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Educação e Tecnologia *Education and Technology* **abordagens críticas** *critical approaches*

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Education and Technology: critical questions

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The use of digital technology is a central component of most forms of contemporary education provision and practice. Crucially, educational technology is now a multi billion dollar business – involving global technology corporations in local educational provision and practice. The need for critical questions to be asked of education and technology is more pressing than ever. This chapter lays out some fundamental questions that need to be voiced in the face of such advances. In particular, it reconsiders seven critical challenges raised by the media critic Neil Postman. While Postman was concerned with the effect of computers and the internet on schools in the 1990s, much of what he argued for could be seen as having continued relevance to our current era of smartphones, big data and cloud computing. The chapter outlines the implications of these lines of critical questioning for making sense of the current state of education and technology. These are discussed in terms of: central topics of concern; key actors and interests; methods of inquiry; and likely outcomes of asking critical questions of education and technology.

Keywords: Technology; Education; Digital; Media; Critical; Neil Postman.

I. Introduction

Contemporary society is run increasingly along digital lines. In many parts of the world, people lead lives that are conditioned by an array of digital systems, digital devices and digital practices. The everyday ‘affordances’ of digital technology are well rehearsed and accepted – from the ways that we encounter and consume information; communicate and interact with others; and generally go about our daily routines. The increased presence of digital technology in everyday life is therefore seen to be breaking down traditional boundaries between place / space; production / consumption; single / simultaneous acts; synchronous / asynchronous time; individuals / institutions. These changes are usually imagined in positive terms – with digital technologies seen to be capable of overcoming barriers, facilitating new ways of participating and engaging with the world, and fundamentally challenging notions of authority, authenticity and expertise.

Digital technology has clearly impacted on many areas of society. For example, social media are described as altering the basis of political and civic society – having a profound influence on how national elections are run in many countries, as well as sustaining the rise of political insurgency and fundamentalism in others. At the same time, it would seem that corporations located in Silicon Valley are becoming the defining economic powerhouses of the post-industrial era. Elsewhere, leisure and entertainment industries have been substantially rearranged and restructured over the past decade – with broadcast media, newspapers, music and book publishing all struggling to retain their relevance in a world where free and open access to creative ‘content’ is seen to be an inalienable right.

The particular question that will involve this chapter is how education fits with these digital re-calibrations of society. Just how should we be making sense of educational change in these

technological times? What are the educational implications of ongoing technological developments in machine learning, automation, algorithmic decision-making and so on? How should we now conceptualize what were previously stable categories of being a 'student' or 'teacher', a 'school' or 'university'? What are we to make of the rapid commercialization of technology-based education as a multi-billion dollar business? What implications does digital have for the core processes of education such as learning, knowledge building, teaching and pedagogy?

As the scope of these questions implies, it is high time for us to be engaging in appropriately complex discussions of technology and educational change. Digital technologies are increasingly defining most forms of contemporary education. We already live in an age where schools, universities, libraries and museums are awash with digital devices, platforms and applications, so it is impossible to imagine the future of education without computerized technologies at the centre. As such, we need to develop accounts of education and 'the digital' that are as rounded and realistic as possible. This not an area of discussion where is there one obvious way forward, a clear consensus or an unequivocal truth. Instead, the topic of education and technology requires a great deal of debate and dissection, scrutiny and contestation.

II. The need to problematize Education and Technology

Unfortunately, much of the recent discussion around education and technology has been woefully underpowered. Academic research into education and technology is frustratingly weak, with most 'evidence' about the benefits and/or risks of technology use lacking in generalizability and rigour. Popular and professional discussions about education and technology still tend to be hopelessly optimistic or dystopian. Objective discussions are often

undermined by the understandable desire of educators to improve education by any means possible. The imperative of “reforming education for an age of technological and demographic change” (INSTITUTE OF DIRECTORS, 2016, p.8) is repeated *ad infinitum* by policy-makers and industrialists, with little thought for exactly *why* this should be, or precisely *what* this might entail.

For many people, then, the only questions that tend to be asked seriously of education and technology are those related to ‘what works?’ or most often ‘what *might* work?’. Yet, conceptualizing contemporary education along these narrow lines is clearly *not* good enough. Making sense of technology in education is not simply a matter of working through issues of ‘effectiveness’ or ‘best practice’. Clearly, we need to challenge all of the dominant assumptions in this area – if only to be better informed on what exactly might be beneficial aspects of technology (and, it follows, what might not be).

