EDUCATION NOTES
What's actually wrong with American public secondary education?

[problems with educational outcomes/school design/curriculum]

important to show a healthy degree of skepticism so we don't try to fix something that isn't broken and don't just parrot truisms that everyone else is saying. at the same time, it's also important to recognise that the system has undergone revolution in the past and isn't as archaic as many people want to believe. if you stubbornly insist it's "broken", you're likely to implement half-baked solution, which just fucks everyone over.

people start education, but don't finish: 40% of people starting a college degree drop out, and 1 in 5 kids drop out before graduating high school.

even those who finished aren't set: HS education doesn't qualify you for college in 43 states, and the performance of US HS grads are shockingly poor on PISA rankings—it's with developing countries in that regard, and it's not clear that the curriculum we're teaching kids is adequate preparation for our new technological world.

there's also a big mismatch between what research suggests are best practices and what's actually implemented at scale. holding kids back is fucking stupid! "it didn't work the first time, so let's do the exact same thing again!" >$12B is spent on this every year—why don't we do subject based improvement—that requires restructuring the whole system since it's a complex adaptive system.

teachers don't have enough voice. administrators have 3 years of teaching experience, and often despite teachers knowing the contexts of their students well, have to teach material they know won't be responded to well.

then, there's a question of standardised tests, so often vilified. implemented because you need a way to objectively compare performances across schools, but problem with human nature is that once you implement a metric, everyone games the metric instead of optimising for the spirit of the metric (learning). the problem with these is that schools spend 30% of the time preparing, and *students don't even learn from the results*. But these, I feel, are actually necessary—you can't simply copy and paste Finland's education strategy of using few tests because 1) their cultural values (trust) are completely different and 2) they don't operate at scale. And STD tests can be a great tool for social mobility, we just have to modify them by doing things like supplementing them with portfolios, re-examining MCQ paradigm (compare to UK mark schemes) and use better feedback to get kids to learn from them.

but teachers aren't perfect either. instead of designing objectively personalised lessons, they often go on what *they* found effective learning methods when they were children. in this way, I see a future where teachers facilitate, guide learning and technology augments their power and fixes their shortcomings, not where it replaces them.

[problems with equity, race, gender, class—tech can't help with this]

but you can't just focus on school design & curriculum, ignoring problems of equity, race, culture, and gender is wishful thinking. schools are shockingly segregated, even today, robbing youth of huge learning opportunities from peers, enforcing siloed thinking, and perpetuating negative feedback in underserved schools. a cultural shift in values is needed to get schools better funded, like in Korea/Singapore.

And teacher voice is even more important because of issues of race. despite teacher numbers rising, the number of black teachers has fallen. and this is important because studies show that minority students, the ones currently done the most injustice by our educational system, perform

better when they have role models. lots of policy takes the wrong approach by replacing low-performing public schools with “innovate” and “experimental” charter schools that take experience teachers with roots in the community out of the picture. it makes sense, since a black teacher can more easily look past a black kids disheveled clothing and uncombed hair and urban mannerisms and slang to get at the quality of their ideas, so when students have teachers of matching minority races to act as role models, minority involvement in G&T doubles and dropout rates halve. isn’t that crazy! epitome of how answer is half policy/values and half tech.

failed policy in the past, and why it was so

No Child Left Behind

all about 1) research based teaching and 2) equity and supporting poor performing students (minorities, disables, special-needs). however, since they didn’t take input from teachers about how to implement this, the implementation was poor and it turned out to be ineffective in reaching its goals.

Common Core State Standards

This was a federally drafted set of expectations of what each child should know by each grade level. since, again, it had 0 teacher input, it strangled teachers who had a better sense of what *their* kids had to learn, and demanded the implementation of even more standardised tests to check if these expectations were being met.

Race To the Top

All about data-driven changes to teaching, which, again, sounds wonderful, by offering grants to states that suggest innovative ideas on how to change teaching practises by collecting large amounts of data on student performance. also failed because of inherently being an all-encompassing solution that blindly rewards tech innovation.

the lessons we’ve learned from these is that future legislation in the public education space, to be effective, must be 1) informed by teachers who have worked on the ground 2) operating at a grassroots level, districts optimally, but even state-based legislation would work better than federal legislation.

improvements necessary to the system and why I’m best positioned to implement them

is radical change possible? banks were all 10am-3pm until one crazy mf said we should make them all day so that people can come when they’re actually free.

we have to keep international scaling in mind. resource-strained systems like in India need to be able to adopt a version of the new public school system we build, for example. the solution must come from a place that deeply understands the perspective of the student (me), teacher (via CF), programmer (via SWE), legislator (via policy at Harvard) and cultural nuances (living on almost every continent when growing up).

