

# *The High School and College Boundary*

Education 403X: Education Digital's Future

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*"The boundaries between high school and college were established during a very different epoch of industrial capitalism. Digital technology is finally making it possible to consider other ways of structuring education, connecting school and work, and integrating both into the life course of young adulthood."*  
— Quoted from the Education's Digital Future (EDF) 403x Syllabus

## Introduction

The first EDF session of the quarter focused on the changing boundaries between High School and College. During this session, we discussed the origins of the formalization of high school and college as separate and considered the possible benefits and challenges of reorganizing the time/space of what we now call grades 10-14.

What follows is the synthesis of the resulting discussion from this class and the online Piazza posts following the class. This paper is structured around the following these questions:

- I. What are the boundaries between high school and college, and how were they established?
- II. What are the underlying theories governing the organizational logic of this divide?
- III. What are the consequences and limits of this categorical distinction?
- IV. How might digital media enable more flexible organization of school and the life course?

## Section I.

### Defining the Boundaries between High School and College

Let's start with the similarities between high school and college:

- 1 **Social grouping:** "Ailif was curious about the notion of American high schools as characterized by their social circles, in-groups, and cliques. While some group members argued whether this idea might represent an overlap with universities, we also discussed some American television and movies that really amplify the idea of cliques. Someone definitely brought up *Saved by the Bell*, and *Saved by the Bell, the College Years*." (Liam Aiello's group)

- 2 **Tracking:** “Prof. Pea raised the idea of tracking as a uniquely high school practice, but other members of the group noted that certain universities — including Stanford Business — have aspects of tracking that reflect students' prior experience (in the case of the Graduate School of Business), their need for remediation when entering college, or their testing into a university's honors program” (Liam Aiello’s group)
- 3 **Credentials:** “Both give credentials associated with achieving certain milestones” (Shaheer Rizvi’s group)
- 4 **Instructor:** “Some sort of instructor (authority figure) leading the educational experience” (Shaheer Rizvi’s group). As a caveat, Michael McLaughlin noted that “University and college professors are often (not always) obligated to engage in research or under pressure to publish. This can leave teaching as a lower job priority.” So, even if they have to teach — it might not be a priority.
- 5 **Institutions of learning:** “The obvious similarity is that both high schools and colleges are institutions of learning. In this respect they should look similar and if we strip away the formal structure and customs this might be the case. Does an online high school course look all that different from an online college course? I doubt it. We might also just follow a student as they sit in class and prepare for class — without any unusual cues I suspect that through such a lens it would be difficult to separate a high school student from a college one.” (Michael McLaughlin)
- 6 **Prior experience:** “Shelley noted that an overlap with high school and college is that you don't have a wealth of "real world experience" before entering into either institution.” (Liam Aiello’s group)

Our colleagues also raised some of the significant differences between the two domains of education:

- 1 **Definitions of success:** In high school, students need to “get good grades so you can impress a college admissions officer and move up a social ladder,” while in college, students “grades aren’t as emphasized,” and there are “different definitions of success (build good relationships with professors, get involved in research, career development doesn’t mean 4.0 GPA necessarily)” (Farah Weheba’s group)
- 2 **Learning responsibility:** “The general perception is that teachers are largely responsible for student learning in high schools and students are largely responsible for their own learning in college.” (Michael McLaughlin) This often translates into greater teacher accountability in high school, and significantly less so for college.
- 3 **Physical structure:** “Truancy is an issue in high school but not college – high school students must physically be in the building for a specific set of hours. In college on the other hand, there are still requirements, but the expectations are different (the school

admin/ police won't come find you if you're not in class). We explored the idea of a bell system, prevalent in most high schools, as a symbol of strictly mandated activities and push towards conformity, a motif for the regime of schooling." (Alice Fang's group) Also: "High schools traditionally house just classes... college campuses have classes, gyms, dorms, etc." (Shaheer Rizvi's group). The theme of the residential curriculum — living on one's own and the resulting social life and emphasis on individual personality development — seemed prevalent.

- 4 **Curricular differences:** "High school curricula more standardized, colleges have a lot more freedom (variability across colleges and also across departments)" (Shaheer Rizvi's group). Also: "For the most part, high school is for breadth and college for depth." (Alice Fang's group). However, Matt Williams noted: "Having thought a bit about the curricular differences between high school and college, I've come to the realization that, I think, a lot of those differences can, in fact, be deconstructed. In some ways, I'm beginning to think that the biggest curricular differences are functions, not of content and structure per say, but of student emotional, social, and knowledge development. So, for me, the questions that illuminate the differences are — is there college course content "inappropriate" for high school students? Why and how? And, is such a distinction even relevant for a 21st century age in which ALL content is probably accessible to millions of "children" right now?"
- 5 **Choice:** "There is also more choice in college, and choice also in selecting which college. Who makes this choice? In the public high school system, the school you go to is mainly dependent on where you live; it is a combination of the parents' choice and the government that divides up zones. In a sense though, it is still the parents' choice because they choose where to live and whether to send the child to a private school based on economics. As for college — does the government make people go to college? Our group answered with "not explicitly," but undergrad degrees are needed for jobs, especially in US, and especially in Silicon Valley (as compared to other countries like India). There is also the cultural belief that you can't go to college without high school. It is seen as mandatory, even though there are many other possibilities." (Alice Fang's group)
- 6 **Motivation/accountability:** "High school student expected to need to be cajoled/forced to study, college student expected to have intrinsic motivation" (Shaheer Rizvi's group). Also: "Our group largely agreed that if students do not learn in high school, it is considered the teacher's fault. If students do not learn in college, it is most often considered the student's fault and not the professor's fault. Why does this distinction exist in terms of accountability?" (Shelley Jacobson). Meaghan Stern noted the potentially negative consequences of this dichotomy: "As a former K-12 teacher, I can testify to the necessity of cajoling/extrinsically motivating students to do well. College itself is frequently a motivator for many. However, this leads me to think about what happens to those students who were previously externally motivated by teachers or parents once they get to college. Particularly for low income/minority students, extrinsic

motivation is sometimes a huge factor in their presence in college. Once the motivating factor or person is no longer present, students tend to struggle academically and personally because they haven't built the skills or self-esteem necessary to succeed."

- 7 **Time:** "High school time is limited to certain hours of the day, college time permeates all day & night." (Shaheer Rizvi's group). Class time drastically decreases in college (16 credit hours), whereas a full time high school day could run 35 hours per week or more.
- 8 **Consequences of social deviancy:** "An anecdotal example is that a friend of mine was an adjunct professor last year at an area college. He was teaching intro to communication, and a student became agitated and threw a chair in the room. My friend ended the class immediately, and ultimately connected the student to psychological services to get support that was needed. On the other hand, there are any number of similar instances of acting out in high schools where the immediate response is disciplinary instead — and, for practical reasons, it often has to be. There's potential for high schools to serve youth better, but I don't think that collapsing high school and college is the answer — instead, I'd advocate even more specialization at the high school level so that high school (instruction, educational curriculum, and social support) and college are highly distinct. My goal is not to idealize the college setting — certainly, there are plenty of colleges where throwing a chair would have led to immediate expulsion with no further conversation. But the consequences of social deviancy at the high school level and college level seem decidedly different to me."

However, our class discussed how these differences have already begun to fall apart:

- **Artificial Divide:** One group noted that: "there are clear signs that point to the artificiality of the divide between college and high school. E.g. students are navigating both at the same time, such as college students taking remedial courses, high school students doing AP/college classes." (Shaheer Rizvi's group)

To conclude, a number of attendees raised concern over the potential bias of the group:

- **Bias:** Participants thought that those attending and participating in Education's Digital Future might be fairly biased when it comes to characterizing "college" and even "school." This is not to say that we must search for an objective assessment, but rather this should, at least, be acknowledged. Several students also noted the relative bias of our sample as students of Stanford, a highly atypical university compared to the massive numbers of 2-year and community colleges.
- **Narrow Picture:** "Our perspectives as Stanford students are hopelessly compromised by our relative successes in high school and college, which led us each to being here in the first place. Even in retrospect, it is impossible for me to disentangle my assumptions about the purpose of my high school experience for myself and the reality of what that experience could be for other students. I have worked with students for whom high

school did not serve much of a social or academic purpose, for example, and for whom college was an unthinkable place to end up. It's too easy to paint a narrow and elitist view of the high school and college experience, when for many students that is not the reality at all" (Paul Franz).

## **Section II.**

### **Two Theories for Educational Organization**

Prof. Mitchell Stevens shared two theories, the "functionalist" and "conflict" perspectives, of educational organization that give different explanations for why high schools and colleges have come to be the way they are.

#### **Functionalist Perspective:**

The first type characterized education systems as a process of top-down, intentional, "functionalist" method of producing of human capital. By this view, high school and college are separated to deliberately maximize human capital production by, for example, customizing instruction for different ages, offering a range of possible job training methods, and efficiently using government education funding. (EDF class summary)

#### **Conflict Perspective:**

A second view instead characterized educational systems as more of a bottom-up emergent result of conflict among public and private stakeholders jockeying for wealth and power. By this view, the divide between high school and college may be (among other things) more of a historical artifact of a "credentialing arms race" between families attempting to out-qualify their neighbors for jobs. (EDF class summary)

#### **A Missing Component: Intellectual Enrichment**

It is worth considering whether these two narratives take into account personal development and enrichment, which is usually part of the "pitch" of any self-respecting university. Several students, including Betsy and Galina, noted that (at the risk of sounding naive) these theories didn't match the more conventional narratives of going to school for intellectual enrichment. Roy commented that the beliefs of educational suppliers and demanders may be different — for example, are the learners in a functionalist theory aware that they are competing in a market for human capital, or do they view it as a civic duty or personal enrichment?

## Section III. The Consequences and Limits of this Divide

### Conceptualization of “the student”: Accountability

The consequences and limits of distinguishing between high school and college primarily take the shape of how we conceptualize “the student.” As discussed in EDF on Jan. 15, “high schools and colleges hold different people accountable for the academic success or failure of a student — high schools tend to look to parents, teachers, and staff as “leaving students behind,” while colleges more frequently hold students to be the directors of their own learning.”<sup>1</sup>

Under the current bifurcation, a student becomes an adult at age 18 — often starting their year of being 18 as a “child” i.e. a high school senior, and ending the same calendar year as a more autonomous “adult” college freshman. As discussed in EDF, data mined from online courses could provide insight into the ways in which such a crude binary neglects the under-18 students who have more agency than the current structure affords recognizing. One pair (Christie and Arik) noted, “poor performance in HS is the teacher's fault, [but] poor performance in college is the student's?”

### Conceptualization of “school”: Space, Choice and Content

A separate consequence of the distinction between high school and college (which could change in an online context) is the tethering to a particular place, and the rules about who can attend what school. Public high school districts are largely determined by geographical proximity, whereas college attendance runs the gambit of in-state, out-of-state, private, local, community.

