Online learning and teaching: Digital Culture or Clutter? (Integral Version)

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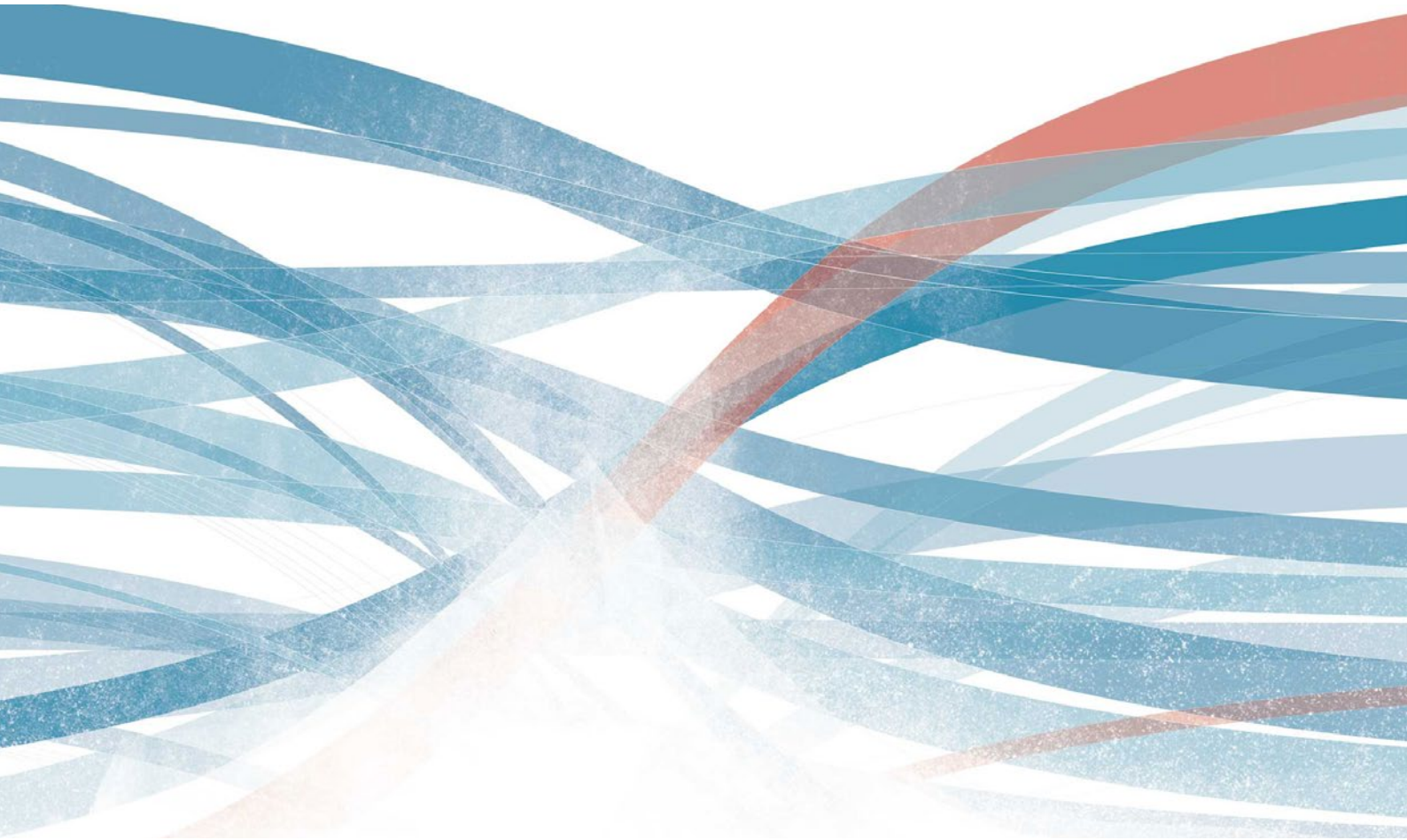

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Online learning and teaching: Digital Culture or Clutter? (Integral Version)