In this spirit, there is a need for writing, research and debate that approaches the use of technology in education as problematic. This is not to assume that technology is a problem, but does acknowledge the need to ask serious questions of technology use in education. This involves the production of detailed and contextually-rich analyses; engaging in objective evaluation; and taking time to investigate any situation in terms of its positives, negatives *and* all areas in-between. This also involves being inherently sceptical, yet resisting the urge to descend into outright cynicism. Adapting the distinction made by Michel Foucault, this involves seeing the application of technology in education as ‘dangerous’ rather than ‘bad’, while remembering that any critique always needs to result in action rather than inertia:

My point is not that everything is bad, but that everything is dangerous, which is not exactly the same as bad. If everything is dangerous, then we always have something to do. So my position leads not to apathy but

to a hyper- and pessimistic activism. (FOUCAULT, 1982 as cited in ROUSE, 2005, p.115).

Any discussions, therefore, need to recognize the inherently political nature of education and technology. Seen in this light, then, many of the most important questions that surround education in the digital age are the fundamentally political concerns that should always be raised around education and society – i.e. questions of what education *is*, and questions of what education should *be*. Developing a fuller sense of how and why digital technologies are being used in educational settings in the ways that they are, therefore, demands recognition of issues of power, control, conflict and resistance. Put bluntly, any account of technology use in education needs to be framed in explicit terms of societal conflict over the distribution of power.

III. Developing critical questions

Underpinning all these concerns is the need to develop robust, rigorous and far-reaching questions. In short, our critical understandings of education and technology will only ever be as good as the questions that we ask. So what form might these questions take? Here, there is perhaps no better place to start than the seven questions that media critic Neil Postman (1997) was keen to suggest should be asked of any new technology in education, i.e.:

1. What is the problem to which a technology claims to be a solution?
2. Whose problem is it?
3. What new problems will created by solving the old one?
4. Which people and what institutions will be most harmed by this new technology?

5. What changes in language are being promoted by these new technologies?
6. What shifts in economic and political power are likely to result from this new technology?
7. What alternative uses might be made of the technology?

Unfortunately, Neil Postman died in 2004, denying him of the opportunity to apply his thinking to the Ed-Tech boom of the 2010s. Yet, while Postman was concerned with the effect of computers and the internet on schools in the 1990s, these questions can be seen as having continued relevance to our current era of smartphones, big data and cloud computing. Indeed, these questions point to a perennial range of issues, ideas and approaches that should be taken forward into any contemporary discussion of education and technology. For example, these questions highlight the uncertain and contestable nature of technology change, as well as suggesting that technologies are not neutral, but promote certain values, interests and agendas over others. These are questions that alert us to the interaction between technology and society, economics, politics and culture. These questions also highlight the likelihood that any intended outcomes of technology use will be accompanied by unintended consequences of technology use. Perhaps the most important areas of critique that these questions invoke are that of use and usefulness. Why do we actually need digital technology use in education? How exactly are digital technologies impacting and changing education? Is this even a sensible way to think about the relationship between education and digital technology?

These are all deliberately complicated and confusing ways of approaching a topic that tends to be considered in oversimplified terms. As such, it is perhaps useful to reflect in a little more detail what is being asked in each of Postman's questions ...

a. What is the problem to which a technology claims to be a solution?

This question alerts us to one of the fundamental (but usually unspoken) tenets of technology use in education – i.e. educational technology as an essentially ‘positive project’. This alludes to the underlying belief that digital technologies are – in some way – capable of improving education. As Donald Ely (1999) observed, educational technologists have long positioned themselves as ‘change agents’ of some sort who are dissatisfied with the *status quo* and whose work is, therefore, driven primarily by improving systems and fixing problems. This mindset is evident, for example, in the tendency throughout the 2000s to refer to ‘*Technology Enhanced Learning*’ or during the 1980s and 1990s to ‘*Computer Assisted Learning*’ – descriptions that leave little doubt over the inherent connection between technology and the improvement of learning and teaching. As such, the *de facto* role of the educational technologist is usually presumed to be one of finding ways to make these technology-based improvements happen and – to coin a phrase often used in the field – ‘harness the power of technology’.