“I think that the area most likely to change would be “place.” A major part of the crisis of education has to do with location. Aside from the ease of tele-presence releasing us from the constraints of physical presence, the boon of digital presence can extend to children's social well being as well: for instance, a professor in Sociology did a recent ethnographic study in the Bay Area of pre-teen children who live alone in apartments so that they can attend a better school than where their families reside”

A core consequence of the current division between high school and college has to do with the “differentiated signal value of the credentials” of the respective institutions. Freedom of choosing classes in college versus having a prescribed curriculum in high school is also a consequence of the current division.

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<sup>1</sup> (EDF summary, <http://edf.stanford.edu/course/jan-22-symbolic-deference-inherited-system-credit-and-accreditation-us-higher-education>).

Finally, the issue of appropriateness is an alternative framework for the division of high school and college: a major consequence is that content can be “appropriately” tailored for the respective student bodies by keeping them separate.

“The questions that illuminate the differences are — is there college course content “inappropriate” for high school students? Why and how? And, is such a distinction even relevant for a 21st century age in which ALL content is probably accessible to millions of “children” right now?” (Matt Williams).

### **Conceptualization of Equity: Credentials, Resources and Democracy**

First, the current college and high school boundary perpetuates an inequitable schooling system. Currently, a high school diploma opens fewer doors. However, alternative forms of high school and college could destabilize the current logic of a college diploma leading to improved job opportunities. Below, Meaghan Stern writes about

“Organizationally, a substantial change that we will begin to see has to do with access to both high school and college through online “alternative” forms of high school and “alternative” forms of college. Socially, politically, and culturally, this change will cause us to confront what we expect from schools: previously a source of “advantage” to the population who attended the physical school, education now becomes more accessible. What happens when everyone has access? How am I supposed to get the advantage in society that my parents and grandparents got by virtue of their education?

High school, seen as compulsory and necessary for a democratic society, will likely become a more fluid, participatory, and “choice oriented” structure. Alternatives to “real” school environments will become more accepted as viable educational opportunities. San Francisco’s Flex Academy is one current example: it markets itself as “the best of online education meets the best of traditional, onsite schooling.” Students independently work through online curriculums at cubicle-style workstations in the school building. Teachers monitor student progress, at times pulling small groups into a more traditional class-like setting where they are able to review key concepts or skills or address trends across the group. As a byproduct of its alternative practices, Flex Academy attracts students who were not otherwise successful in traditional learning environments. A product of this digitization is increased access to education.

Structurally, changing the organization of high schools using technology requires a more intense overhaul of what we consider “real school” than [a] college/university. Online post-secondary courses appeared long before secondary teachers considered using computers as a primary (or even supplementary) method of instruction and/or assessment. MOOCs, forums, and other online learning platforms are increasingly accepted as credentialing forms: it seems expected that post secondary schools will continue to digitize and expand online.” (Meaghan Stern)

Related, the small groups that met during class discussed the ways in which there is distinct “variance in resources and opportunities based on location of college or high school” (Courtney, Nancy, Cho, Becca, Rob, Amit, Greg, and Dan, Farah).

Finally, toppling the wall between high school and college may have a benefit of democratizing currently exclusionary structures:

“Online platforms serve to make the world seem smaller — people are more able to connect to places and people far away. This has the potential effect of democratizing an institution that was previously only open to a subset of the population that could a) find post-secondary opportunities: college counseling, school visits, scholarship opportunities, b) move to access the opportunity: commuting or relocating, and c) afford to finance the opportunity: tuition becomes negligible with online courses.

Web-based college admissions processes, virtual tours, scholarship and entrance applications, and courses serve to provide access to those who were previously unable to access the physical versions. Post secondary education will thus due to wider accessibility through online tools. The world of education tends to stick to its definition of “real school”: a room with a teacher, students, desks, assignments, grades. The definition of “school” and what constitutes a legitimate “education” come under fire when we confront these alternative methods of gaining a credential: if more people are accessing the advantages of education, in what way will we begin to re-create the advantage that post-secondary school previously provided to those who were able to physically access it?” (Meaghan Stern)

## **Section IV.**

### **The Impact of Digital Media on the Boundary between High School and College**

#### **Liberating learning from the confines of formal institutions**

This session of EDF also began a discussion about how digital media is changing the character of learning by liberating it from the confines of formal and physical institutions such as schools and colleges. Furthermore, as officially recognized ‘learning’ moves outside the realms of tightly controlled institutions, access to education potentially increases, allowing individuals not served by the traditional education industry to participate.

“Recent advancements in technology such as wide distribution of broadband connections, affordable tablets, nearly omnipresent smart phones, and free content for learning (Khan Academy, MOOCs, Gooru, YouTube, and Wikipedia) have changed the way we acquire human capital. No longer are schools the primary mechanism for producing human capital because in the digital age, there are pathways to learning skills and content that are not bounded by the formal institution (high school or college). In terms of place, learning from experts is no longer limited to elite settings; there are many

methods to access the philosophy and methodology of experts outside of college campuses.” (Molly Bullock)

## **Advantages of Digital Media**

There is broad consensus that digital media provides many advantages over traditional method of teaching dominant pre-tech era. Digital media allows content customization, increases convenience, increases data analytics and makes education more affordable.

### **1 Customized content**

“Traditionally, high schools and colleges follow a similar model for creating a course: The academic publishers create the textual content, and the local teacher organizes an itinerary of these texts and discusses their content during class. Although there are variants, this teacher-and-textbooks form is common in typical schools from grade 9 to grade 16. In the upcoming years, curricular content for high school and general college prerequisites will be increasingly gamified, MOOC-ified, or otherwise made into some interactive digital interface.” (Stephen Frey)

“Digital enables significantly more customization, modularity and one-to-one mapping of content delivery, skills development and certification. Computers are becoming more effective at measuring skills proficiency and development over time by using adaptive testing methods to identify specific tasks and sub-tasks that an individual student struggles with vs. a general approximation of skill. This is easiest to see with math and computer science related skills as computers can be the means of input and output. A computer can easily determine if, how and where computer code has broken down. Follow up questions / prompts to the student can zoom in on specific areas to see how/where the student’s thinking broke down.” (Tyler McNally)

### **2 Convenience**

“The digital age is offering convenience above all else and admittedly a more interactive experience as the technology advances. So how does this relate to Mitchell’s framework and ensuing forum prompts? Convenience will play a greater role in impacting potential college students in comparison to high school students. The ability to complete college work for a low cost, around a work schedule, without excessive travel offers more to a college population (even that large portion in local city colleges) than to the high school population.” (Michael McLaughlin)

### **3 Data Analytics**

“What makes digital education and instruction interesting is not the alternative structures it a prior supports, but rather the depth and detail and sheer amount of data that can be collected by modern technologies. The implications of Big Data and Learning Analytics

on the relationship between high school and college, however, are not entirely clear. It depends very much on how those analytics are implemented, interpreted, and designed into learning systems.” (Molly Bullock)

#### **4 Affordability**

“Free, video-based instruction is growing in popularity as a supplement to traditional educational resources – I can watch a Khan Academy series on statistics as a way to prepare for a statistics exam in high school or college. And its also occurring as a replacement – students of all ages from around the world who could not afford (in time or money) to attend courses delivered by eminent professors (or anyone else) can do so anytime, anywhere via the internet.” (Tyler McNally)

#### **5 Skill-based hiring**

Credentialing and accreditation are crucial features of our current educational system. Both the high school diploma and the college degree are widely recognized standards by which graduates are sorted into jobs and other social positions, and by which we as a society have certified that certain skills and knowledge are reproduced over time[1]. Digital media has the potential to change the power dynamics of the traditional education institutions as employers use skills assessment rather than credentials for job qualification.

“Educational institutions have build power by stratifying the education and restricting access. Digital Media would change this by lowering the cost of education and increasing access. As more and more people start enrolling for online education and companies start hiring based on skill rather than accredited degrees a shift in the power dynamics would ensure. Market forces would dictate whether this threat is credible or not as the outcome would largely depend on openness to hiring based on skills and accreditation/verification of the skills.” (Manmeet Mavi)

“Human capital can be earned online if and when employers begin to more widely recognize alternative paths and perhaps begin applying internal metrics rather than traditional credential systems in determining best-fit employees. Regarding content, those working outside the traditional system can work outside the traditional script. If the demand for certain skills and content shifts to a specialized collection set forth by the employer, traditional requirements (as set forth by the college accreditation bureau) will become less important.” (Molly Bullock)

## **Blurring of high school and college boundary**

With increasing access to education the boundary between the high schools and colleges is blurring. This can be primarily attributed to the competitive nature of admission process and the value we still accord to accreditation by educational institutions.

“As MIT, Harvard, Stanford, Coursera, etc. rush to put up online content, one can, I think, easily imagine this setting off an admissions arm race among prep schools and students aiming at top colleges. After all, what better way to demonstrate whether or not you'll succeed at a particular college than to do well in a course offered by the same college? So, do college guidance counselors start advocating for free periods in which students can take courses from these universities? Would those classes be given a special (honors, etc) place on the high school transcript? How would college admissions officers interpret a transcript with four or so courses from their university? How might high school faculty perceive this shift and its driving factors?” (Matt Williams)

“Grades 10-14 will become more blurred as high school and college classes use not only the same textbook (as some AP classes do), but the same MOOC / digital learning program / online lecturer. For many first-year college courses, the role of content delivery could pass from physically-present lecturers to online rockstar professors and HCI-knowledgeable curriculum designers.” (Stephen Frey)

## **Regressive Pedagogy**

In spite of great benefits of digital media, we discussed how, surprisingly, not much has changed in terms of pedagogy at high schools and colleges. In fact, pedagogy can often seem regressive despite the progressive technology.

“In the short time that MOOCs have been the rage, it is notable that there has been no meaningful pedagogical revolution. This is because pedagogy is no great mystery: apprenticeship works for training people to do things, communities of learners are usually more effective than individuals at teaching complex and multi-stage tasks, and lectures are decent — if not always great — at helping people remember information and regurgitate it. That MOOCs operate primarily on a lecture model now is not surprising, nor will it be surprising when someone finds a way to do more complex pedagogical work online and at scale. I doubt that a new pedagogical model will be created.” (Paul Franz)

## **Digital Education: compete or support formal education systems?**

Though digital media is reducing the divide between schools and colleges, we do not expect it to compete with the formal education system. It would, however, complement the traditional education system and improve efficiency. It might be formalized and integrated with the existing education system depending on how the market forces play out.