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Online, network- and computer-mediated learning and teaching are here to stay. While technology-rooted platforms in the education field have had their ups and downs, this time the shift towards- and entrenchment of- technology in education seems permanent. In 1967, Professor Seymour Papert and his team created Logo, a special programming language designed for children, and demonstrated that widespread literacy can and should start at a very early age. Professor Sugata Mitra's illustrious "Hole in the Wall" experiment, in 1999, raised great hopes for what he called "Minimally Invasive Education". Mere access to computers and connectivity fostered exploration and discovery, even without teacher mediation. The introduction of simple unsupervised networked computers was reported to bring about improvements in enrolment, attendance and performance, English vocabulary and usage; concentration, attention span and problem-solving skills; and working cooperatively and self-regulation. In 2005, Professor Nicholas Negroponte led the global effort to equip underprivileged children with computers, worldwide. Titled "One Laptop per Child", this initiative was just one global manifestation of the excitement regarding the educational and learning potentials of networks and computers. In the first two decades of the twenty-first century, and especially during the pandemic of 2020, technology has become both a mainstay and main feature of learning systems.

Here, I would like to examine the main implications of this sea-change. I will argue that the transition is irreversible, and I will attempt to outline boundaries and issues deserving of our attention.

Technology and education have an ongoing approach-avoidance relationship. In contrast to the triumphant, hopeful views from Papert, Mitra and Negroponte and those like them, others, like Nicholas Carr, dared to ask "Is Google Making us Stoopid" (the misspelling is mockingly intentional), hinting that the fascination with gadgets may be more childlike than mature, and that the flashy promise of technology may be no more than a misleading flash in the pan.

On the one hand, teaching and learning have always been very personal and unmediated. Warm, face-to-face parental guidance has long been recognized as the linchpin of cultivating values and knowledge in the next generation. As a result, the suggestion that technology can do all or even part of the job was often met with some concern or even suspicion. Technology is perceived by some to be cold, impersonal, mechanical. Or at least it used to be viewed as such.

Furthermore, education is the business of the more experienced transmitting what they learned from earlier generations to the newest generation. Thus, education might be placed in a conservative role by definition. As cautious, conventional and traditional forces by design, educational establishments and leading figures have not always welcomed innovations, at times even perceiving or painting them as "Barbarians at the gate" rather than partners in a shared quest aimed at supporting and shaping the next generation. The

rejection of technologies by authorities or “powers that be” may have been intensified because computerized technology was perceived to be the domain of the young, sometimes called “Digital Natives”. The matter may have been fuelled by “Digital Immigrants” expressing their concern regarding tools they do not understand and an unwelcome and burdensome retooling required of them by the introduction of these new tools.

Cautious and critical attitudes toward the introduction of new technologies are not only Luddite-like reflexive, knee-jerk reactions to innovation. Often, the critiques of technology are justified. The tried and true is often indeed both tried and true. Not all shiny innovations should be embraced. My position takes into account the long and occasionally painful history of technological promises made for education, as well as the very active and vocal stakeholders. Historical reports of technological fixes and leaps forward are abundant. In too many cases, the technological wonders of one day resulted in frustration and unfulfilled promises in the next. We should remember the assurances of radio-delivered distance education, followed by similar expectations generated by television, satellite and CAI (Computer Aided Instruction). Some very important contributions resulted from the incorporation of these innovations. Overall, however, the rosy picture painted by their advocates was never fully realized.

On the other hand, some medium and process related advances, i.e. “new technologies” of their respective times, have been revolutionary in their impact. For instance, the invention, dissemination and adoption of the printed book and the widespread establishment of compulsory primary education are two widely recognized leaps forward that can be attributed, at least in part, to innovation-based improvements.

On the other side of the same equation, we should remember that much of our perception of the meeting point between education and technology has been constructed by an unrelenting public relations and advertising effort on the part of corporate hardware and software producers. The critical response to these persuasive messages has had less funding and a weaker pulpit to preach from. The discourse surrounding technological restructuring of modes of learning and teaching can become acrimonious, where critics accuse supporters of everything from naiveté to greed. Below, I will attempt to go beyond these historical precedents and the opacity they create for the core issue.

I will suggest that we should ask some deep questions of ourselves and of the technologies that have become so ubiquitous. We are handing over the most precious of our assets into the new hands of a set of practices with which we have relatively little accumulated experience. Do evidence or logic support going in this direction?