Postman encourages us to challenge and question these assumptions. Why exactly are specific technologies being used in education? What are the problems that are claimed to be addressed? To what extent are these issues necessarily ‘solvable’? If so, are these technical issues that can be addressed through technical means? Asking pointed questions like these invariably results in difficult and awkward answers. For example, there might be *no* specific reason or rationale for implementations of technology. Sometimes it is presumed that technologies should be used in education simply because they can be, or that the technology exists. This is referred to as technology being introduced into education as a ‘solution in search of a problem’. Otherwise, technology is often implemented in education through a misplaced and unrealistic sense of what Evgeny Morozov (2013) has termed

‘solutionism’ – i.e. the hope that new technologies will solve deep-rooted problems and limitations of education “better than previous efforts’ (FERSTER, 2014, p. xii). Either way, interrogating these basic assumptions often goes a long way toward explaining the mixed impacts that technologies are often found to have on education outcomes.

b. Whose problem is it?

Postman’s second question alerts us to the competing agendas and vested interests at play within the push for increased technology use in education. Posing this question therefore offers a powerful basis from which to problematize education and technology as ideology. This recognizes that digital technologies in education are not neutral but are carriers for assumptions and ideas about the future of society. In other words, the design, promotion and use of technology in education are sites in which struggles over power are conducted. In particular, this question begins to disentangle the many influential interest groups who push particular ideas and assumptions about technology use in education. These groups include:

- a. Commercial producers of hardware and software, IT vendors and other IT industry actors;
- b. Politicians, policy-makers, government officials and bureaucrats working in the area of education administration;
- c. IT consultants, authors and enthusiastic practitioners who have positioned themselves as ‘experts’;
- d. Academic researchers, educational technologists and learning scientists;
- e. Employers and industrialists looking to reform education systems around business interests;

- f. Progressive educators and activists looking for alternatives to mainstream school and university systems.

All these groups might be well-intentioned, but they are clearly motivated by advancing their own interests and agendas. Thus debates around the pros and cons of technology in education are not simply debates over the technical capacities of digital technology. Instead, these are ideological and ethical debates concerning what education should be about, and whose interests education should serve.

Thus questions need to be asked of how all of the groups just outlined work to frame the imperatives of technology in education in distinctly different ways. Perhaps most obviously, digital technologies are often presented as fitting neatly with a number of values and interests relating to the nature and organization of learning. In this sense, many people's faith in educational technology is underpinned by a dominant set of values stemming from progressive education ideals and/or social constructivist and socio-cultural models of learning – all of which privilege learner-centred and learner-driven forms of education. Alternatively, there is the promotion of educational technology in terms of promises of enhanced organizational effectiveness and efficiency. These include the idea of technology contributing to the efficient logistics of educational provision; the idea of technology contributing to the profitability and commoditization of education; and/or the idea of technology contributing to countries' economic competitiveness and efficiency of labour and knowledge production. Alongside these agendas, a strong strain of anti-establishment, counter-cultural thinking also underpins some support for digital technology as a means of re-organizing educational provision and practice. Elsewhere, libertarian accounts of technology and education tend to frame technology as a means of individualizing educational engagement and therefore interrupting the monopolistic control of education institutions and the state.

c. What new problems will be created by solving the old one?

Postman's third question acknowledges that neither technological change *nor* educational change is a matter of straightforward improvement. Technological change is complex and very few aspects of education are as straightforward as the benefits that were outlined earlier might suggest. Any technological 'solution' in education is almost always accompanied by a number of unintended consequences, secondary effects and longer-term shifts. As Postman was fond of arguing, the most important discussions that need to take place about digital education often are not concerned with what technology will do but concerned with what technology will undo.

This perspective implies that any instance of technology in education must be seen in terms of limits and constraints that it imposes as well as opportunities that it may offer. Even what may appear to be the most 'transformatory' technology can end up limiting the choices and opportunities Available at to some people and under some circumstances. In particular, acknowledging that technology is connected with pre-existing organized structures of human activity can help us develop more detailed understandings of why technologies are used (and not used) in education in the ways that they are. It is therefore important to acknowledge that technologies do not always change things in education for the better. Technologies do not always allow people to work more efficiently, or support people in doing what they want. Instead, technologies can often have unexpected and unintended consequences, often linked to other issues far beyond immediate concerns of teaching and learning. By questioning the logic of new problems for old, critics can point to the many gaps between the 'clean' rhetoric and 'messy' realities of technology use in education.

d. Which people and what institutions will be most harmed by this new technology?