“My personal opinion is that there will, for a time, be a proliferation of new formal educational systems and platforms, many of which will not be certified by any governmental body (though they may be by employers, which also counts). In the spirit of disruption, the best and most interesting of these will not compete directly with school, but will rather do things that schools don't do. In fact, we already are seeing this: Khan, Coursera, Udacity... Over time, they may even supplant existing structures (or integrate with them). But the key to their disruption is in not directly competing with school, yes, but also and more importantly in doing data better.” (Paul Franz)

“In lieu of a big name like "Stanford," online instruction, and public education generally, will continue to be heavily scripted and assessed, and so I think that we will see the least disruption via digital media in regards to governance and content. In the short term, rather than displacing K12 curriculum generally, it's much more likely that we will see digital media displacing target non-core areas, such as credit-recovery, AP, world languages, as cost-saving measures in schools.” (Jason Sellers)

## Conclusion

In this paper we present multiple ways of considering the bound separating high school and college. First, we discussed similarities and differences between the domains, such as both relying on an instructor (similarity), but truancy and limitations of the physical school structure being greater issues in the high school setting (difference). However, the class and paper note the false dichotomy of these distinctions, as evidenced by high school students taking AP courses and college students taking remedial courses. Second, the paper reviewed various theories governing this divide. In this section, we looked at the functionalist and conflict theories of education presented by Professor Mitchell, and added the point that there is an intellectual basis for education which might be overlooked by these two categories.

Third, we discussed the consequences and limits of this high-school versus college distinction. Points raised here include whether 18 is a logical age or marker at which to deem someone autonomous and accountable to themselves, or whether that is an invented notion. We also considered the role of physical space for high school (i.e., why is high school place-based, but college is traditionally further afield?) and questioned whether it would be possible to diminish the distance between the two realms through virtual college tours or location-agnostic schooling. Finally, we reviewed the ways digital media might enable more flexible organization of school. Here we considered five main areas where technology could bolster learning, including (1) customized content, (2) convenience, (3) data analytics, (4) affordability and (5) skill-based hiring. Finally, we discussed whether digital education would support or replace the current institutions.

Some of these centuries-old distinctions will take time to dissolve even as technologies and teaching models emerge that place into question their very existence. Moreover, broader

societal forces in the US, including the age of 18 indicating financial and housing independence for some, military service, and general adult autonomy, may act to keep current high-school and college barriers in place. However, crippling costs of higher education and over-burdened high-schools might force the current model to change despite this resistance.

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1 <http://edf.stanford.edu>

## College Credentials in the Digital Future White Paper

### **Tyler McNally: Functionalist and Conflict Theories of Accreditation**

In the first several weeks of the EDF winter session, Professor Stevens introduced two social science theories which can be useful lenses through which the class could understand the role of accreditation and credentialing, the focus of Weeks 3, 4, and 5.

Accreditation and credentialing are so integral to our educational system (and have been for hundreds of years) that most people seem to take them for granted. For example, how many students could name the accreditor their university is certified by? How many students know the basics of the accreditation process? Perhaps it's similar to buying a piece of organic fruit at the supermarket. We see the stamp and pay the premium, but how many of us know the processes, systems and evaluation methods required for a producer to get that stamp? If we did take the time to evaluate the process, would our view of the stamp change? Would our views also change if we were confronted with different types of organic certifications or produce that provided detailed information about its provenance, but did not include a certification?

Evaluating the current system of accreditation and credentialing, comparing this system with new options and viewing all of these through the lenses of Functionalist and Conflict theories enabled the class to develop new insights about the pros/cons of the current system and potential opportunities and pitfalls for the future.

Let's begin with the theories. Anita Varma suggests that a functionalist perspective would "argue that accreditation facilitates a system in which the best and the brightest are easily identifiable and move through the appropriate institutions. Average folks are filtered into average institutions, and so on." Further, "the functionalist perspective would argue that accreditation enables and buttresses an efficient system for education to churn out a spectrum of workers, for all kinds of work."

Based on these objectives, accreditors would need to focus on specific types of activities and roles. For example, as Hannah Miller Rich noted, accreditors would need to "ensure that all schools deliver equally high quality education using data-driven and outcomes-based strategies

that guarantee optimized student learning.” In carrying out these activities, Accreditors take on an important role in the college system. They are the “check and balance... that supervises one of the most important facets of this country,” the human capital development and use system.

The conflict perspective yields a very different picture. From this vantage point, accreditation can be seen as “a means by which power is preserved by certain groups of society and denied to others,” says Hallie Fox. “Rather than seeing each individual as meaningful, conflict theorists view education more in zero-sum terms. There are only so many credentials to be offered and so many powerful positions in society to be had — everyone can't possibly be equal. Credentials legitimate the position of certain individuals at the exclusion of others.”

Consequently, accreditors focus on different types of activities and roles. Hannah notes that accreditors will need to “perpetuat[e] inequality by maintaining the illusion that traditional education is the only way to prove intelligence and competence.” Since, “higher education is significantly correlated with professional success, yet access to a four-year \$200,000 education is accessible to very few,” it's important for accreditors, that all stakeholders (students, employers, universities, policy makers, etc.), “[continue] to judge an individual's merit by their ability to attend an accredited university.” In doing so, conflict theorists would see accreditors as “continuing a long history of structural inequality.”

As Hallie Fox notes, this credential (and the accreditation process underpinning it) has been “generally unquestioned by society at large... as a legitimate way to sort, classify, reward, and create a stable population of capable workers.” In the rest of this paper, we look at how current and emerging forms of teaching, credentialing and accreditation are changing the landscape and dynamics of the college credential.

### **Liam Aiello: Responses to the Credentialing Panel**

Week 5 of our EDF winter session brought together four panelists to discuss college credentialing in education's digital future. The panelists — Richard Arum (NYU professor of ed and sociology), Therese Cannon (WASC), Emily Goligoski (Mozilla Open Badge Initiative), and John Katzman (2Tor, Noodle, and Princeton Review) — all offered insights and challenges to the current model of college credentialing in the United States, and our class was more than willing to engage with, and offer further challenges to, these ideas.

One major theme to emerge on the discussion boards arose from Richard Arum's indictment of the rituals of college certification — specifically, he referenced the lax and varying adherence to the rules of the credit hour across institutions and lecture halls — and how

universities must be held more accountable for student learning should they desire to maintain their credentials and federal aid funding, and also to justify their cost.

The notion of how best to hold universities to higher standards for student outcomes sparked diverse debate on the forum. Karen Kindler noted: “In his remarks, Richard Arum talked about how the credentialing process for institutions, which, in theory, should be a legitimizing agent was, in practice, seemingly ceremonial and thus, a sham. He suggests that the accreditation organizations, which should play a significant regulatory role in the credentialing of institutions, have come to accept their largely symbolic roles, and are abetting an increasingly dysfunctional system. This ineffective system is entrenched within the higher education framework and its influence in it is pervasive through rules and norms.”

Molly Bullock followed up with some observations about Arum’s criticism of universities’ uses of performance assessments, and his advocacy, instead, for more extensive use of value-added assessments of student learning: “Arum decried performance assessments as the solution to this systemic problem because of their intrinsic link to prior aptitude and achievement. According to Arum, the solution lies in value added assessments, those that can measure student growth over time through repeated administration of an assessment...I wonder though, whether value added assessments are the best solution for the US credentialing system. Will gains scores become the new measurement of a credit hour? Who is going to write the assessments that define what knowledge is in any given domain and can they write, revise, and publish these assessments fast enough to meet the constantly changing demands of the workforce?”

Molly went on to offer an alternative vision to value added approaches, embodied by University Now, <http://unow.com/>, and its commitment to, and assurances of, quality higher education: “They offer self-paced courses at two universities. The model for earning a degree is completely competency based and as such they take their assessment creation very seriously. They offer students resources and personal learning analytics that indicate assessment readiness and also allow students to challenge the end of course assessment whenever they are ready...Through a disaggregated faculty model, they are able to counsel students individually based on their learning outcomes and profiles. Also because of this unbundled model, evaluators are separate from teachers and advisors and dedicated solely to creating and administering assessments that test desired learning outcomes.”

Manmeet Mavi echoed Molly’s challenge to value-added assessment, and offered up a space for considering what “deteriorating student learning” in relation to increases in access to “broad-based education and the benefits it accords”: “Richard Arum’s remarks on performance

based assessment seem to have been motivated to increase the learning outcomes. I agree with Molly's comments that value added assessment is not an improvement over performance-based assessment. Value-added assessment is not only difficult to measure (as pointed above by Molly), but also fails to capture minimum proficiency achieved or objectively compare proficiency of various students. I personally believe the credentialing system in its current form is adequate and only lacks flexibility when it comes to determining criteria for granting degree/diploma."

Hannah Miller Rich, alternatively, pushed for higher accountability from colleges and universities, offering a personal view of how the immense financial cost of higher education demands higher expectations for outcomes: "For the amount that college costs, and the way in which this cost stratifies achievement based upon socioeconomic status, I find the lack of student learning appalling. I think that we need to step back and think about the purpose of higher education today — what do we want students to gain? How do we want them to grow? I deeply believe that young people need to explore, ask big questions, be confused and develop their own values. I do not think that higher education that costs \$50,000 is the right place for this...I hope that the conversation on value-added assessment does not lead to a narrow conception of achievement or learning, but allows for a critical discussion on what, how and why students are learning what they learn in higher education."

And Meaghan Stern, in a post entitled "What DO Credentials Mean?," extended the conversation about standards for higher education even further, drawing insightful parallels — and cautions — between the standards movement in K-12 education and what might be in store for universities: "Arum's talk made me wonder what happens to this underlying assumption if a person has a degree but no skill?...In higher education accreditation, there is a push to standardize education and curriculum to ensure that graduates have comparable skills across different states and school systems. If this is the path that higher education is to follow, I think we need to learn from some of the byproducts and consequences of recent K-12 developments. Will standardization lead to more breadth/requirements and less depth/involvement in study? Will teacher and professor evaluation replace student development as the focus?...There are many more parallels in the struggles faced by K-12 and Higher Ed than we sometimes acknowledge. The current difference is that in K-12 we focus on teacher accountability. In Higher Ed, it seems that we are still trying to figure out where to place the locus of responsibility for outcomes."

For other students on the forum, the question of the accrediting agencies themselves

raised some thought-provoking comments. Therese Cannon, former executive associate director at WASC, offered an appraisal of the patchwork of accreditation agencies that operate across the United States, indicating that varying criteria for accrediting universities led to a system of loosely-defined certifications that were often incompatible with larger universities. This notion sparked a conversation between Matt Williams and Max Alexander around the question, What's stopping Stanford from becoming an accrediting body itself? Writes Matt: "What's stopping Stanford (or other brand name universities) from getting into the accreditation business?...It has the resources to assemble committees, federal panels, accreditation experts, and education scholars to reflect and review applications from online colleges that want the consulting expertise to run rigorous educational programs. It could play a significant role in shaping the discourse of online education, even funneling some high-achieving students directly into its own programs."