Technological Determinism or Technological Imperative?

Are we driven by technology, or do we have control? Should we allow technological developments a place at the steering wheel, or should we insist on setting the course, keeping technology in the place and status of tools?

The question of technological determinism and/or imperative is ages old. Does the ability to do something mean that we will do it? A seemingly nobler position is that which keeps mechanical innovations at bay, insisting on human, conscious and conscientious control. 'Tis

nobler to say (and even believe) that humans will and always should outperform and count more than machines. Technological determinism, in this view, is a nightmare to be resisted. Proponents of innovation, on the other hand, are repeatedly surprised to see the rejection of improvements just because they are new. So, which is it? Technological determinism, in the negative sense of the words, or technological imperative, optimistically speaking?

These questions exist in all fields. Should the very availability of certain drugs mandate their use? Genetically-modified food sources? Can and should we pull back on the use of particular sources of energy, despite their efficiency and economy? Similar questions are raised with regards to the deployment of weapons, choice of marketing tactics, administration of policing, etc.

The educational field is host to similar debates. Some hold the "purist", ideological position that views technology with suspicion. Subscribers to this position insist on placing education squarely in the remit of human responsibility, equate technology with lack of warmth, and regard innovation as unnecessary. It is a fact that innovations in the educational field have often been greeted with fanfare and high expectations, only to prove only partially up to the task. High expectations clashed with less than satisfying results. Dissemination and adoption were often slower than predicted, and results disappointed. Television, radio, and satellite delivery are glaring examples of technologies introduced with high expectations, only to be hindered by slow uptake.

Change is hard. Even more so in the field of education, composed as it is of multiple generational layers and of complex expertise, bureaucracies, and often conflicting values, interests and expectations. New technology requires change. Its introduction is therefore often met with scepticism, opposition and pushback.

We should examine the changes afoot because change does not go down easily, specifically for all the reasons that education is such a touchy “hot button” issue involving as it does budgetary, political, honor-related and emotional aspects. This is what I plan to do below. How will the inevitable wholesale introduction of computers and networks into the educational ecosystem pan out. Change is coming, but what will change?

The illustrious prophet of technological determinism, Marshall McLuhan, famously quipped that “The Medium is the Message”. So, what is the message of these new media?

I will propose further on that the changes visited upon us by the new technology can be summarized under the following headings: **Distance, Center and Time; Privacy; Discourse; Memory; Print and Codex; Classrooms; Truth and Choice; The Promise**.

**McLuhan

Distance, Center and Time

Some of the earliest hopes regarding the effects of networked computer technology was their service as bridges of distance. “The Death of Distance” was an oft-repeated observation. Books and articles made this observation with regard to amplification devices from telegraph to radio, and from television to satellites. Indeed, in regions where geographical spread was a special challenge, such as in rural or sparsely-populated Australia or Canada, as well as in sections of the Middle East and India, technology served as an

efficient conduit for information and knowledge. Often, early optimism was followed by disappointing results. Hopes proved to be higher than realized gains. Education did not really leap forward. On the other hand, content and expertise, guidance and even human contact from afar were enabled to a degree never experienced before.

The arrival of digital networks accelerated this process and overcame much of the criticism and resistance to earlier technologies. Now, with computers and networks, much more could be done from afar. Telemedicine and tele-therapy, tele-policing and even tele-parenting became much more prevalent. As with all the changes enumerated here, we should now question: to what degree is location still the most determining factor? Does where you are still matter as much or more than how much you work or how talented you are? There are numerous indications that distance does indeed matter less as time goes on.

While we are on the matter of time, we should note how time itself has morphed. The tick of the clock and the date on the calendar were principal constructs in organizing our thinking about education. To this day, cartoons use images of the schedule to indicate schooling. The school bell, which regulates class hours, and the weekly and semesterly agendas govern students' life. All of this synchronicity is now challenged by learning, education and content served up 24/7. Computers and networks have accelerated if not introduced asynchronicity in all aspects of daily life. Ever since email began edging out the phone call, people (followed by educational practices) embraced opportunities to unhitch their own schedules from others'. The elasticity of synchronicity has arrived.