This question extends the idea that technologies do not result only in positive outcomes. Postman's suggestion of technology 'harming' individuals and groups points to the inequalities and disadvantages that often arise from the increased role of technology. Moreover, these question points to the need to look beyond technology, and toward the social contexts of technology use – in particular, the individuals and institutions that constitute 'education'. In the first instance, then, Postman reminds us to see education and technology as human experience. In these times of exciting and ceaseless technological development, it can be easy to forget that digital technology use is something that is as human as it is technical. Yet when we talk about digital technology we are often referring to the activities and practices that people conduct in tandem with technology, rather than the technologies themselves. This highlights the need to focus on people's feelings and emotions, their (dis)pleasures and (in)sensitivities when encountering digital technologies during the course of their everyday lives. In the context of a school, for example, students, teachers, administrators, leaders and parents are not simply neutral variables in any instance of technology use. Instead, technology is clearly something experienced within distinct human contexts and with distinct human consequences. Any investigation of technology and education is therefore an investigation of the human experience of digital technology use – i.e. people's everyday practices and perceptions.

This question also highlights the need to problematize the social structures and contexts of technology use. Take, for example, the organizational structures of schools and universities – from the timetabling and scheduling to the enactment of various policies such as common core or standardized testing. Broader contextual influences relate to social class, race, ethnicity and gender; the

subtle (and not so subtle) ways that neighbourhood values, cultures and ideals clash with those of schools; the ethos and philosophies that institutions adopt (e.g. as 'sports school' or a 'Ivy League' college). All of these institutional issues will influence (and be influenced by) technology use.

e. What changes in language are being promoted by these new technologies?

Postman was careful to point to how technology alters the meanings of fundamental aspects of language – citing Socrates' fear of writing altering the meaning of 'intelligence' by downgrading the importance of memory (previously a crucial element of intelligence in an oral tradition). This fifth question therefore highlights the need to scrutinize the restricted modes of language that pervades descriptions of education and technology.

Indeed, very little of what is said with regards to technology use in education could be described as objective, accurate or appropriately nuanced. Instead, the language favoured within education to describe technological processes and practices tends to be value-laden. This is language that is often certain about what should be happening, thereby leaving little room for alternate outcomes. For example, a seemingly innocuous term such as 'learning technology' implies an unambiguous purpose for digital technology in education – i.e. as a tool that is deployed in the pursuit of learning. Consider the implications and inferences of other common terms such as 'virtual learning environment', 'Smart Board', 'intelligent tutoring system' and 'connected learning'. Such labels convey a clear sense of what will happen when these technologies are used in education. Certainly the possibility of technology *not* leading to learning and/or other educational gains is rarely a matter for consideration.

As such, Postman reminds us that language of education and technology needs to be made the focus of sustained controversy. For example, we need to challenge the ways in which dominant framing of education and technology tends to marginalize, ignore and/or deny the complicated and compounded inequalities of the digital age. Indeed, the ways that digital technology is talked about within educational circles certainly promote superficial, ephemeral and often banal aspects of the topic at the expense of any sustained engagement with its messy politics. This is also language that routinely normalizes matters of oppression, inequality and injustice. There is little – if any – acknowledgement of differences of class, race, gender, disability or other social ascription.

Similarly, we need to challenge the ways in which the language of education and technology avoids proper discussion of the political economy of digital education, and the corporate reforms of public education through privately sponsored technological means.

f. What shifts in economic and political power are likely to result from this new technology?

Here Postman is pushing for interpretations of education and technology at the level of politics, policy-making and the economic and commercial activities of firms and governments. There are clearly many ways that political institutions, political environments and economic systems intersect and influence each other at the point of technology. There is a need, therefore, to examine how persons and groups with common economic and/or political intentions appropriate technology development to engineer changes which are beneficial to their interest(s). One important question here is how technologies are appropriated and re-appropriated by political and economic interest groups in ways that diverge from the intentions and claims of designers.

These are increasingly important questions to ask in light of the increasing commercialization of technology use in education. From Microsoft and Google, through to Kroton, Pearson and thousands of far smaller 'Ed-Tech' start-ups, digital technologies have positioned for-profit interests at the centre of how public education is now funded, organized and delivered. It is increasingly being argued that the use of digital technologies in schools is driven by an 'education-industrial complex' (PICCIANO; SPRING, 2013) of IT industry and publishing businesses, foundations and think tanks, and other vested interests.