Max Alexander responded: "Would Stanford, or a similar university be more interested in getting into the business of accreditation, or be likely to actually consider whether or not it still needs its own WASC accreditation? (Falls along the same lines of the university as the quasi sovereign — could a place like Stanford fully function outside of the purview of the US government's grant dollars?)... An elite university would rather rid themselves of the pressure to release their student learning data (possibly coming down the road from an institution like WASC), and allow themselves to reframe what comprises their accreditation standards. These standards would likely align themselves with the information that the university is already paying top dollar to promote and display to the world: number of Nobel prize winners, average employment/salaries of graduates, famous alumni, successes of sports teams, etc....In referring to the recent changes in the criteria that WASC uses to evaluate post-secondary institutions, [Therese] mentioned that WASC is now looking at the extent to which universities are 'doing good work', something that would differentiate them from the for-profit universities that are dedicated 'solely to the pursuit of profit'."

John Katzman, of 2Tor, Noodle, and the Princeton Review, spoke about the relationship between universities and content providers, and the urge in a competitive, outcomes-based environment to incentivize the gaming of these outcomes — short-term outcomes that prioritize, say, online content, to benefit institutions at the expense of long-term learning goals that universities should aspire to articulate, measure, and achieve.

Tyler McNally responded with a comment about higher education having a vested interest in maintaining a "status quo": "I initially laughed when John Katzmann showed the

picture of kid with hundreds of badges covering his body. But the more I thought about it, the more I considered his choice to show that image in light of Richard Arun's comments about higher education's position as a "mature, successful industry." It seems self-evident that higher education, in general, and prestigious universities, more specifically, have a large vested interest in the status quo. Then it also must be true that the suppliers to the mature, successful industry are also equally vested...Princeton Review, 2U, and Noodle... I think all of those business are amazing and valuable, but they reinforce and rely on the status quo."

Anita Varma responded as well, elucidating her standpoint on the need to establish a better articulation of the purposes of higher education in terms of what its future might hold: "Overall, I left the panel thinking that there was a latent conflation of what the purpose of education has been with what the future of education should be. If the purpose of education in the past has been to prepare a strong mass of worker bees for the jobs that a corporation-dominated market creates, the future of education does not need to take that purpose as a given. There are systematic limitations to both the education system and labor force as they exist now. Maintaining fidelity to long-standing values and norms may be a cautious approach, to avoid "breaking the educational system as you reinvent it," as one speaker said. However, maintaining values of the existing system of education warrants a closer examination of what these values and norms are — and whose interests they serve — in order to envision a future system that substantively disrupts rather than replicating the disparities and shortcomings that exist in the current system."

### **Karen Kindler: Synthesis of Piazza Posts on Badges**

Credentialing and accreditation are crucial features of our current educational system. Both the high school diploma and the college degree are widely recognized standards by which graduates are sorted into jobs and other social positions, and by which we, as a society, certify that certain skills and knowledge are reproduced over time. The current credentialing system developed as a series of negotiated contracts between particular schools sharing similar prestige and status. These courtesy agreements are now being challenged by potentially seismic changes to the political economy of U.S. higher education. Such paradigm shifts create opportunity for reimagining academic credit and accreditation.

One such opportunity is the example of the open-source badging system, which offers a potentially useful way to signal a student's or candidate's abilities. Alternative credentials could create a mess of unintelligible micro-credentials, but on the other hand, they could also provide

a more granular, clear, and normatively "accurate" signal about a candidate's qualifications. Yet who will be responsible for "curating" the badges into larger suites of knowledge areas?

Some suggest that tech-based companies like Google, Cisco, Facebook, or perhaps a MOOC will certify a sequence of badges as their "programming diploma" for example. The argument is as employers with specialized needs that aren't totally satisfied by current credentials, tech companies should have a vested interest in exploring and examining the richest sources of badging content. This is an important point because the value of the diploma or "curated set of badges" depends more on the perceived credibility of the issuer.

Yet there are increasingly similar attributes between the developing open-sourced credentialing system such as badges and traditional degree granting systems. In a typical degree-granting system, lower-level performance metrics such as tests, assignments, and projects are accumulated into course grades; the credits or units for those courses form a bachelor's degree. Most four-year universities issue a B.S. in a subject based on 30-40 "common core" units, 40-50 in other requirements, and 20-30 in electives. Thus, considering for differences in general education fulfillments, two students could complete only half of their ~180 units with the same classes, yet both earn a B.S. in the same subject from the same university. To categories learning and streamline education, administrative progressives designed the credit system as a mechanism to track, sort, award, credential, and granting degrees. The degree is chunked into a single informational unit on a CV or application, and few people who see it afterwards know what went behind it. For better or worse, the degree offers a signal about the student's ability, without delving into the lower-level details of his or her learning process.

To become useful to outsiders there are those who argue that any open-sourced credentialing system will need a meaningful method to "chunk" lower-level skills into higher-level competencies and serve as a mechanism for establishing trust and cooperation between people. And that's where badging's similarities to the black box of traditional degree granting systems come in. As a proxy for a student's ability, badges, like degrees, signal learning has occurred. It is in the same category as a college degree, social signal, technical certification, or recommendation letter. Badges for online courses serve as a stamp of approval for completed work without knowing what went into it. Call badges the administrative progressive's 2.0 in online education. Same problem yet again —increasing educational access to an ever increasing diverse population of students — and our solution seems to be exactly the same: credentials — a mimetic response.

Given the promise of innovative technologies we can do better than the administrative progressives did a more than a century ago. If digital learning is supposed to revolutionize

education, then we come up with ways to revolutionize credentialing. The more codified and parameterized the activity, the less its value to predict metacognitive skills such as creativity or initiative. A black-boxed credential can't fully measure what employers or application committees want to know: Could this person identify the most important questions to research? Can they follow self-imposed deadlines? Can this person solve problems that don't have a protocol — can they catch the curveballs? Can they synthesize today's ideas with that class from two years ago?

Perhaps we should be thinking about different domains in education being disrupted in different ways rather than all of higher education being disrupted in the same way. How can a badging credentialing system serve the needs of Google and Facebook vs. the needs of Exxon Mobile or General Electric? Is this a false dichotomy? For this reason among others, the need to unbundle college delivery is enormous.

In talking about badges we would be remiss to not mention gamification's influence in possibly creating a new paradigm for badging certification and credentialing. Some are concerned about this movement and caution if gamification attributes are being introduced to badging, the badges shouldn't be an end to themselves or their own reward. They question: Where are we going with this attempt to gamify and badge-ify education? Does making learning about credentials work? Sure. People are motivated by badges, degrees, grades, credit hours, etc. (are badges that different from grades?). But is that really what we want? Do we really want to encourage people to "game" the system more than we already do? Wouldn't we rather make learning about learning? Aren't the best educative experiences like the best games: fun, challenging, imaginative, innovative, and inspiring? The best learning experiences share a key thing with the best gaming experiences: Players and learners would have participated in them whether they received "credit" or not. Badges can adulterate the gaming and learning experience in that they allow the game or learning designer to be lazy, don't make a good game or learning experience, and just trick the player or student into playing or learning by giving her a badge. Gamification works, but it leaves no one satisfied.

Others are more supportive of and confident in badging's capabilities in enhancing the learning experience in the education schema. They argue that we attend schools in large part to keep us on track and earn credentials and badges. There is a motivational piece to the badge that many may identify with — similar to the way learners derive nuanced motivations to pursue more learning from their varying esteem for instructors, grades, their classmates, etc. We could certainly learn without schools (in fact, we do all the time) but it would be tough to keep pace

without the structure pushing us forward. If gamification makes the process a bit more enjoyable, then all the more power to the new technology, badges and all.

Schooling and learning are not the same. Learning can certainly happen in schools, but many go through the system and have little to show for it, so why not go the distance and make the classroom a game as well — at least the latter game has the potential to engage, teach, and motivate (we all want badges).

Finally, from the Open Badges FAQ website comes the question, “Will badges expire?,” and its answer: “It will depend on the individual badge. Issuers can set expiration dates with each badge that they issue and that information will be carried with the badge. Issuers might choose to do so for skills that need to be refreshed or are quickly outdated. Through the Open Badge Infrastructure, when someone tries to use or share a badge that has expired, the OBI will convey that the badge is expired.”

The conception is striking because in thinking about our traditional notion of the degree, a brick-and-mortar bestowed diploma ensures some degree of lifelong recognition for whatever efforts were made to cobble together the learning experiences required to achieve it. No “best if used by” date was attached — although it was perhaps implied.

There is a badge that is familiar to many educators: their teaching credential, and the requirement in most cases to renew or bolster it as part of one’s professional obligations to improved practice. Yet there are frank opinions that teaching professionals express when it comes to renewing this badge: graduate class, more money, and more time in professional development that they would prefer to spend elsewhere. Certainly, many educators cherish the opportunity to grow professionally, but it doesn’t negate the externally-applied obligation to assure they do so.

In what ways might badge issuers determine their requirements for renewal? How this might be applied, ideally, to instill a sense that certain practices and knowledge merit regular re-acquaintance, and that an external reminder must be issued so that this re-visiting of learning occurs? Pragmatically, it should also be considered that other forces might compel a badge issuer to manipulate renewal requirements, and how learners might reevaluate their pursuit of such a badge as a result.

Certainly, these ruminations can apply to all realms of credentialing – from the CPR certification that rescuers renew every year to the “lifelong benefits bestowed” by a prestigious university’s diploma to the un-referred choices of an open badge issuer on Mozilla. But the questions still remain: how does one determine the life-span of a badge; should an expiration date be attached? And what ways is this determination subject to the whims of those who hold

nuanced views of the virtues of ongoing learning, combined with the opportunities to capitalize on this process, or further gamify it in the digital realm?

# Evolution of Digital Curriculum

## *Risks, Opportunities, and Innovations of Evolving Digital Curriculum*

**Molly Bullock, Greg Bybee, Hallie Fox, Meaghan Stern**

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### **Part I: Risks of the digitization of these public-contribution activities**

While generally optimistic, EDFers raised concerns about some of these new digitized innovations. These concerns were primarily in regards to information overload and granularity, permanence, privacy, pedagogy, and equity.

#### **Information Overload and Granularity**

There was much concern about information overload. Katie Hagey commented: “One concern I have about the digitization of public-contribution activities is that it may contribute to the vast amount of information available in the digital sphere, without increasing the amount of useful information. In Nate Silver's language, I imagine we might see the 'noise' compounding relative to the 'signal', thereby rendering it more difficult to find truth and interpret. I doubt that this concern is so grave that it may debilitate public-contribution activities, but worth considering that forums involving public contribution will need to deal with generation of not useful, misleading, or downright wrong content” (Katie Hagey, EDF Post Week 6).

