National Education Policy 2020 – Imagining Digital Technologies as a Resource to Achieve Educational Aims

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Abstract

The National Education Policy, 2020 (NEP) asserts that education is fundamental for achieving full human potential, and for the development of an equitable and just society. Clearly, digital technologies are impacting our lives in all aspects - social, political, economic. The effectives of such impact in education would need to be seen against the extent to which its use can support in the achievement of educational aims. The NEP rightly visualizes that digital technologies can play a big role in creating, revising, curating, adapting and publishing of curricular resources in multiple languages spoken in the country, to create a rich learning environment in all courses at all levels, including through translation. While the NEP does emphasize the need for digital technologies to support teacher professional development, it sees it largely in terms of building skills of teacher to become 'users'. Yet critical perspectives on technology are most relevant, specially in the context of dangers to the aims of education through privatization and commercialization of education, hence teacher development needs to enable teachers to become creators, visualizers, designers of digital technologies to their contexts, and be restricted to using products developed by business entities. The NEP rightly points to the dangers of implementing unproven digital technologies (which has led to a very large number of failed projects), and recommends a process to screen digital methods. The dangers from the 'new guy' - "artificial intelligence" are not adequately emphasized in the NEP. Uncritical adoption of the latest craze of 'personalized learning' can derail the basic premise of education as social constructivism, and its purpose as social transformation.

The National Education Policy 2020 (NEP) begins with the assertion that education is fundamental for achieving full human potential, and for the development of an equitable and just society, thus emphasising that education must aim at social transformation. Historically, the Indian society has been afflicted by divisions and exploitation, including, on the basis of caste, creed, gender, and region. Reversing this exploitation and offering justice and dignity to hitherto marginalised sections is essential to build a just society. Education should also, as a by-product, enable citizens to acquire productive employment, which the popular imagination perhaps captures as the primary purpose of education. Yet, education is the primary project of society to establish justice and equity in an evolutionary manner. Hence, we need to understand 'quality education' necessarily as 'socially transformative education', which requires the redistribution of power, privilege, and resources. A national policy on education needs to be studied with reference to this ongoing project.

Such socially transformative education has four important components – infrastructure, curricular content, teacher,

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and community participation. The NEP discusses the second and third components in detail. This article will restrict itself to how the NEP explores the role of digital technologies (hereafter 'technologies') in supporting such transformative education.

The NEP asserts that the focus of integration of digital technologies would be to improve teaching-learning and evaluation processes, support teacher professional development, enhance educational access, as well as streamline educational planning and administration. This focus on technology as a resource to address accepted educational aims and priorities is a welcome departure from the usual 'we have technology, what can it do?' (hammer looking for a nail) kind of perspective that has often dominated the 'technology in education' discourse.

Curricular content

Eisner (1991) asserts that teaching and curriculum are the fundamental aspects of education, just as systole and diastole are to a beating heart. A rich, contextual, and diverse curriculum that is both appropriate and adequate is essential for good quality education. The NEP discusses the need and possibilities of such a provision in multiple sections.

The section on Early Childhood Care and Education requires the development of learning materials for early childhood education, while the section on curriculum and pedagogy, calls for the large-scale creation of resources in multiple languages, which are mediums of instruction in schools across the country. The NEP asks that enjoyable and inspirational books should be developed for students, in all Indian languages through translation processes that integrate digital technologies as well, and should be provided in school and local public libraries. Such development should factor in the need to contextualise local needs and provide bilingual textbooks and teaching-learning materials for mathematics and science to enable students to think and speak about these subjects in both languages. It rightly suggests that the widespread provision of books will support the inculcation of reading habits within educational institutions and in communities.

The section on assessment, calls for moving from testing rote-based learning to conceptual understanding. This requires an appropriate design of assessment processes and materials. Assessment materials should not be seen narrowly in terms of tests and closed-ended questions, but more broadly as a rich and varied set of 'quizzes, puzzles, exercises, application-oriented cases'. Though the NEP envisions this as a 'simple' process, it would require high levels of competence among the creators.

Each of these tasks requires vast and varied sets of curricular resources on numerous topics to be made available in all languages and for different learner contexts and levels. The digital technologies can enable this. Resources on a large scale can be developed through programs that engage school and college teachers and teacher educators to collaborate on (digital) networks and use (digital) tools to develop (digital) learning resources that can be easily re-used, adapted/contextualised, curated, shared, and published using digital methods. Complex, multilingual, multi-level, multi-purpose resource creation can be managed through digitally-mediated processes.