Asynchronicity is everywhere (and, of course, all the time). People listen to their ever-present earphones while doing what used to require undivided attention. Students and white-collar workers juggle multiple open windows on their computer screens. And many people carry or wear more than one digital device at a time, attending to their squeaks, squawks and notifications all at once.

Consequently, we developed a new take on multitasking. For generations the idea of multitasking was frowned upon. Children were encouraged to do one thing at a time. Thinking about more than one task was labelled "being scatter-brained". But with the new clarion calls of technology, we are witnessing a new thinking about multitasking. Now, doing different things simultaneously is becoming the norm. Not only do we appreciate virtuoso pianists, chess players or aircraft pilots who are able to do different things simultaneously, we are beginning to incorporate the education, or at least training, for multitasking into our general curricula.

While distance is shrinking or bridged over, and time is being re-construed, an even greater shift is visited upon the idea of center. Human communication used to be conducted and governed through central switches. This was true for family gatherings, townhall meetings and classrooms, which all operated by rules of order and a central authority endowed with the right and power to delegate participation and turns of speech. It was even truer for technologically-mediated communication: broadcast radio and television depended on centrally-allocated frequencies. The arrival of digital networks was enabled by the invention of packet switching, a technology that circumvents centers. Modern networks are rooted in a design concept that dodges centers. The technology was designed to sidestep loci of control. It does so successfully, resulting in a new reality of communication: enforcing censorship is much less viable. Pornography, state secrets, and even national currency are much less controllable. There simply is no longer a viable and enforceable center. Limited,

too, are the potential oversight options of educators. Central accreditation and curricular standards, as well as parental and institutional authorities in learning and mentoring might be equally challenged. As networks of content and contact, from social networks to repositories of text, lectures, music and ideas spread out and grow away from central control, the notions of teaching and leading can no longer rely as heavily as they have on central control.

Thus, the most tangible impacts of digitization and networking fall upon the structural notions of distance, time and center. These changes cannot help but restructure the location, timing and management of how we learn and teach. Some of the effects are immediately obvious: these include the emergence of distance education (for the death of distance), life-long-learning (as a re-imagining of time), and extra-curricular curricula (the expression of the crumbling of central control). And the changes have only begun. Because of the role once taken by topology, chronology and center, and subsequent to the erosion of these, we are to expect even further redesigning of education.

Privacy

The technology of computers and networks is omnipresent. A seeing lens and listening device everywhere. Digitization makes it easier to record the signals of activity. Preservation of these records is becoming the norm. Skills for analyzing and gaining insights based on these big data are improving. The benefits of collecting surveillance data about individuals and processes are evident to all. And the expectations that organizations, governments, and corporations actually collect, store and analyze these data are growing too. At all levels, we can spy, therefore we do.

Public backlash and indignation regarding the encroachment of technology on privacy is one of the most prevalent signs of the times. Privacy has become a major concern. Collecting data about people, their locations and inclinations, preferences and abilities has grown into a major area of technological development, and dealing in personal data, by selling or extracting value otherwise is a big business.

The field of education is in the fray too. As computers and networks become ever more present in learning environments and processes, more uses for surveillance emerge. Testing and assessment have always been domains in which data were gathered about individuals. Increasingly, the processes of learning are being tracked and recorded.

Where does all this lead? Which of the two visions of the future would you bet on? Given the ability and the utility of personal surveillance, would you expect the future to have more or less privacy in education? And given the ever-evolving affordances of technology in tracking the location, attention, concentration, retention and comprehension of the individual, can we even expect technology to be less obtrusive as time goes by?

Most pundits believe that privacy will continue to erode. Legislative and regulatory efforts notwithstanding, people in general and students or employees in particular will be under more surveillance as time goes by.

This fact creates two challenges for educational policy and decision-makers. On the one hand, there is increased vigilance and involvement in the regulatory and legislative processes regarding privacy. We should all worry more and follow more closely the privacy implications of gradebooks, attendance sheets, evaluation forms, security devices and other data collections that take place on the grounds of being performed for the sake of educational projects. On the other hand, and perhaps more poignantly, we should also take more care to avoid losses and costs associated with exaggerated vigilance regarding privacy. Not only is privacy a very subjective construct, it is also one that is changing rapidly and probably receding because of technological advancements beyond our control. It is also true and quite important to note that the safeguards for privacy sometimes get in the way of other goals and values.