Manmeet Manvi similarly addressed concern about the danger of controlling the quality of information available to students online. “The biggest risk of digitization of public contribution is the distributed responsibility with little control on the quality and the integrity (correctness) of the data. The public contributor may not be qualified to provide accurate and complete information” (Manmeet Manvi, EDF Post Week 6). Tyler McNally described this risk as one of granularity: “Since storage and transmission costs are so cheap and tending towards zero, there is no reason to be selective in what aspects of information is kept and what is not. We keep everything and everything about everything. Word and wikipedia store every word types, deleted, and retyped; logs the location and time when these events occurred and identifies who did what. The end result is no longer just the story; the stream, enabled by digitization, becomes the story” (Tyler McNally, EDF Post, Week 6).

#### **Privacy and Protection**

Another inherent risk EDFers raised was about student privacy and protection. Max Alexander and Liam Aiello, both former teachers, addressed the risk of student information being available publicly online. Max commented, “As it stands, schools tend to default towards restricting any student information or production from appearing on the web- but is this really an appropriate way of training students to represent themselves on the internet? I do believe that there is a balance to be struck between protecting students personal and private information and allowing them to share information about themselves and their work with a broader audience” (Max Alexander, EDF Week 6). Liam used wikis in his 5th grade humanities curriculum, aware it was

a risky endeavor. “Then parents would hear about my use of wikis in my humanities curriculum, the most commonly voiced concern was in line with what Matt Williams shared: you’re sharing my child’s writing with the world? Is that...okay? I would assure them that I was able to maintain a great deal of control over what was shared publicly, and how students responded to one another’s writing...I would often promise parents that, towards the end of the year, I would open access to the site to them, so they could see the results of students’ progress as online collaborators and creators. And yet, come the end of the year, I never once did share open access to the site with the parents. I would hedge, concerned that they would “gather data” on their own child, and one another’s children, and on me as a teacher that they were free to interpret in whatever way they saw fit. So too, then, would my concern grow should my students’ work be suddenly shared with the entire online world. While I would hope that the power behind this public sharing might be something I could get students to uptake, I would also be concerned at which age felt appropriate for such a monumental exposure to the informal (or, perhaps, formal, should any data analyst choose to be interested in 5th grader’s writing topic choices? Who knows?) evaluation of many more eyes...But certainly, Matt’s concerns about what information, and judgments, might be made when we share students work publicly for the sake of introducing them to the responsibilities and risks of online publication” (Liam Aiello, EDF Post Week 6).

Tyler McNally agreed there are legitimate concerns about privacy. “Digitization makes search and access easier. Its possible (though not feasible) that someone could visit local public schools around the country, taking notes on what students are reading, writing and creating. Not everything would be accessible, but one could acquire a lot by reading school newspapers, looking at physical message boards, and simply asking students "would you be willing to give me a paper copy of your essay?" Digitization transforms this process from an infinite (and therefore, likely useless) endeavor to one that is instantaneous” (Tyler McNally, EDF Post, Week 6).

### **Limited Risk Taking?**

Others worried the digitization of educational activities may actually inhibit students’ risk taking. “For instance, if every remark we made in EDF was posted, searchable, and tied to our names in written form, some of us might be more reticent to speak or to offer daring ideas. The notion of the classroom as a "safe space" applies to taking risks in written projects as well. There are any number of papers written by my 60 very bright Stanford undergraduates which include remarks that, in context, are simply not fully thought out — and out of context would quickly become problematic. Instructors can edit their students' work before making it available for public consumption, but this solution would detract from the ownership students feel about the contribution.”

### **Permanence**

There is also the issue of permanence. Anita referenced Viktor Mayer-Schönberger, who argues in "Delete: The Virtue of Forgetting in the Digital Age" (2011), “it is becoming virtually impossible to delete a digital record. Students need to take risks in the classroom, to be uninhibited enough to make mistakes (within reason), and to have the safety net of knowing that their thoughts —

however premature or minimally developed — will not necessarily follow them into adulthood. Certainly, some projects are simply innocuous. I don't think there's any deep ethical problem with the astronomy project, for instance. But when student work becomes (massively) public, a new host of concerns arise related to the lasting nature of online material. The phrase "never sign your name to something you aren't proud of" takes on a new magnitude when projects from elementary school onwards could be retrievable by interested parties (potential employers, for one) later in life" (Anita Varma, EDF Post Week 6).

Tyler McNally also expressed concerns over persistence online. "There is no delete button on the internet. Great in some respects for information preservation, but as discussed during class, there is something to be said for a world in which what you did, said, or wrote when you were 15 years old is a vague, distant memory for just a small group of people rather than an instantly called-up data point online. Digitization is immortality, with all the beauty and terror that goes along with it" (Tyler McNally, EDF Post, Week 6). This also brings to question traditional academic citation. As it stands, it is not "equipped to deal with modern scholarship, especially as it becomes more multi-modal" ([Paul Franz @Paul\\_Franz](#)).

McNally summed up our concerns about digital contribution in classrooms well: "Taken together, these effects create a new kind of information space that can be a dream for researchers in the aggregate — we are collecting almost comprehensive data, down to the bit, of the what, who, where, when and how — all the better to understand the why. But this kind of detailed aggregation becomes anxiety-provoking at the individual level. It's fun when you can keep tabs on your friends by going to their Facebook profile and seeing their wall. It's a different experience when you can search every friend profile instantly and find out who recently became single, lives in Boston and likes to go to [insert name of bar here] on the weekends. It's not often we (humans, society) have to consider the idea that just because we can do something doesn't mean we should. In a world of scarcity, things that help us be better, faster, cheaper are presumed to be good. But information technology makes scarcity obsolete. Without scarcity forcing choices, an informed public working through institutions and leaders have to make these choices. And perhaps the types of public contribution activities that were presented in class are just the right kind of activities that are needed to educate the next generation via direct experience about the risks and opportunities of digitization. We might not appreciate how sweeping the impacts of digital search, access, granularity and persistence are until we see our own digital cave drawings immortalized. Once its digitized, there is no delete button, but after experiencing that, perhaps we can make informed choices about what to digitize and when" (Tyler McNally, EDF Post Week 6).

## **Pedagogy**

In response to conversations started during class Week 7, Paul Franz called for better instruction while tweeting: "you can't just give kids the game/book. You also have to get them to play/read like a designer/writer" ([Paul Franz @Paul\\_Franz](#) ). Paulo raised another concern about STEM in classrooms and digitized learning: "At the moment, teachers are feeling left out of the Maker Faire, Maker Movement. Kids are having all the fun" ([@PauloBlikstein](#)). He reminded us "hands-on learning is an old idea, but every 20 years we have to remind ourselves

about it”; plus, “hands-on learning is expensive” (@PauloBlikstein). The rush to flip these process is “wrong. We should start with hands-on and then teach the material” (@PauloBlikstein). These concerns reflect the risk of rushing ahead with technology without considering the relevance of pedagogy.

Others also voiced concern about replacing human skill and ability. Meaghan Stern brought up the example of “super-suits” in recent Olympic swimming competitions. “Super-suits brought up many questions regarding the relationship between technology and ability: did technology render talent/ability unnecessary? What happened to the swimmers who did not have access to suits? If they had the suits, would they be able to compete for the top spots, or were they actually slower? Did swimmers with the suits really earn their place on the medal podium or in the record books? Does it actually matter that some swimmers set records with suits? Isn’t that just the next frontier?” If we use technology to replace talent, then we may miss the opportunity to teach “hands-on” skills and knowledge like that expressed by Paulo, Zuckerberg, or Gates. Teachers may “become superfluous as a result of technology.” How can teachers be a part of this revolution?

### **Equity**

Meaghan compared the super-suit controversy to technology in the classroom and also raised questions of equity: “Will students with access to technology begin to learn new and different ways that will benefit them more than students without new technology? Is technology another way to separate “haves” from “have-nots”? Technology in education is frequently seen as an equalizer — a way to bring education to parts of the world or society that does not have access (remote locations in India that benefit from web-based medical collaboration, for example), or a way to differentiate instruction to reach all students at the appropriate math levels. However, I still am somewhat skeptical about what happens if everything becomes technology based, and there are still people out there without access. What happens to the argument about equity then? The swimming world responded by outlawing the technology and putting asterisks next to records set while swimmers wore suits. If technology ends up creating inequity, what do we do next?” (Meaghan Stern EDF Post Week 6).

## **Part II: Opportunities for the digitization of public-contribution activities**

When challenged to think about the implications of digitization for curriculum and pedagogy, EDFers were hopeful about the promises of technology to transform STEM, humanities, and K-12 learning. Digitization has the power to disrupt the current state of education and the status quo, providing opportunities for more and deeper access to knowledge, and participation in knowledge creation.

### **Disruption**

Manmeet Mavi brought up the digitization of textbooks and their potential to disrupt the publishing status quo. He described the work of CK-12, which has “created an open-content, web-based collaborative repository of books termed as the “FlexBook.” “Flexbook is an “open platform [which] allows public/teachers to add and modify the content... Through digitization of

public content, Flexbook has the potential to disrupt the K12 book publishing industry which relies on copyright and royalty to maintain ridiculously high book prices. CK12 might render the K12 book publishing industry obsolete in the same way as Wikipedia made encyclopedias such as Britannica obsolete.” (Manmeet Mavi, EDF Post Week 6)

Meaghan Stern echoed technology’s potential to disrupt the status quo: “Technology in education is frequently seen as an equalizer- a way to bring education to parts of the world or society that does not have access (remote locations in India that benefit from web-based medical collaboration, for example), or a way to differentiate instruction to reach all students at the appropriate math levels.” (Meaghan Stern, EDF Post Week 6)

Tyler McNally wrote about the promise of trending toward democratization through digitization since “digitization makes search and access easier.” The opportunity to be able to trace the arc of information and its development adds richness and depth to the story. Technology also renders school learning more consequential. Students described the opportunity to “for schoolwork to make a meaningful contribution to global communities,” as Anita Varma posted. (Anita Varma, EDF Post Week 6)

### **Student Exploration and Discovery**

Hallie Fox touted the opportunity for engagement and discovery when students use technology to become the drivers of their learning. “With the use of technology, we can actually let students explore and discover. They can take action in their communities and their world. Students want to do this. As a teacher each spring I did a project on endangered species with my 5th graders. There was nothing more exciting for me then to see my kids search for answers to their own questions and develop solutions to problems they cared about. I could not do that with our science textbook and the supply of books was so limited at my school that technology was not only more efficient, but also connected directly to student-led discovery.” (Hallie Fox, EDF Post Week 6)

Hannah Miller Rich discussed the authentic value of online learning experiences. Students develop “tangible skill through exploration.” She also noted practical applications of online learning: “The ability to contribute to, and not just consume, online material is a powerful tool for the social and private sector. The experience interacting with social and public media may also prepare students to be able to market themselves or publicize their business ventures later in life. Using the internet as a venue for publicity is a skill that cannot be undervalued.” (Hanna Miller Rich, EDF Post Week 6)

In Week 7, EDFers dove into describing specific ways classrooms, textbooks, and students might possibly benefit from digitization. Opportunities for transforming teaching and learning ranged from digitized and linked texts, support for special education, bridging school and real-world applications, and visualization.