Secondly, India is a unique country with many languages. Preserving, protecting, and promoting these languages is essential not only for communicating and learning but also for the cultures of India's diverse communities. The threat to the regional languages of India is real and imminent and can be fundamentally attributed to the proliferation of digital technologies, mainly the Internet. English dominates the Indian Internet and other languages have a marginal presence, which is one reason why its power and prestige increases exponentially compared to other Indian languages. The NEP bemoans that Indian languages have been neglected due to which the country has

lost over 220 languages since Independence. The dominant regional languages that determined the linguistic organisation of the country into states are also under threat of being subordinated. UNESCO has alerted that 197 Indian languages risk extinction (see http://unesco.org/languages-atlas). The popular demand for English medium schools also arises from this power imbalance.

The NEP asserts that the teaching-learning of languages must be integrated with school and higher education. A continuous supply of high-quality learning materials including textbooks, workbooks, novels, poems, and plays would be necessary for languages to stay relevant and provide vibrant opportunities to students. The NEP suggests that such translations need to be a continuous activity because vocabularies and dictionaries have to be regularly updated and widely disseminated, to enable current issues to be meaningfully discussed in these languages.

If school and higher education are easily accessible in local languages, it would redress, to some degree, the craze for English and allow us to achieve the promise of 'home language' as a medium of instruction to some extent. This means that the education system must have in-built structures and processes that can continuously create educational resources in Indian languages. This will also support students' proficiency in multiple languages (going beyond conversational competence to include reading and writing as well) – an element that is stressed in the NEP.

The NEP calls for the creation of an 'Indian Institute of Translation and Interpretation'. Such an institute would need to bring in language, subject and translation experts to promote all Indian languages, and also integrate digital technologies to scale up the creation. The Government of India has initiated the 'National Language Translation Mission' for widespread and large scale translation of resources across languages, using digital technologies, including through machine learning. IT for Change has been attempting (Kasinathan, 2021), in modest ways, to support educational institutions in encouraging their faculty (student teachers, teachers, and teacher educators) to collaboratively translate content from English to Kannada using simple FOSS tools and platforms like MediaWiki. Principles from this approach could be taken up on a large-scale, within the school and higher education system, to meet NEP's ambitious recommendations in the area of content, and also support teacher professional development by encouraging teachers to engage with these materials during the trans-creation of e-content.

Programs for teachers and teacher educators, to develop multilingual learning materials, using digital platforms and tools, can also support large-scale trans-creation of art, literature and cultural resources from one language to another. The digital platform is indispensable to this huge, complex, and perennial resource creation process; sharing created resources freely (as Open Educational Resources) on digital platforms can help others re-use, revise/adapt these for their own use and publish their variations back on these platforms.

The NEP implicitly accepts that such materials must be accessible to all, without the constraints of traditional copyright ('all rights reserved' by the author/publisher). However, it does not explicitly call for the creation of Open Educational Resources (OER). Any content is OER if it is licensed using 'copyleft' or 'creative commons' licensing, which allows others to re-use, revise, curate, and re-distribute the content. The global OER movement has been working to ensure the easy availability of learning resources to all. In India, the Ministry of Education has set up the NROER and DIKSHA OER platforms. The principle of OER must be explicitly applied to all resource-creation processes and outputs. These rich and growing repositories can automatically become sources for digital libraries, which the NEP recommends as part of rejuvenating public libraries across the country, as well

as providing resources for schools, teachers, and students.

Likewise, although the NEP recommends that a variety of educational software applications should be developed and made available in Indian languages, it stops short of calling for the licensing of such software through the 'general public license', which is the popular license used by free software communities to develop and distribute free and open-source software (FOSS). FOSS and OER licensing make software and content 'public' resources that everyone can participate in creating, using, and sharing. Thus, the call in the NEP to invest in the creation of open, inter-operable, evolvable, *public* digital infrastructure in the education sector must be read as necessarily including FOSS, OER, open hardware and connectivity, as well as open standards in each of these.