Discourse and Conversation

The way we talk is transforming like never before. Language is evolving quickly. Digital tools are giving birth to new forms of expression, while wrapping them in new forms of encapsulation and delivery. With the digital systems engulfing us and our students, we learn differently, and we also connect differently. Social networks provide new and different ways in which to become part of communities, and communicate.

Emojis have evolved from emoticons and are rapidly taking over interpersonal communication. So have forms of communication that would have seemed utterly baffling only a short time ago -- “Likes” and “Shares”, comments and upvotes have made their way into the main flow of interpersonal as well as public discourse.

Greater portions of our communication with family, friends, co-workers and others are taking place online. We use social networks and instant messaging for mundane tasks, as well as for the most intimate of conversations. In some contexts, our utterances have become shorter and terser. In others, we communicate more frequently and in greater depth than ever before.

Computerized translation capabilities are quickly reshaping the potential radius of exchanges. With language barriers being removed, the world is becoming more of a small village, while local linguistic-bound culture may face new challenges. With computers improving at NLP (natural language processing), the technologies of text-to-speech and speech-to-text are developing new learning potentials at an unprecedented rate.

Furthermore, the size and composition of audiences we contact and hear from has increased immensely. Dunbar’s number, an anthropological measure of how many friends individuals tend to have, has changed due to the manners in which communication technology and practices have changed.

Even the norms of communication are affected by technology. With more of our conversations taking place online, structural boundaries of communication are changing too. Turn-taking used to be a major part of polite manners. Online group chat has changed this. Group deliberation can and does take place without one needing to wait their turn. This relates to the elasticity of synchronicity described earlier, but also the more general formation of new ways to converse.

As learning and education are rooted in communication, the emergence of new channels and modes to express oneself, talk, listen and understand cannot help but impact how people teach and learn.

Books and Codex

For many generations, since Guttenberg's moveable type, printed books, bound sheafs of paper bearing signs and symbols, have served as icons of being learned. "Bookish" types were the term we used for nerds.

The printed book is still widely cherished and held in high regard. Libraries are central to many if not most institutions of learning. Yet the printed book, the codex, is rapidly receding in importance, as alternative modes of encapsulating knowledge are proving more efficient, more popular, more useful. The printed book is not as accessible, portable or searchable as its digital replacements. Reference materials, such as encyclopaedias, atlases and dictionaries were the first to go. But textbooks are following quickly in their footsteps.

Books will probably remain a symbolic and perhaps emotional artifact at the center of attention for a generation or two yeat. Moveable type edged-out the scroll and the scriptoria, relegating them to museums and collector-item status. In much the same way, and probably much faster, printed books will become more of a sweet memory than a salient presence.

The emergence of printed books caused an earthquake in the fields of knowledge and learning. Print is credited with making reading and writing accessible to the masses, causing geopolitical transformations in the power and status of the church, and in helping science emerge. The five centuries since Gutenberg have been impacted heavily by the technology of print. In all likelihood, the new technologies of digital publication, audio books, reading and writing on screens and the like will have a similar impact.

Education and learning will have to address the new reality of content no longer encased necessarily in bundles of several hundreds of pages. The transformation’s impactwill reach far beyond the publishing industry.

Memory

“Knowing”, in some learning contexts, boils down to remembering. Knowing some things by heart has always been part of learning. Whether it be the multiplication tables or portions of verse, dates in history, canonical formulae or the names of anatomical units - the ability to commit facts to memory has served well those who excel in it, and frustrated many others. Digital technology is poised to change this. As increasing portions of human knowledge are digitized, and as the technologies of search and retrieval improve in accuracy and speed, and access to search capabilities becomes ubiquitous, memory might be losing its luster. Knowing how to find something is becoming more important, perhaps at the expense of actually knowing that very something.

Clearly, the ability to evaluate information is still central to intelligence, and therefore remains a main goal of teaching and educating. Nevertheless, mastering the facts themselves will take second place to other skills. The ability to find trumps the ability to

memorize. In a world that doubles its knowledge every several months, the ability to store and retrieve in human memory is losing its importance. Education needs to shift its focus to other aspects of being learned.