### **Transform Classroom Teaching**

Current and former teachers noted the opportunities technology affords their classrooms. Liam Aiello expressed the value technology adds to student voices, removing the teacher from a position of “prime knower’ of a text, shifting this role to his or her students as much as possible.” (Liam Aiello EDF Post Week 7) Matt Williams likewise discussed using a wiki achieve that objective, posting text and engaging students through online commentary for high school literature circles. Digitization of texts also circumvents the challenge of acquiring sufficient physical texts for students. “What emerged was a live text, full of close readings and interpretive discussions. The students loved it (they met my goals too) and we even ended up printing it out in the end of the unit and binding a copy for the next year’s class” (Matt Williams EDF Post Week 7). Max Alexander and Meaghan Stern engaged in a lively conversation about the benefits of restructuring a digital history textbook with live links to other sources and topics, thus expanding the field of knowledge that students would be able to consider “history.”

### **Support for Special Education**

Hallie Fox noted existing technological supports for Special Education students, “For students who were truly dysgraphic, I used adaptive technology so they could record their writing before a scribe would write it down (often myself or a parent)” (Hallie Fox EDF Post Week 7). She also acknowledged ways that technology might help engage struggling writers: “It was also challenging to teach and manage because students were always moving at a different pace through the writing process. Some took days to brainstorm and outline while others rushed but needed more time editing and revising their work. If there were an online tool to help students through the process and help them focus on their ideas rather than the details of spelling, I think many of my students with IEPs would have been far more confident and excited about writing than they currently are. An online tool could provide students with examples of the type of writing they are doing, a recording device to verbalize ideas and listen to them later, sentence starters, or outlines to help them plan their work. For students with disabilities, using graphic organizers and having aids (like dictionaries or word lists to help spell) can drastically reduce anxiety about writing and enhance their performance. For example, if students are working on a persuasive writing piece, they would be able to reference examples of other student work (that is about at their level), brainstorm ideas, draw ideas, use an adaptable outline, sentence starters, and spelling help. Making this interactive and allowing space for teachers to comment on a student’s work or letting peer editing occur (I am thinking about leaving comments as you may do on PDFs) would be a fun, easy way to engage students in the writing process.” (Hallie Fox EDF Post Week 7)

### **Bridge School World and Real World**

Molly Bullock noted that technology has an opportunity to bridge the world of school with the real (social) world where students are already “content producers” via YouTube, Twitter, Facebook, and blogs. She also suggested the promise of “longitudinal digital portfolios” that allow “parents, teachers, and students to see growth and change over time” and may be “tracked, aggregated, and summarized in a dashboard optimized to illustrate growth over time.” Thus, rather than at an end point, achievement evaluation might “take place over multiple points during the year and students should iterate on an upgrade to their publications throughout the

year” (Molly Bullock EDF Post Week 7). Digitization offers the chance to restructure how we think of traditional teaching and learning tools of textbooks and assessments.

### **Visualization**

Anita Varma described opportunities to create visuals to accompany students’ and teachers’ flexible thinking. “[A schematic’s] arrows, connectors, and interactants could all be moved by the instructor and by the student to 1) reflect how a different study might conceptualize the same concept/model and 2) to indicate the fluidity of how communication unfolds as dynamic rather than stagnant” (Anita Varma, EDF Post Week 7). Michael McLaughlin visualized a world wherein “any equation in a [Chemistry] textbook could be clicked on to bring up a series of videos that run concurrently. One video would show the reaction as actually performed with large scale chemical samples. Another video would show a molecular model view of the process.... This would retrain the student brain to think in parallel about what is happening in the macro- and micro-scale worlds” (Michael McLaughlin, EDF post week 7). Restructuring students’ interactions with curriculum can promise to change the way they think and the way they see the world.

## **Part III: Innovations**

Throughout the posts, students considered existing and potential innovations enabled by digital curriculum. Broadly, these fell into four buckets:

- 1 Improving pedagogy through digital curriculum
- 2 Visualizing and interacting with content
- 3 Improved content discovery and richness
- 4 Broadened access and openness

### **1. Improving pedagogy through digital curriculum**

Several students commented on the potential for online or digital content to improve pedagogy.

Liam Aiello writes about changing the way we think about “reading comprehension” by allowing students to create their own knowledge around a piece of literature and engage in rich discussions. In essence, Liam proposes moving away from the traditional textbook model of understanding literature and instead, “offer [students] a space, with digital access to a text, ways to manipulate it and select passages/images for citing evidence (or for remixing, should that better offer a student a chance to express his or her interpretive stance), and ways of recording written responses that can be revisited and reflected upon by the students who wrote them.”

Paul Franz, Greg Bybee, and Robert Lucas discussed on Twitter whether MOOCs were good for pedagogy. Although they disagreed slightly, all seemed to agree that existing MOOCs do not offer greatly improved pedagogy, though some, like Venture Lab, have great potential. In particular, they point to the potential for more individualized, student-centered adaptive-learning. Moreover, significant amounts of data can be used to better understand how students learn.

Manmeet Mavi also pointed to the fact that digital content, including even online textbooks, have the potential for adaptive learning.

## 2. Visualizing and interacting with content

Digital curriculum is not just another way to access existing content, it allows content to be “restructured” or visualized in dramatically new ways.

Hallie Fox shared her experience using Mimio, which “use[s] interactive white boards, iPads, and online programs to help advance student learning. Their products are designed for literacy instruction but involve teacher-directed instruction, formative assessments, collaborative learning, and adaptive instruments to support reading growth.” She continues to explain how technologies like this have helped her teach 5th and 6th grade special education, and the potential for further innovation. She suggest, “An online tool could provide students with examples of the type of writing they are doing, a recording device to verbalize ideas and listen to them later, sentence starters, or outlines to help them plan their work. For students with disabilities, using graphic organizers and having aids (like dictionaries or word lists to help spell) can drastically reduce anxiety about writing and enhance their performance.”

Anita Varma proposes a “digital restructuration that would [offer] ...the ability to draw an interaction schematic, but for the schematic to have movable parts. She offers a number of potential implementations, including “a SmartBoard which the instructor can draw on, and a networked way for students to draw on their own screens but have it appear on the class-wide board. This way, an instructor could 'call on' a student in a digital setting and have the student's re-modeling appear for everyone.”

Michael McLaughlin offers a similar innovation for visualizing chemical reactions. He suggests, “Ideally any equation in a textbook could be clicked on to bring up a series of videos that run concurrently. One video would show the reaction as actually performed with large scale chemical samples. Another video would show a molecular model view of the process. Finally additional videos could run that follow the energy or entropy changes in each chemical species.”

## 3. Improved content discovery and richness

Clearly, digital content online makes the content far more discoverable and easily edited. Several students focused on how the Wikipedia world is hitting education and will transform the way teachers and students discover and consume information.

Manmeet Mavi posted on “FlexBook disrupting the K12 book industry.” Described as an “open-content, web-based collaborative repository of books,” Manmeet supposes that FlexBooks could make all textbooks free and disrupt the K12 publishing industry in “the same way as Wikipedia made encyclopedias such as Britannica obsolete.”

Meaghan Stern makes a similar point, but goes further to suggest that “online texts with embedded links” would enable “myriad of possible connections” between content. In fact, she

offers a number of ways in which online or digital textbooks might transform learning. “The digital version would be adaptive to student reading levels: it would allow students to read the same “text” but easier words would be substituted, more images inserted to help students decode the meanings of challenging paragraphs,” she explains. “The digital book would also be linked to different sites that provide more information about a particular vocabulary concept, word, person, place, or event.”

Hallie Fox points out that digital content revives “Dewey-ism” and enables students to easily “explore and discover” new content. Tyler McNally concurs. “Digitization makes search and access easier. Its possible (though not feasible) that someone could visit local public schools around the country, taking notes on what students are reading, writing and creating. Not everything would be accessible, but one could acquire a lot by reading school newspapers, looking at physical message boards, and simply asking students “would you be willing to give me a paper copy of your essay?” Digitization transforms this process from an infinite (and therefore, likely useless) endeavor to one that is instantaneous.”

#### 4. Broadened access and openness

On a related point, digital content, particular when online, enables a new level of openness and accessibility.

As Tyler noted (above), “Digitization makes search and access easier.” Several students talked about how this access, particularly Massively Open Online Courses (MOOCs) are transforming student learning. In the twitter discussion, Paul Franz, Greg Bybee, and Robert Lucas debated how open MOOCs really are. Greg argued that MOOCs really are open — at least as much as is realistic today — and that openness and pedagogy should not be confused.

Many students discussed the risks of the publicity and permanence of student-created content online. While the risks were discussed earlier, it’s important to note that this permanence itself, is a great innovation — in hundreds of years, primary research will be completely transformed, and no one will ever have to wonder what an original author really said.

#### Conclusions

Though digital curricula offer numerous possibilities to transform classrooms, they must be pursued with a bit of skepticism. While technology offers the chance to innovate and enhance student’s educational experiences, it cannot replace the intangible connection between a teacher and a student. We must be cognizant of the fact that “one man’s risk is another’s opportunity” and one man’s opportunity may be another’s innovation. To sum up our thoughts, Molly Bullock created an ingenious infographic highlighting the tension between risk, opportunity, and innovation in digital curricula.

# Education's Digital Future Discusses:

## Learning in a Digital World...

**Excitement**

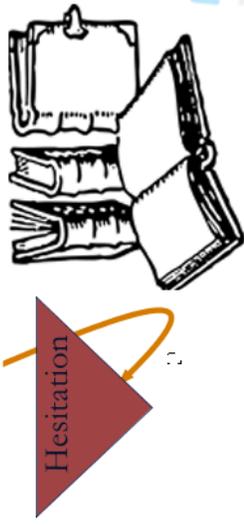
*Increased Access to Specialized Knowledge*  
Visualizations and models make accessible what was once invisible. Get the type of information you need in the format best for you. You too can master Statistical Molecular Thermodynamics.

**Democratization of Resources**  
Instantly answer any question your science book never answered. Circumvent the challenge of finding a class set of physical texts. Free up time to worry about having a class set of devices. Uneven access could mean a dangerous digital divide.