Teacher Professional Development (TPD)

Although Eisner suggested that content and pedagogy are the systole and diastole of teaching, he added that "No curriculum teaches itself, it always must be mediated, and teaching is the fundamental mediator." This highlights the criticality of teacher agency. Material making, apart from being an end in itself, can also be instrumental for strengthening teacher development and agency. As teachers and teacher educators engage with materials/content and the complexities of marrying educational aims, contexts, and diverse learner communities, they will need to think of creative approaches to develop rich and contextual materials.

The NEP recommends that teachers should be encouraged to use bilingual teaching methodologies, using bilingual teaching-learning materials, as this would be relevant for students whose home language may differ from the medium of instruction. The process of material trans-creation can also strengthen teachers' multilingual capacities, essential for providing multilingual teaching environments in schools. Such an approach would be equally applicable to Science teachers in English medium schools across the country and to Marathi/Tamil/Telugu/Urdu 'minority language' medium schools in a state like Karnataka, and would support home language-based instruction at higher levels of schooling as well.

The NEP also recommends that digital technologies should be extensively used for teaching-learning of languages and to popularise language learning. Using FOSS applications to create picture stories, audio books, video stories on a large scale by teachers, can popularise language learning. ITfC , in collaboration with the Regional Institute of English, South India, has conducted workshops for elementary and secondary school language teachers to develop their abilities to create audio OER using the FOSS audio editor Audacity. The 'storyweaver' (https://storyweaver.org.in) and 'Karadi Tales' projects are good examples of multilingual approaches to language learning through image, audio and video resources, that can be implemented across the country.

Apart from using digital technologies to support teachers' in 'creating and learning', these technologies can also support teacher development through 'connecting and learning'. 'Creating and learning', 'connecting and learning' are themes for ICT integration in education, discussed in the NCERT National ICT Curriculum, 2013. The NEP suggests the substantial expansion in the use of technology platforms such as SWAYAM and DIKSHA for online training of college and university teachers as a part of their in-service continuing professional development. It recommends that teachers should be given continuous opportunities for development, including learning recent advances in their profession. Such development should be offered in blended mode, combining workshops and online courses. Digital platforms would also be needed to enable teachers to share ideas and experiences. Currently, WhatsApp is the most popular platform in India. However,

as a proprietary platform, WhatsApp is vulnerable to privacy, surveillance, and data security risks and there will be a need to encourage the adoption of FOSS platforms for enabling teacher interactions.

I have earlier emphasised, in this journal, the need to adopt FOSS online learning platforms such as Moodle Learning Management System and the BigBlueButton webinar platform (Kasinathan 2020a). These learning platforms can be deployed state-wide since they can be installed on teacher education institutions' or state government data centres' servers. However, proprietary platforms could become prohibitively expensive if implemented state-wide. More importantly, the risk of data surveillance and data theft on proprietary online platforms is real and must be avoided.

A critical perspective on technology

Technology is not new to education. It has always been considered a resource that a teacher can use in the manner she thinks appropriate. All teaching aids are technological artifacts. Digital technologies can be best used in education by being available to the teacher to use in a manner the teacher deems fit. Of course, teacher capacity building to make use of digital technology is essential since digital technologies may be too complex for all teachers to acquire purely through self-learning. Yet, capacity building cannot be restricted to the ability to use a tool, it must also include a critical understanding of when to use the technology, whether to use it at all, and what dangers/ risks its use entail. Building such a critical perspective to technology among teachers is as, if not more, important than simply imparting the knowledge to use it. This warning is important since most of us tend to see ourselves as 'users' of technology – we have no idea how it works, or what it does. In the case of digital technologies, ignoring the 'know-if and know-why' and focussing only on the 'know-how' can be positively dangerous and harmful. Two dangers are discussed below.

First, unlike technologies of the past, digital tools and platforms seductively sneak into our lives as 'free' (gratis or no cost) products, although they actually deprive us of the 'free'doms, which we exercise for other technologies. These freedoms include freely sharing them with others, customising them to our needs, etc. As 'users' of digital tools and not 'participants', teachers are locked into technologies over which they have no control, severely affecting their agency. This risk is mitigated by choosing FOSS technologies over proprietary technologies.