how can tech help with this

poorest kids fall behind over summer
    tech gives them access to the same resources the rich kids use
exam results aren’t acted on
    computational teaching systems integrate what they learn about your mistakes into how they teach you—immediate, embedded feedback
people have to resit whole grade
    computers can enable people to work on only the areas that need work

personalisation has always been at odds w/ implementing things at scale
    tech can change this paradigm
most teachers spend most of their time teaching low-level google-able knowledge
    if you automate this part of learning, teachers can focus on motivating, inspiring students, helping them where they're stuck, and conveying and explaining deep, nuanced concepts in beautiful ways
a lot of the work kids are doing is busywork
    need to be wary of tech falling into the same trap, where they spend so much time learning how to handle the tech that they don't actually get anything out of it. and pretending that we're changing the world by implementing SMART board while racial and socioeconomic segregation is still rampant is wishful thinking.
teacher feedback is binary
    collecting data like recording lectures and submitting them for peer feedback can change the game

what are finland/Sinapore doing to do so well in education

private schools are illegal so rich parents are invested in public school quality. they have 5h days, almost no HW, long breaks. but we must understand it works in their cultural context only.

in singapore, they take a more tyrannical approach. there's one particular exam, in which students, if they don't perform, are sent to trade school—literally taught how to be baristas (mindblowing). their investment in education is much higher, so >40% of teachers have a degree in the related subject (in fact almost all, where US no. is 40%) because only top 30% of uni grads are even allowed to apply as a teacher. they've built a culture where it's as prestigious as being an investment banker or surgeon.

technology in education

how is society changing its demands on the education system

we use computers to read, writer, calculate, think, now. all the skills that operate underneath the hood are abstracted away, so we need more technology in education simply to mimic the real world, as well as a focus on more conceptual, abstract things that computers *can't* do. so education is providing a skillset different to that needed by an evolving society.

there is an uncoupling of schooling and learning. there's just too much to learn now that you can't simply add on more years to a school curriculum, and people are being forced to adopt a strategy of life-long learning to succeed.

and incorporation of technology is fundamentally incompatible with current classroom-based system, so you can't just add more technology like going 1 to n innovation. teachers aren't teaching kids to traverse fake news, tech would provide more distractions, more avenues for cheating and bullying is simply employed in a traditional classroom. as legislation seeks to standardise and narrows the curriculum to be able to do so, the scope of what needs to be learned is, commensurately, widening.

the technophilic argument
schools are 1) supposed to mimic the real world, which is now relying on computation everywhere, and therefore educations should too. in the real world, computation is changing the way we think (analogous to how industrial revolution amplified our physical capabilities) and communicate (affinity spaces over geographic communities, which presents its own set of challenges)

and computation itself can improve traditional educational outcomes:

context of applying knowledge: games/simulations are powerful tools—learn infectious disease and history by investigating the source of infection in a virtual village, learn to write by doing a fake political campaign and comparing how many people in the simulated country vote for you compared to your peers. instead of teaching arithmetic by doing "james has 42 watermelons" actually have kids set up a bank and compete to see who can make the most money, involving risk/loan calculations.

personalisation: literature says this is good—it's what we do for special needs kids, and now we can scale it!

interactivity gives feedback in real time, as opposed to tests where you almost never learn about your mistakes until it's too late.

teach kids how to traverse the world's information, by teaching them to work with and create websites, vlogs, web forums and more. instead of teaching them phases of the moon, adding fractions or date of the US civil war (all of which they forget after they leave school), teach them to learn.

the technophobic argument

schools are complex adaptive system that had to make changes at scale over time. for example, graded classrooms, tests, mandatory attendance, textbooks, and everything common in our current system is an adaptation to make classroom-based learning work better when it was first created in New England in the 19th century. as such, every time you make a new change, the system becomes more complex, and has more moving parts, and so it becomes harder to make an *additional* change, since there are now additional things that would affect. it has thus become rigid.

so introducing more tech to lessons in a 1 to n manner won't work. for example if you do, longer lessons are needed (set up time of tech), and thus there are fewer lessons, and thus we must rethink the curriculum. there are further deep incompatibilities between tech and the current system:

learning by reading vs learning by doing
memorising vs applying
teacher vs learner control
teachers as experts vs diverse knowledge sources

overall, just in case learning vs just in time learning cannot co-exist in a single school system.

it's also natural for teachers to be critical about technologies, even if the tech is going to empower them and not replace them. they have invested years in adapting and learning the rope of the existing infrastructure, so a major revamp will have them re-learn everything they've been taught. and sometimes skeptics are right—TV and film didn't revolutionise education like the technocrats predicted it might. and when computers make learning the nitty-gritty low level content unimportant, teachers double down on it:

quote from past—"students increasingly rely too much on pen/ink and it is a sad comment on education to see that most students can't use a knife to sharpen a pencil properly."

