

# 21st Century Education Manifesto

Education is outdated. It's an artifact of a no-longer existent society, solving problems that haven't existed since before Faraday started connecting wires together. Put simply, it's old.

Fortunately, there are several drivers of radical change currently coming to a head. First is advancement in technology, especially human-computer interaction. Second is the rapidly expanding focus on understanding the brain through cognitive psychology and neuroscience, which is shedding light on effective teaching strategies. Third and final is the rise of new educational paradigms, systems, and philosophies that promote skills and mindsets more relevant to modern society.

The education system of the future looks nothing like the current status quo. The system in place today was well-designed for the times in which it was invented. In the late 19<sup>th</sup> century Prussia instituted a state-run compulsory system of education to teach a nationally mandated curriculum. Schools consisted of students, sorted into grades by age, all receiving instruction simultaneously from a centralized source (the professor) who in turn received instruction from a much larger centralized source (large teacher-training institutions called seminaries). This Prussian model can be characterized by its lack of personalization, general unidirectional communication from teacher to student, and student groupings based on age. Currently, the face of educational innovation has been Massively Open Online Courses (MOOCs). These offer new material taught by top-tier instructors, yet in essence replicate the Prussian model on a digital substrate: content is still delivered unidirectionally from a central source in a non-personalized way. Even MOOCs' strongest asset -- being accessible to all -- is irrelevant at the moment, because there is no substantive interaction among MOOC students.

## I. Technologies

Future technology holds many wonders like virtual reality, highly interactive media, brain-machine interfaces, intelligent AI, and much more. It will be possible to represent a large chunk of human knowledge into a web of concepts, all strongly interdependent. With this, we can target learning to an individual's particular situation. If someone needs to build a motor, we can lay out the learning pathway required to do so, including the fundamental physics, force calculations, and construction process. Already, Khan Academy offers an infinite progression of math and science exercises automatically tailored to the student's background, which is indicative of things to come.

The act of learning itself is also dramatically changing. We are moving towards technologies that can represent information in dynamic and responsive ways that simulate interactions with the real world. Consider the difference between playing with a physics simulation versus reading the equations that govern it. Computing power and display technologies are freeing us from abstract representations like equations and, in the future, text.

## II. Cognitive Psychology

Complementing new technology is a clear understanding of how our brains learn. For the first time in history, scientists are beginning to understand the way we learn and remember new information. For instance, curiosity has been identified as a heightened neurological state that is crucial for absorbing new information. Just as importantly, psychology tells us how to avoid forgetting what

we've learned. Assessments—if done at spaced intervals and in a low-stakes environment—are possibly the best way to reinforce learning. Unlike high-pressure exams that force students to cram at the last minute, these assessments pace students and keep them actively recalling their understanding of the material.

For example, after realizing the power of spaced repetition, two MIT undergraduates created a website called Homer<sup>1</sup> that helps students cement new concepts in their minds by answering questions periodically.

### III. Educational Philosophies and Paradigms

New paradigms are taking advantage of these technological and psychological advancements to restructure the entirety of education. We group these new methods into three areas.

#### Individualized Approaches

From self-directed models to improved modularity of classroom content, these educational philosophies offer an ability to present information that the learner is actually personally vested, and interested, in. Montessori pioneered the learner-centered approach, and a number of products leverage it, from mastery-based learning in Duolingo to modularity in Udacity.

#### Collaborative Environments

College is successful because it fosters community - something at which most, if not all, new-age learning approaches fail to do. Hence, we do not believe static online content will be able to replace academia. Collaborative environments offer academic 'villages' that inspire people to learn and innovate together, not compete against each other on curves and percentages.

#### Experiential Classes

Experiential-based learning is a new model in which professors are responsible for guiding their students in a process of discovery rather than teaching new material. Classes are centered on open-ended questions that can be approached via multiple avenues. Students are encouraged to answer the question that is addressed in the class by conducting research and working on team projects. This new approach permits individualized education by encouraging students to be the motors of their own learning process. The professor simply serves as a guide that introduces his students to different resources and inspires them to discover the unknown. Children would be tasked with synthesizing aspirin, and learn titration on the way.

These approaches are just some of many new educational paradigms that have emerged in the last ten years. As cognitive psychology research continues to grow, it will support and augment these ideas.

Finally, who are we? We are a14z of MIT, a grassroots group of students resisting the antiquated model of education. We aren't a bureaucracy or committee. We support, fund, and incubate projects and ideas that transform education. Help us revolutionize education. Join us with your projects, your revolutionary ideas, your napkin scribbles, and your late night hackathon scripts. We have connections to edX, the Office of Digital Learning, the Martin Trust Center at MIT, and many more. We will use these to make your projects a reality.

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<sup>1</sup><http://homer.meteor.com>