While the mantle of memory is being passed from human to machine, from carbon to silicon, there is an even deeper, almost philosophical aspect to the shift in importance of memory. Some say that "The business of life is the acquisition of memories. In the end that's all there is." If our life and living and those of others are the accumulation of memories, and as technology makes it easier to encapsulate, copy and transmit memories in digital form over silicon rather than in chemical form on carbon, life itself is thus being reconceptualized. We should reflect on the rapidly approaching spectre of machines that contain the sum of memories of a single human. What if this sum can then be cloned? Proponents of the so called "Singularity" are even willing to place a fairly close date on this prediction. Whether they are right or guilty of exaggeration, the implications for how we teach and educate are enormous.

Choice

Education, some say, is about preparing for choices. Whatever it is we teach, we hope it will lead to making better choices in life. The processes of growing up and maturation are about assuming more responsibilities, taking more control and accumulating the experiences, knowledge and skill that are required in making choices. Learning, many of us believe, is one of the unique privileges and characteristics of being human.

We need to learn how to make choices, and we need to teach about choice. In an era of fake news, where truth itself is being challenged, choice is perhaps the most important competency or aptitude we should teach.

The trouble is that, of late, even learning itself has been usurped by technology. Learning, not just teaching, is a task increasingly performed by artificial devices. Machine Learning, and the artificial intelligence that it serves, is one of the fastest growing branches of technology. The accumulation of digitized information, known colloquially as "Big Data", has set the stage for the emergence of techniques that allow machines to synthesize records of past experience, deriving conclusions and enabling them to perform complex tasks. In other words, computers are no longer programmed just to perform. They are now programmed to learn.

Learning by computers, not just with them, has several implications. First, we should realize that our (human) students are no longer the only learners around. This could be humbling. In no small part because when sufficient, high-quality Big Data are available, machines learn faster, more reliably and just as deeply as humans. When machines learn, they generate automatically-created algorithms. In other words, to a certain degree, computers go beyond remembering and calculating. They can generalize. Algorithms are important, as they are incorporated in all walks of life.

Algorithms assume the agency and autonomy we usually associated with humans. If the original goal of education was to help students grow, allow them to take more responsibility and control, and to develop, what should we make of a situation where artificial devices are

no longer just tools. Devices that learn begin to compete with humans on a new level. They, too, are developing to be autonomous and have agency.

Consequently, education needs to teach algorithms and inculcate critical and moral thinking about them. As algorithms escalate in importance, the charge of education should amplify understanding of algorithms and encourage thoughtful inspection and analysis of their composition and role. As more of human choice is undertaken by automata, education needs to be ever more on the alert.

Classroom

Long before the Covid-19 pandemic, questions arose about the necessity, utility, and pedagogic justification of classrooms. Classrooms in the classical sense are envisioned as locations for groups of pupils seated in an orderly arrangement of chairs and tables. The teacher at the front of the classroom, to whom all eyes are directed, should be considered the center of attention and the fountain of knowledge. This is the so called “Sage on the Stage” model of education. This model of classrooms has been deployed for most age groups and in widespread locations. There have been economic and logistic reasons for the popularity of this mode of teaching and learning. The number of students supervised by a teacher, the efficiency, measurability and accountability afforded by the classroom management model, and the similarity of classrooms to other industrial and military forms of “command and control”, all supported the growth and spread of schools consisting of rooms that serve as a “home” for students and/or teachers. The trouble is that classrooms were rarely a truly warm and nourishing experience. Few are those who remember spending many long hours in a passive, seated position as an enriching experience. Learning as part of a class of two or three dozen students was often found to be neither cognitively nor orthopedically optimal.

Alternatives to the “Sage on the Stage” model abound. Self-paced individual study, learning from a “Guide on the Side” (rather than Sage on the Stage), in the Socratean mode, from individual tutors, in small groups, home schooling and many other options have been proposed. When circumstances, regulation and budgetary constraints allowed, some of these alternatives have been tried.