**Changing Skillsets, Changing Pedagogies**  
Teacher Decentralization: from sage on the stage to guide on the side. Students master basic skills through individualized instruction. Use of the internet as a tool for publicity is a valuable skill. How will teachers get training, infrastructure & support? Kids must learn the risks and responsibilities of online publication.

**Information Overload**  
Is there too much noise to find the signal?

**Credibility**  
Kids & adults still lack skills for evaluating source credibility.



## Contributing to the Digital Landscape....

**Near Infinite Storage, \$\$ Approaching Zero**  
Ever think about printing the contents of your computer? Does the fact that we CAN record everything mean that we SHOULD?

**No Data Point Left Behind**  
Tracing the arc of information gives depth & richness to how we know. Granularity- we are keeping everything about everything.

**Child Development**  
Models & sims allows productive failure & decreased consequences. What is the right age for a wide public audience?

**Distributed Content Creation**  
Student agency grows with contributions to local & global community. Are all perspectives equitably represented?

**Decreased Barriers to Publishing**  
Disruption? Will Pearson go the way of Encyclopedia Britannica? Google returns 86 million results for lesson plans, where do I start?

**Sharing without Boundaries (Informal)**  
How many Harlem Shake videos is too many Harlem Shake videos? If you haven't uploaded it, does it really exist?

**Digital Immortality**  
ANXIETY- once you press send, the words are yours for eternity. There is no delete key on the internet.



## Digital Curriculum

*Using Learning Data...*

**Detailed Data Aggregation**  
Longitudinal portfolios instead of yearly multiple choice tests. Does data reflect what it claims to measure?

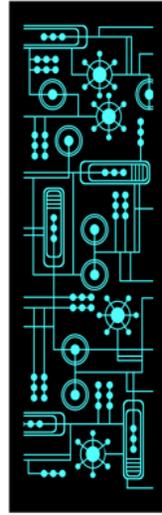
**Authentic Inferences**  
Data needs a huge amount of cleaning. Quantity is only good if there is also quality. To really understand the data, you must also know the CONTEXT.

**Instantaneous Data Collection**  
Does the threat of permanence raise our barriers to participation?

**Privacy vs. Access**  
Is there control over who accesses student data? How, when, why?

**Data on Minors**  
Is enough being done to protect the rights of children?

**Easy Searching**  
Aren't adolescent mistakes are best forgotten?



One person's risk is another person's opportunity.

One person's opportunity will be someone's innovation.

"EDF Final on Games"

by Paul Franz, Max Alexander, Stephen Frey, Michael McLaughlin

**[Note from the authors: the following white paper is the transcript of an “interactive fiction” game that can be played at [stanford.edu/~pefranz](http://stanford.edu/~pefranz). The text in brackets below is part of the game’s code.]**

Constance Steinkueller is a room.

"[if unvisited]You plug into a virtual world, surrounded by the avatars of other 'players.' Looking around you see students and experts engaged in conversation, playing games together, arguing over the merits of gaming to learn. Some of the avatars sit in elaborate, but semi-transparent offices. You see James Gee and Dan Schwartz in the distance.

As you gain your bearings you realize that you have plugged directly into the virtual office of Constance Steinkueller. In front of a framed picture of President Obama, you see Constance herself, an associate professor at Wisconsin Institute for Discovery University of Wisconsin-Madison, and cofounder of the Games+Learning+Society Initiative. You approach Constance, curious about her connection to the White House.

Constance introduces herself, and tells you that she believes that she was drawn to the White House because of the administration’s interest in 'games as a vehicle for thinking about cognitive and behavioral change.' She claims that her perspective is unique because she understands the dangers of this mission — warning of the Orwellian 'gamified citizenship,' but saw the possibilities to 'get it right.'

You then ask Constance what her perspective is on the general games market. She responds by contending that although there is a diversified game market, it is not widely known or widely accessible. Kids spend more time on game than homework, yet people are reluctant to acknowledge (which she believes to be empirically true) that learning happens when kids playing games. Her support — 'Games are hard!'

You then ask Constance to delve deeper into the empirical proof for her claim, which she responds to by presenting the results from a study she conducted that demonstrated increased reading performance among boys, when the learning was gamified. You finally ask Constance to share her recipe for the famed 'gamification secret sauce.' She tells you that the sauce must consist of one part content expert, one part game designer, and one part data scientist in order to cook up a great educational game. [end if]

[if visited]Constrance smiles, 'Nice to see you again.'[end if]

Time to move along.

South (s) is James Gee.

Southeast (se) is Malcolm Bauer.

Southwest (sw) is Dan Schwartz."

James Gee is a room. James Gee is south of Constance Steinkueller.

"[if unvisited]You enter another online affinity space, this one for a massive multiplayer social game. A thousand digital avatars have connected to form the represented collective mind of Jim Gee, a sociolinguist at the University of Arizona. Jim describes how books were once held up as a savior of education, and are indeed powerful tools for learning when used in a context of rich dialogue, discussion, and design. Instead, we skim massive textbooks without active engagement. Jim feared that games would fall into a similar trap, becoming 'schoolified' and leached of their potential for rich learning context (EDF website).

He then goes on to describe how we can make technologies that fit 'the nature of human beings as learners.' Humans are built for goal-based action; we remember an activity better when it is directly connected to a meaningful outcome. Together, humans function best as 'plug and play' devices. While intelligence is typically pictured as the trait of a single individual, our cognition evolved to be used in networks with other human beings. A collectively-intelligent network will enable you to harness individual differences in people's abilities, so that crucial pieces of information are not missed. In addition to strengthening the networked intelligence of the human mind, games can also extend its ability to simulate potential scenarios using self-representative avatars.

Jim closes with a piece of advice to game designers to not just build games — to build capital-G Games with networks of supportive shared activity (EDF Website). [end if]

[if visited]The James Gee collective consciousness is too busy playing its game to talk to you anymore.[end if]

East (e) is Malcolm Bauer.

West (w) is Dan Schwartz."

Malcolm Bauer is a room. Malcolm Bauer is southeast of Constance Steinkueller.

Malcolm Bauer is east of James Gee.

"[if unvisited]Stepping towards Malcom Bauer, you feel as though you fall asleep and reawaken. As you shake off the confusion you realize that you are in a classic arcade. The decor is circa 1978. A friendly group of teenagers call you over to join in Tank 8, a multi-player arcade game. As you join in, you overhear Malcolm Bauer (managing senior scientist at ETS and director of assessment at GlassLab Games) talking to some other visitors nearby — 'in the play, in the collaboration... there was learning, there was excitement, there was risk, and there was bonding.' If only the education games of your own time could generate the same level of engagement. The thought rattles around in your mind, when hand touches your shoulder and beckons you to disconnect from the game. The hand belongs to Malcolm Bauer himself.

Malcolm too has considered the question of how to 'gamify' schooling, or how to 'schoolify' games. There are a few great examples of software that finds the game mechanics inherent in knowledge. For example, the iPad app Dragonbox challenges children with manipulating colorful tiles to clear a board, and gradually transforms the surface decoration of the ruleset until the player suddenly realizes that he/she is performing complex algebra. This game has selected a small but important bit of math, and operationalized it perfectly into a game. At the GlassLab, Malcolm works as a cognitive scientist alongside game designers, artists, and educators to build games that act as true formative assessments, with properties like clear expectations and immediate feedback. Their pioneering games aim to be an existence proof of rigorous, polished, and sophisticated educational entertainment (EDF Website).

Adding Malcolm's expertise to your own, you find yourself once step closer to understanding this world of 'gamification.' But where to go next?[end if]

[if visited]You take another spin playing Tank 8 before deciding it's time to move on.[end if]

North (n) are students.

West (w) is James Gee."

Dan Schwartz is a room. Dan Schwartz is southwest of Constance Steinkueler. Dan Schwartz is west of James Gee.

"[if unvisited]You come to a new, surprisingly bland room. You turn around and around and see nothing of interest, but suddenly you bump into someone, who must have appeared from nowhere. Before you can even see who it is you're getting an earful. 'You think that knowledge transfers? I don't even know if transfer is possible!' An intense, curly-haired man glares at you as you try to come up with a response. He smirks, 'Of course, the problem is the way you education people try to measure and classify knowledge. You think it's all information this, cognitive processes that. But that's just the obvious stuff, not the important stuff. What you really want to assess is choices.

If a student makes a good choice, what does anything else matter? Knowledge — procedural knowledge or content knowledge — will come from good decision making. So assess that.'

'What does that have to do with games?' You reply.

'Everything! Look, games are a great way to measure choices. You can see exactly what a player looks at, what they click on, whether they choose to persist when they fail, whether they seek the easy way out of a challenge. It's all choices, and it's easier to measure in a game than in a normal test. And, as I was saying, the content knowledge doesn't transfer out of the game anyway.'

You stand amazed. 'Who are you?'

'A dark humanist. You can call me Dan.'

As you try to puzzle out what a dark humanist is, Dan continues, 'Anyway, student choices do transfer. If you set up the game right, you can predict student performance in class highly accurately based on what they do in the game. The question is, how can we use that to teach.'

You look down as you try to think of an answer, but when you look up Dan is gone. Maybe a dark humanist is like a warlock or something.[end if]

[if visited]You hurry through Dan Schwartz's domain as quickly as you can.[end if]

North (n) are students.

East (e) is James Gee."

Students Discussing Choice is a room. Students discussing Choice is north of Dan Schwartz. Students Discussing Choice is west of Students Discussing Gaming Outcomes.

"[if unvisited]You can not help but step in the direction of a group students gathered in some kind of virtual ice cream parlor. You listen in on a discussion of choice in learning and the implications of gamification. You do not recognize the dark, cloaked member of the group, but as common as anonymity is online, you're not put off by this. Instead you listen in and try to get a sense of the questions that are driving this intellectual adventure.

Matt Williams begins, 'Much of what was discussed at gamification was old educational theory, boiled down to this: choice in learning contexts helps children learn. James Gee implored us to not use tech the same way we used the technology of books (the invention of the textbook, etc.). But, seriously, what's stopping us from doing that? As long as education remains a system that is contingent upon a certain construction of a learner, then how would games be any different?'

The mysterious, shrouded figure jumps in, 'One of the themes in this course and in the wider education reform discourse is the role of choice in student learning. We spoke about choice during the class on high school/college line in talking about where agency lies in schooling. During the K-12 school years, the control over choice tends to lie with policy, administrators, teachers and parents and yet this agency seems to switch from the institution to the individual when reaching higher education. As agency is key ingredient for engagement, I believe that games, which can foster a sense of ownership and choice, are a vital asset to K-12 education.'

Finally, Abby Larson turns toward you, asking, 'Do games have the potential to change where structural agency sits in K-12?'

She stares at you intently, but you have no answer. She takes a bite out of an ice cream cone as you promise to think about it. As good as virtual ice cream sounds, the only hunger motivating your quest is the hunger for knowledge[end if].

