at MIT

Class 12, Mon Feb 28: Computational Thinking

Guest Speaker: Emily Relkin, Ph.D. Candidate from the DevTech Research Group

Wing, J (2006) “Computational Thinking”

Barba, L “Computational Thinking: I Do Not Think It Means What You Think It Means”

Class 13, Wed March 2: Working with engineering students**

Guest Speaker: Amon Millner, Associate Professor of Computing and Innovation at Olin College

In teams, students will work together.

Class 14, Mon March 7: Social robots

Guest Speaker: Daniella DiPaola from the MIT Media Lab’s Personal Robots Group

Personal Robots, MIT Media Lab

Class 15, Wed March 9: Working with engineering students***

Students will work together

Class 16, Mon March 14: Tangible Interfaces with engineering students

Guest Speaker: Orit Shaer, Professor of Computer Science and Media Arts and Sciences Program at Wellesley College

Child visitors for playing with KIBO

Class 17, Wed March 16: One moving part-demo with engineering students****

Students will demo their projects and get feedback

Assignment Due: One Moving Part Project

Mon March 21: Spring recess

Wed March 23: Spring recess
**Class 18, Mon March 28: Children as co-designers**

In this class, we will explore the different roles that children can play in the development of a product.


Guest speaker

**Activity:** Developing a testing protocol

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**Class 19, Wed March 30 Working with engineering students on final project**

Students will work on final projects

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**Class 20, Mon April 4: PTD and the project**

Too often youth experiences with technology are framed in negative terms (e.g., cyber bullying, sexual predation, invasion of privacy, addiction to videogames, etc.). This session will present alternative to this deficit discourse about youth experiences with technology.


**Book guide** (chapter 10)

Activity: Students will work in groups evaluating different technologies using the [PTD card game and checklist](#).

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**Wed April 6: No class**

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**Class 21, Mon April 11: AI in the Media**

We will explore different op-eds and will choose one to answer

[https://www.theguardian.com/commentisfree/2020/sep/08/robot-wrote-this-article-gpt-3](https://www.theguardian.com/commentisfree/2020/sep/08/robot-wrote-this-article-gpt-3)
Top 9 ethical issues in artificial intelligence | World Economic Forum:

Assignment Due: **Provocative Issues Paper**: Individually, students will write a 3-5 page paper describing a provocative issue around AI and education and discussing ethical issues it brings up.

**Class 22, Wed April 13: Showing final project**

Students will demo their work

Assignment Due: Final project demo

**Mon April 18: No class, Patriot's Day**

**Class 23, Wed April 20: Making project movies with engineering students**

Guest Speaker: Javier Storch, Videographer for BCG

Students will work in groups to make movies

**Class 24, Friday April 22 (Substitute Day): Coding as Literacy**

Vee, A. Understanding computer programming as literacy


Activity: The literacies of the XXIst century

**Class 25, Monday April 25: Coded Bias**

We will watch the movie and ask questions

Activity: Coded Bias

**Class 26, Wed April 27 Final presentation of movies with engineering students**

Students will finalize their presentation for their project This presentation will include a 2 to 3 minute video (equivalent to a Kickstarter video) telling us about their product.

**Mon May 2 Final reflection with engineering students**

Students will reflect on the experience.