Second, unlike a pen or a book, which are inert, digital technologies can be interactive. Because of this, many programs focus on directly providing applications and content to students, bypassing teachers. There is a widely held belief that teachers lack willingness / motivation and ability, and are the problem in school education, and that digital technologies can help to provide education without teachers. While self-learning does have a role, it is futile to imagine that it can replace learning mediated by a caring and competent adult. During the school closure triggered by the pandemic, apps for student learning are being pushed big-time. While these apps may provide some structured interactions and may be useful when schools are closed, this should not be confused with real education in classrooms.

The so-called 'disruptive' technologies – machine learning with big data – will lead to an increasing emphasis on 'personalised learning'. This will further reduce the role of the teacher, both by encouraging learners to learn through direct engagement with the computer and also by 'suggesting' to the teacher what content and pedagogy should be followed for a particular learner. Artificial intelligence (AI)-based assessments of student learning, will tend to be narrow and fail to capture larger conceptual understanding. AI risks de-skilling teachers and converting education into a process of 'learnification', atomising conceptual

understanding into smaller and smaller bits of achievement, which machines are able to test (Kasinathan 2021b).

The dangers of AI in other fields are already being documented, including their inherently iniquitous nature (Flynn, S., 2020). AI in education can worsen existing social inequities, directly contradicting education's primary aim of social transformation, discussed at the beginning of this article. A rule I would propose is that no technology should be allowed to come between the teacher and learner. The best use of AI could only be suggesting diverse content and pedagogic strategies to a teacher, allowing her to make the final decisions. The NEP alerts that technological development is happening at a furious pace, hence it is not possible to foresee in what ways technology will impact education. While it calls for ongoing research and evaluation to assess the benefit and costs of digital technologies, it is must be clear that technologies and their functionalities will keep changing. Firm adherence to fundamental principles of education alone can enable us to stay clear on how to design the integration of digital technologies in education. Teacher agency and control over classroom processes is one such fundamental principle.

Neil Postman's (1998) principles of technology are useful caution in designing AI in education. Firstly, all technologies benefit some and harm others, and we need to investigate who is benefited and who is harmed. Technology companies can gain from the large school market, but education can suffer by integrating unproven products or services. Secondly, benefits are usually visible immediately but harms are often visible only over time. For instance, 'gamification' was hyped as 'the game changer' for self-learning, but the harms, including addiction (Andrade, 2016), as well as ethical harms (Kim, 2016), are being noticed over time. The NEP suggests that "activities involving coding will be introduced in Middle Stage". This too is an area where we must exercise caution. There has been an increasing hype around learning coding in middle school, as large commercial programs are pushed on parents who lack an adequate understanding of the issue (TDH, 2020). In addition, the danger of addiction to digital technologies is high, and younger children need to be kept away to reduce the possibilities and extent of addiction. Toyoma (2011) warns that "... there is a repetitive cycle of technology in education that goes through hype, investment, poor integration, and lack of educational outcomes. The cycle keeps spinning only because each new technology re-initiates the cycle."

Access to digital infrastructure is currently highly iniquitous. While most middle-class students, even from primary schools, have had some kind of online education during the pandemic, it is estimated that over 80 per cent of the students going to government schools have not been able to regularly access digital education (NCEE, 2021). The NEP stresses that we need to plan for a scenario where Internet-connected smartphones or tablets are available in all homes and digitally-enabled (smart) classrooms in all schools. Access is a prerequisite for enabling use. However, increasing access must be implemented simultaneously with developing digital literacy. Digital literacy includes critical perspectives to digital technologies, which can prevent schools and teachers from becoming passive appendages to digital infrastructure, including AI. Also, availability of device, electricity, and connectivity are three independent huge challenges, which need to be overcome through significant public investments. In the section on online education, added in light of the school and college closures triggered by the pandemic, the NEP correctly requires massive investment in public digital infrastructure to address the huge inequities in access to digital learning.

Such digital literacy is equally important for communities if, as the NEP recommends, they use the school digital infrastructure for 'adult education and lifelong learning'. There are cases of illiterate (and literate

but ill-informed) people being fooled into transferring their assets and rights to online scammers and 'making sense' of the digital phenomena is more important than merely the ability to use apps. Thus, for adult learning, building such critical understanding should be fundamental to the integration of digital technologies such as apps, online courses/ modules, satellite-based TV channels, online books, and digital technologies enabled public libraries. The NEP seeks teachers' professional development to engage with the online and blended modes of learning. However, it sees this largely as the 'ability to use' online tools than the ability to critically review and use (these tools) as deemed appropriate.