Computers and networks at the heart of educational systems propound another option. The classroom can be flipped. Instead of structuring the learning experience around the physical classroom, where lectures are given by the teacher (Sage on the Stage), followed by assignments and homework done, so to speak, at home, the flipped classroom mode makes use of the affordances of technology. It is now easy and affordable to record lectures, and even easier to make these lectures available online - anywhere and anytime, 24/7. At least in theory, technology now makes it possible to record the single best teacher or lecturer for any topic. Duplication of that lecture is a matter of two or three keystrokes. The recipient or target of the lecture is given control over pace, as well as the options of pausing, fast forwarding or skipping through the material. All of these are activities that do not require a classroom, and, in fact might be better done at home or in locations of the learner’s choice. The physical facilities and schedules of the school can then be better used for supervised, mentored work, and for social activities as well as project-based and team assignments. The method is called flipped because, in addition to the logistical advantages it presents, it flips

around the nature of work at home and at school. What used to be homework is now schoolwork, and vice-versa.

The third decade of the twenty first century began with a worldwide pandemic. In many corners of the world, Covid-19 sent students and entire institutions away from their campuses, and disbanded classrooms as we knew them. So even without the pedagogical observations and insights proposed by flipped classroom enthusiasts and proponents, many locked-down and quarantined students quickly learned about flipped and hybrid classrooms and learning mechanisms.

Longer term, and even beyond pandemic-related experiences, the accumulation of online, recorded instruction in all areas of knowledge and teaching has by now amassed corpora rivalling the oeuvre of textbooks and syllabi offerings in traditional institutions. Many of these sources are in so called MOOC (Massive Open Online Course) form, or in shorter video and audio productions such as Khan Academy, TED talks, podcasts and vodcasts. They are poised to turn the tables on the traditional classroom, as often the production values poured into producing them are superior to those offered by the traditional, classic classroom.

There still are spectacular teachers. If and when you are lucky to experience one such instructor, you will remember them for life. But the average teacher is not as good as the spectacular star. While the online offering can strive to be better than average, those that succeed get duplicated. So there are economies of scale fuelling the process.

In education and teaching, the biggest task involves redefining the role and skills needed for teachers and mentors in this new era. Where should the teacher practice their craft, where is their contribution most expected and valued, when the podium or stage are no longer theirs?

The Promise

After all is said and done, we should recall the early enthusiasm regarding technology in general, and its contribution to well-being and education. Were the early promises fulfilled, or was it all a pipedream?

Most technologies are greeted in their early stages with hope and optimism. Gartner's so called "Hype Curve" documents the fact that enthusiasm for new technology is often followed by disillusionment and a fall from grace. Many useful technologies recover from the ebb and flow of burst bubbles of early excitement. Facing the new technologies, education practitioners as well as policymakers and other stakeholders should brace themselves for a rough ride. The rollercoaster of innovation is already dizzying, and will continue to accelerate. There will be an endless stream of new capabilities in creating, presenting, storing, and retrieving content and experiences. There will be innovations in assessment. And, most of all, what we want to teach will keep morphing. Clayton Christensen termed this "Disruptive Innovation". This disruption is now happening in education. Powered by computerized processes, taught from near or from afar over the net, online learning is breaking the boundaries of traditional, monolithic approaches.

Some of us, raised in the latter part of the twentieth century, were fortunate enough to experience the early rush of optimism relating to the promise of technology. It seemed, for a while at least, that computers and networks may solve many of humankind's problems.

Literacy was to become almost universal. Liberal ideas were spreading. The network would bring about more democracy, access to information and knowledge, and more. But was our view of the world too rosy?

We should now ask how much of that optimism was justified and what did we miss? Computers and networks have been harnessed to do some evil too. The changes enabled by technology, including those in the field of education, are double-edged swords. While there seem to be major advances, there are serious concerns as well.

I propose that each of the dimensions I have discussed here, from reconceptualizing distance, time, and center, to the end of books and classrooms as we knew them through the current status of memory and choice are all reshaping education and learning at an unprecedented pace. Education is being disrupted. Technological determinism is no longer a question, it is a fact. Our responsibility is to understand the directions pointed out by technology-based disruptions, and try to steer their adoption and implementation. While there may be attempts to slow the change and fight back to preserve matters as we have known them and grown to feel comfortable with them, change is afoot. The transformations visited upon education and learning are huge. We need to assume control of the changes, and work towards fulfilment of the promises through a deep understanding of their elements.