As such, Postman reminds us to constantly challenge the private sector values that underpin much of what is blithely seen as the inevitable technological reform of public schooling. Take, for example, how digital technology is being used as justification to redesign, reform and re-orientate the nature, form and values of public education. Philanthropic foundations, transnational corporations, venture capitalists and other 'edu-prenuers' continue to invest substantial amounts of time, finance and spin in attempts to 'fix' and/or 'disrupt' our supposedly 'broken' school and university systems through technology-based approaches. These include promises of technology-driven 'personalization', games-based-learning, 'flipped classrooms', maker culture, 'twenty-first century skills' and so on. Innovations and incursions such as these might well be desirable and beneficial, but surely require sustained scrutiny and critique. Many of the 'new' forms of digital education being promoted by commercial interests are based undoubtedly around different agendas and ideologies than those we are used to seeing in public education. These shifts in tone and emphasis may, or may not, be a 'good thing'. Yet these are issues that require more recognition, debate and scrutiny from critical observers and commentators.

g. What alternative uses might be made of a technology?

Postman's final question acknowledges that it is important to remember that critical questions of education and technology are not asked simply for their own sake – for example, to appear clever, condescending or snarky. Instead, we should ask critical questions as means of highlighting and suggesting ways of addressing the many contradictions and conflicts that clearly surround technology use in education. Indeed, the best social science research is pursued with an underpinning intention of developing culturally plausible suggestions as to how current inequalities and hegemonies may be countered, and how educational activity may be reshaped along fairer and more equitable lines. This suggests scholarship that builds upon Ann Oakley's (2000) notion of academic inquiry that is democratic, interventionist and emancipatory. In this spirit, all of the critical questions outlined in this chapter can be used to identify 'spaces for possibility' where opportunities exist to resist, disrupt and alter. The ultimate aims of taking a critical approach to education and technology should be to turn critique and insight into the production of alternative strategies.

IV. Conclusions

It is useful to keep the spirit of Postman's seven questions in mind during any discussion of education and technology. In particular, these questions remind us of the need to take care that the novelty of future technological developments does not distract from scrutinizing the rather more 'messy' realities of present. Postman urges us to be expert and knowledgeable about technology, but to remain dis-interested when considering its outcomes. Above all, it is important to resist the temptation to unthinkingly associate digital technologies with inevitable change and progress in education. Instead, everyone with an interest in education and technology should remain mindful of the

continuities, recurrences and repetitions associated with 'new' technologies.

Above all, Postman's questions prompt us to remember that education and technology is as much about investigating the imperfect 'state of the actual' as it is about exploring the perfected 'state-of-the-art.' Instead, crucial questions need to be asked (and hopefully answered) of how digital technologies (re)produce social relations and in whose interests they serve. As all of the chapters in this book suggest, time is now right to take Postman's sentiments from twenty years ago and develop a new tradition of 'education and technology' writing and research that is more realistic, relational, critically-minded and public-facing in its approach. Past voices such as Neil Postman's are certainly worth remembering and keeping close to our hearts as we move forward into the brave new world of twenty-first century education.

References

ELY, D. ELY, D. Perspectives on the implementation of educational technology innovations. *ERIC Document Reproduction Service Nº ED427775*. [N.I.], 1999. Available at: <<http://files.eric.ed.gov/fulltext/ED427775.pdf>>. Accessed on: 16 August 2016.

FERSTER, B. *Teaching machines: learning from the intersection of education and technology*. Baltimore: John Hopkins University Press, 2014.

INSTITUTE OF DIRECTORS. *Lifelong learning: reforming education for an age of technological and demographic change*. London: Institute of Directors, 2016.

MOROZOV, E. *To save everything, click here: the folly of technological solutionism*. New York: Public Affairs, 2013.

OAKLEY, A. *Experiments in knowing*. Cambridge: Polity, 2000.

PICCIANO, A.; SPRING, J. *The great American education-industrial complex: ideology, technology and profit*. New York: Routledge, 2013.

POSTMAN, N. *The surrender of culture to technology*. College of DuPage, 11 March 1997. Available at: <<http://bit.ly/2nf0rlc>>. Accessed on: 16 ago 2016.

ROUSE, J. Power/knowledge. In: GUTTING, G. (Ed.). *Cambridge companion to Foucault*. Cambridge: Cambridge University Press, 2005. p. 95-121.

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