The NEP recommends the use of assistive devices and other digital technologies for children with special needs, to help them integrate into classrooms and engage with their teachers and peers. While all students are vulnerable to cyber exploitation and cyber abuse, these students are even more so. Building critical understanding as a fundamental component of digital literacy is essential for all teachers and students. As global democracies world struggle with an onslaught of fake news and propaganda through social media (Vaidhyanathan, 2018), it is clear that this onslaught can only be addressed in the long term by building critical thinking skills as a part of formal education. This is a necessary complement to legal and policy measures.

Education and technology – Bi-directional impact

The NEP asserts that technology and education have a bi-directional relationship at all levels. It rightly sees that "technology will impact educational processes and outcomes" but its assessment of the impact of education on technology is limited to educating Indians about technology ("will require extensive research both on the technological as well as educational fronts"). The educational aspect must include the ethical and normative aspects as well.

There is a vital additional component to the role education can and must play with respect to technology, raising and discussing the questions of "Technology – When should it be used? When should it be avoided? And to what extent should it be used?" Philosophers, sociologists, and political scientists have highlighted that technology must not be accepted as a given, but its scope and impact must be continuously interrogated and even consciously limited. A 'mythic approach', as described by Postman (Postman 1998), which involves the unquestioning acceptance of technologies 'as a part of natural order of things', must be avoided.

While the actual production of technology might still happen predominantly in industry, research, or free software communities, the role and scope of technology in our life needs to be shaped by informed public discourse, and higher education must birth and nurture such debates. Such debates must also be part of the mandate of the autonomous body, the National Educational Technology Forum (NETF), which the NEP recommends should be created as a platform that can support the free exchange of ideas in school and higher education, on the use of digital technologies to strengthen learning, assessment, planning, and administration. However, the NEP imagination of the decision-making at the NETF as restricted to national and international educational technology researchers, entrepreneurs, and practitioners is inadequate. It should necessarily include inputs also from educators with a background in various disciplines that contribute to education. This should also apply to the unit proposed by NEP to be set up within the Ministry of Education for the development of "digital infrastructure, educational content, and capacity".

These debates are particularly necessary around the latest trend of big data and machine learning (AI). Every time we consider the use of AI, we need to ask several questions including, what kind of decisions are to be made by the AI? How will

these decisions affect different sections of society? Who is likely to be harmed? Unless there is a common clarity that any harm or unfairness is not possible while using AI, it should not be used outside of testing. Real-life consequences cannot and should not be suffered by innocent people simply because technologies have to be used or matured.

The NEP alerts us that with rapid advances in science and technology, including the recent rise of big data, machine learning, and artificial intelligence; many unskilled jobs may be taken over by machines. It asserts that the need for a skilled workforce, particularly involving mathematics, computer science, and data science, along with multidisciplinary abilities across sciences, social sciences, and humanities, will simultaneously increase. This belief suggests that the extent of gain and loss will be similar.

However, a secular analysis of technology-related disruptions to work and employment suggests that the limits of nature, which new technologies continuously seek to exploit, have been reached (Bernstein, 2015). Even as the disruption of the industrial revolution (which displaced agricultural workers into industries, and replaced physical labour with machines) continues to be unresolved, especially in a country like India, the digital revolution will displace unskilled, semi-skilled, factory and white-collar jobs, and reduce the need for many modern professions as well (Mehta B.S., 2019). This hugely negative and iniquitous impact on employment will only be partly compensated by new jobs created by these disruptions, in few areas like data science. In addition, the profile of job gainers and job losers will be very different. As Postman warns, technology changes benefit some sections and harm other sections and "the winners always try to persuade the losers that they are really winners" (Postman, 2018).

Already, jobs have become the issue around which elections are contested in many countries. In India, we have been witnessing an increase in unemployment (Nath, 2020). This process is likely to worsen. In a labour surplus country like ours, the appropriate deployment of technology needs to be a matter of design rather than being determined by chance or left to the market. This example is to illustrate the perils of not adequately assessing risks from technology-induced changes.

The solutions to the problems of technology do not always lie in its increased use, but hard political choices about its appropriate use. The debates to create the thinking and impetus for such political choices need to lie in courses and research on technology and society in higher education, where learning about technology is not about its creation or use, but its place in society, and its place in education, to support social transformation towards justice and equity.

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