all of this hints that simply adding more technology to the current classroom-based system will not work.

establishment of universal schools & the first educational revolution

if we want to design a new system, we're going to have to build it from the ground up. has this ever been done before—a complete revamp of education? yes, so we have precedent.

apprenticeship era—> printing press made reading/writing crucial—> protestant reformation democratises religion—> religious states like MA shift the responsibility to religious education onto state now that everyone needs to study bible—> american revolution turns US into a republic,

where not citizens need to be educated to guide policy decisions—> industrial revolution is main catalyst where we have mass migration into cities, more educated population needed to operate machines, and parents working in factories all day need somewhere to put their kids. since you already have a school system in MA working to solve all three of these issues, they simply scaled it, led by reformers like Horace Mann.

what are the analogous pressures forcing a new revolution today?

too much knowledge to simply add years to schooling
diversity of learner backgrounds (globalisation) means textbooks work less well
increased private spending on education
"adultification" of youth increases in-person bullying & children hating school

what can technology do to improve schooling

1) improve learning in the conventional sense. Khan Academy allows customisation, Pinterest allows teachers to get feedback on teaching plans, MOOCs allow access to content not usually taught in high schools.

2) transform education to centre it around production of content and affinity spaces, with Wikipedia, YouTube, etc., all playing an important role. EG if a kid likes dinosaurs, right now they have not outlet to explore that interest, even though doing so might teach them important lessons about history, geography, science, in the process. in the future, if a kid likes dinosaurs, they can choose to learn about that in class, read articles online about dinosaurs, make youtube videos and animations about their extinction, code a website teaching other kids about dinosaurs. this teaches him not only the science/history we'd teach him in a conventional class, but teaches him how to explain things to others, how to get feedback/criticism from a community, how to market his ideas and sell himself.

ultimately, the pros of using technology are the project based learning teaches kids how to learn, how to apply knowledge, and makes things fun since you have autonomy over what you're learning. also, creating a market for edu-products encourages competition and therefore increases the quality of products.

cons are that it might take away the intensity of social interaction found in schools, could increase inequity (but could also decrease it), and could cluster like-minded people together by being more focused on affinity spaces.

the three eras of education

these are going to be the fundamental changes made as we go from the 2nd to 3rd era:

ages: surrounded by adults (who teach you) to peers to mixed ages
responsibility: parents to state to individuals/parents
expectations: turn out same as parents to education as a great equaliser to individual choice of destiny
curriculum: practical skills to fixed body of knowledge to learning how to learn
pedagogy: apprenticeship to didacticism to interactivity
assessment: observation to testing to embedded and *coupled to learning*
location: home to school to anywhere
relationships: personal bonds to authority figures to computers guided by teachers

policy action and cultural value shifts needed

replace standardised tests with a certification program where 1) kids choose to take it when ready and 2) it tests skills like algebra, not math, and creative writing, not english and 3) it's on a computer where the questions asked are shifted in real time

project-based learning out of a list of possible projects for that grade: for youth, they might play a civilisation game specifically made to educate kids, where they learn about history, geography,

strategy, economics while trying to expand their empire as the Romans. or similarly the dinosaur analogy teaching them science. for older kids, you might have them write a short novella to teach them english, or start a local business to teach them economics and entrepreneurship, or even act out Aristotle's life to discuss philosophy and learn drama.

there has to be a bunch of changes in how both parents and we as a society view technology for this to be effective, though. tech is inherently seen as bad and wasteful—any time I spend on my computer is seen as wasted time by my parents. we're told to read to expand our vocabulary, when research shows the same time spent watching videos is equally good. we've fallen into this rut believing that if it's fun, it's not productive.

we have to be okay understanding that school is not the only place people go to learn, and in giving students more autonomy over *what* they choose to learn. curriculum will have to be rethought, eg. math needs to be more abstract and conceptual and not as algorithmic since computers can do all the algorithms anyways.

and there needs to be a fundamental shift in how policy is devised. 1) needs to be context aware and so devised on the level of a district/state and not federal and 2) needs to be made by teachers who are intimately aware of technology, so ideally also programmers/engineers. on that note, the technocrats need to stop being missionaries thinking they're coming with their magical gifts, and instead need to think of how they can use their innovation to meet social needs in a scalable way.

I differ in my opinion that 1) technology is compatible with the current education system, we just need more of it 2) edtech companies are going to solve education 2) policy change, the way it's being done today, will solve education.