[if visited]The ice cream parlor has attracted more conversants, though many have chosen to leave. In fact, you recognize only the anonymous figure from before. He? She? beckons to you. You come closer.

'Why did you not consume any virtual ice cream?' the figure asks.

'I chose not to,' you reply.

'You chose... poorly.'

You can't tell whether you've had this conversation before, but something tells you it is time to leave.[end if]

South (s) leads to Dan Schwartz.

East (e) are other students.

Northeast (ne) are still more students."

Students Discussing Gaming Outcomes is a room. Students Discussing Gaming Outcomes is north of Malcolm Bauer.

"[if unvisited]You walk through a small lounge, seeing a couple of students chatting with each other. At the end of the room you see a student virtually skydiving, her avatar racing through the air and buffeted by wind, even though she looks still from inside the lounge. You go to the window and see that the avatar belongs to Meaghan Stearn, who turns towards you, saying, 'Thinking about gaming to learn has led me to think about the role of games in student's non-academic development. What is the potential of games to impact or teach soft-skills, life skills, and skills crucial for use in the community?

Games, because of their low-stakes nature, are also environments in which students are able to take risks, engage in interactions, and participate in scenarios that mimic real life situations without the risk of failure. Games can be learning opportunities where students can try different strategies without high risk. There are also games that expose students to experiences outside of their immediate realm. An example is Third World Farmer, which aims to build a more globally aware consciousness in its players through the activities and hardships embedded in the game.'

As she finishes her parachute fails to open. 'See,' she says, 'in the game failure is not punished in the way it would be in real life.' Her avatar plummets past you, making a cartoonish whistling noise before hitting the earth. Of course, Meaghan is unharmed by the virtual crash, getting up and smiling at you.

Shaheer Rizvi, one of the chatting students in the lounge, taps you on the shoulder, and you turn around to listen, 'One of the questions raised by the panel was: can games help kids pick up essential skills needed in the 'real world?' Given recent research showing the importance of non-cognitive skills such as creativity and emotional resilience, especially at younger ages, this is a question that is being asked of our educational system as a whole. But given the fact that (1) Jim Gee noted how engaging games can be for kids, (2) kids spend significant time on their gadgets anyway, and (3) schools traditionally focus less on non-cognitive skills, it seems like this could be a particularly useful niche for educational games.'

The other student, Anita Varma, chimes in, 'I think gamification poses a new set of questions around how to do assessments of student learning: in what ways can we distinguish between excelling at playing a game versus excelling at learning and deeply comprehending the material? In the best-designed games, I suspect there wouldn't (or shouldn't) be a way to complete a level without comprehension.'[end if]  
You walk back through the lounge and look back outside of the virtual window and consider giving virtual skydiving a try, but think better of it. Instead, you head onwards to more conversation.

South (s) leads to Malcolm Bauer.

West (w) are other students.

Northwest (nw) are still more students."

Students Discussing Affordances is a room. Students Discussing Affordances is northeast of Students Discussing Choice. Students Discussing Affordances is northwest of Students Discussing Gaming Outcomes.

"[if unvisited]The room here is a plain lobby, much like you'd find in Stanford's Center for Educational Research building. The students here, however, are anything but plain. Stephen Frey has the head of a Triceratops, and Paul Franz is apparently made of spaghetti noodles. Along with Hallie Fox (as a toaster) and Anita Varma (who looks normal enough), they are engaged in a heated conversation about the affordances of games for learning.

Anita is speaking, 'On the other hand, there are affordances of games (pattern recognition, rote memorization of moves) that could afford space for 'faking through it.' This is not unique to games, of course — I have plenty of students who pantomime the pieces they need to get by on a very traditionally formatted exam.'

Hallie adds, 'The panelists all highlighted an important factor of gaming - goal based action. We are programmed to solve problems, set goals, and work to achieve those goals. There are not always logical, linear steps to achieving goals in life, nor in games. That's the excitement! We get hooked because we have not yet solved a problem. The problems to solve in games are not so impossible that we give up, yet challenging enough they may take more than one attempt to solve, or even a few. We come back to them because we know they can be solved, we learn more each time and get better at gaming - clues that lead us one step closer to achieving our goals. This is what makes them addictive.'

Spaghetti Paul Franz responds saucily, 'Yes, but let's be careful about these broad characterizations. Games are a complex category of media. Like books, they vary greatly in quality, purpose, genre, and design process. They have a variety of ideological purposes (often making money is a key, but independently developed games often have deep artistic goals and ideologies). They work differently for different gamers.'

Stephen adds, 'Indeed, and games are predictive only insofar as they model the real-life situation in which the skills will be applied. Fortunately, games' interactivity with the user can offer a more complex situational model than previous large-scale assessment technologies (i.e. Scantron paper). One interesting game model is 'Touch Surgery,' an iPad app that simulates common surgeries in glorious, gutsy detail. Most importantly, it tests decision-making procedures for the unexpected problems that occur the middle of an operation.'

You're not sure you want to hear any more about gutsy simulations from a talking Triceratops, so you quietly sidle away.

Southwest (sw) leads to a discussion of outcomes.

Southeast (se) is a discussion of choice.

From the Northwest (nw) you hear students excited about the future of gaming to learn.

From the Northeast (ne) you hear students discussing in more reserved tones."

Students Discussing Reservations is a room.

Students Discussing Reservations is northeast of Students Discussing Affordances.

Students Discussing Reservations is east of Students Discussing Possibilities.

"[if unvisited]You see three students working on what appears to be a text-based game essay thing. They're hanging out in one of those new Google-designed virtual workspaces. As they see you enter the room they launch into conversation. Max leads the charge, 'Why have schools been so slow or resistant to the adoption of a gamified approach to learning? The question seems inherently valuable, but ignores a much deeper conversation around the construction of the learning environments, both formal and informal, that facilitate student engagement in the first place. It seems like an obvious conclusion that students sitting around a TV playing games in their basement will be more engaged, on both emotional and intellectual levels, than they would in the more controlled school environment. So my question is— how do we address this disconnect? Is the conversation about 'gaming to learn' destined to fail if we don't first explore how to build school environments designed to promote student engagement?' Paul Franz, presently in a non-comestible form, shares a reservation of his own, 'Multi-player gaming has merits, for sure, but many game developers — particularly in genres like turn-based strategy - point to how few users actually play games online (somewhere between 1 in 20 and 1 in 50 players of Civilization 4 ever even tried a multi-player game, for example, let alone play MP regularly). Reducing the category 'games' to multi-player games would be a mistake as grave as reducing the entire online course space to MOOCs. Are they sexy, large-scale, and highly visible? Sure. But they're far from the whole story.'

Finally, Michael McLaughlin shares a disturbing tid-bit, 'There was a rash of deaths in East Asian computer gaming bars only a little while back. This begs the question: will future students hyper-focus on gamification and ignore other, traditional teaching methods?'

Gaming addiction can be deadly? Hmm... Perhaps you should make your way out of this virtual world.[end if]

Paul gestures for you to go away, as Max, Michael, and he get back to work. As you leave you catch a glimpse of a triceratops head as well.

Southwest (sw) returns to a discussion of affordances.

West (w) leads to a discussion of reservations.

To the Northwest (nw) you see an exit."

Students Discussing Possibilities is a room.

Students Discussing Possibilities is northwest of Students Discussing Affordances.

"[if unvisited]It seems you cannot escape the talking triceratops. Here he is again! Apparently in the virtual world your avatar can be in two places at once. Tabbed browsing at its best.

Stephen asks a question, 'Beyond measuring an individual's content knowledge, how might games track students' work ethic, collaboration, or communication ability? For example, Dan Schwartz's studies showed how students' persistence in individual games predicted their later performance. If this data is collected, can it and should it be used in student assessment?' You remember back to Dan. He would say yes, you think. Indeed, it should be used to change what it is we assess.

Tyler McNally looks at you excitedly and shares his thoughts and dreams, 'Imagine K12 schools around the country setting aside not 20% but 5% or less – a few hours every month for teachers and students to experiment in the field of education games. Perhaps it's enabling kids/teachers to create game like elements in the classroom or related to a specific concept. But, this experimentation would also need to foster collaboration across classroom boundaries. The community / connection / collaboration aspect would give greater meaning to the project and increase opportunities for students to learn from each other.' Games as a vehicle for collaboration? Sounds promising!

Liam Aiello goes a step further. Why can't games be treated as works of art and objects for discussion? 'Just as teachers find ways to make students more away of the strategies they employ as readers and mathematicians, I am curious to learn more about the way educators might facilitate post-gaming conversations – ones that ask students to go beyond talking about the content of a game; beyond what a child liked or didn't like; and further, into what the game required of them, what strategies they employed, and what analogies the game asks them to draw to real-life situations. I could picture a teacher, asking his or her students to enter into a dialog with the author of this piece, to creatively find ways to implore, 'What types of conversations were you just having with that Silk Road simulation?' or 'We just wrapped up our time playing Sid Meier's Civilization. What aspects of diplomacy felt really authentic? What aspects of diplomacy felt neglected by the designers?'

Stephen, Tyler, and Liam agree to work together on building a new gaming-infused curriculum. They put their digital heads together and start working. Tempted as you are to stay and help, you feel the need to move along.[end if]

[if visited]Stephen, Tyler, and Liam seem to be making progress. Others have joined them as they plot for a glorious future.[end if]

Southeast (se) returns to a discussion of affordances.

East (e) leads to a discussion of reservations.

To the Northeast (ne) you see an exit."

The Final Chamber is a room. The Final Chamber is northeast of Students Discussing Possibilities. The Final Chamber is northwest of Students Discussing Reservations.

"[if unvisited]You reach an exit portal that should allow you to leave this virtual world.

But between you and the portal are two giants. The first looks down, 'If this is your first time in EDF,' it says, 'You have to introduce yourself.'

'You first, giant!' You reply.

'I'm Mitchell Stevens, and this is my co-convener Roy Pea.'

'I am Player One,' you respond, 'and I'm here to save the world and/or galaxy from some nameless evil force while rescuing various princes and princesses. With deep compassion and/or a succeed at all costs attitude I intend to defeat my foes and forge a civilization that can stand the test of time. Also, I will buy DLC only once it is on sale.'

'You are very strange, Player One,' Mitchell responds.

'As are you, Mitchell the Giant.'

'I am a sociologist.'

Mitchell stands aside. You look up at the other giant, who smiles down bemusedly. At last you reach the exit portal. You can leave.[end if]

[if visited]The giants are nowhere to be seen. On the ground, however, you see a fallen scroll. It says 'Dear Roy, All is going according to plan. We can begin phase two. Institute Operation Carta Candidus.' [end if]

To quit type 'quit.' To return to the beginning type 'restart.'"