Review Article

Readiness for Education 4.0: Pandemic as the Wakeup Call for Teacher Education Institutions

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Abstract

Change has been the unwritten yet self-evident law of nature and society. However, in recent times the pace, magnitude, complexities and dimensions of these changes got accelerated and intensified. The changes can be discerned in each sphere of our lives including the domain of learning and education sector. Scholars have identified four stages of Education from 1.0 to 4.0. In each of these four phases, all the characteristics change including institutional arrangement, content organisation, learning orientation, technology, teaching-learning methods, and role of students and teachers. Transition in to Education 4.0 necessitates a transformation in teacher education institutions (TEIs) because in these institutions teachers and educational administrators of future are being prepared. This paper looks at the 2 year B. Ed. curriculum prescribed by Himachal Pradesh University in 2015 and assesses the extent to which this curriculum can prepare graduates for future. The paper observes that teachers being prepared currently are not ready for roles and responsibilities they are expected to shoulder in the changed and changing scenario. It further observes that many aspects of current system of teacher education actually stand at Education 1.0 and as such requires responsive curriculum, unflinching commitment and unprecedented mobilization of resources in order to cover the long path in order to transition into 4.0 successfully. The current pandemic has potential to become a pretext for taking steps in desired direction.
Keywords: Education 4.0, Teacher Education, Himachal Pradesh, Bachelor's in Education.

1. INTRODUCTION

The future is not what it used to be!

This statement of French litterateur Paul Valery just points out the strange times we are living in that defy predictability. Change has been the unwritten yet self-evident law of nature and society. However, in recent times the pace, magnitude, complexities and dimensions of these changes got accelerated and intensified largely due to macro processes namely increased globalization, advances in technology, a deluge of information, and industrial and demographic shifts. The changes can be discerned in each sphere of our lives including learning and education sector. Scholars have identified four stages of Education from 1.0 to 4.0. In each of the four phases, all the characteristics change including institutional arrangement, content organisation, learning orientation, technology, teaching-learning methods, role of students and teachers. There have been calls in literature to gear ourselves up for Education 4.0 in order to ensure relevance and leverage innovative tools and technology. It also necessitates a transformation in teacher education institutions (TEIs) because in these institutions teachers and educational administrators of future are being prepared who are expected to lead in to Education 4.0. This paper sums up basic characteristics of four phases of Education, i.e., E1 to E4. Then it looks at the 2 year B Ed curriculum prescribed by Himachal Pradesh University in 2015 in order to assess whether TEIs are expected to prepare education graduates for successful transition in to Education 4.0.

2. Education 4.0: Concept and Key Characteristics

A report jointly prepared by FICCI and Ernst & Young (2017) summarises 4 phases of education. Education 1.0. was characterised by Guru-Shishya method of teaching limited to few privileged people largely influenced by religion. In modern times, in renaissance and after industrial revolution, education started to focus more on development, becoming

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primary responsibility of the state resulting in to growing enrolments across all ages and sections of society ushering in to Education 2.0 which got universalised owing to advent of printing presses and establishment of universities leading in to formalisation of higher education. In this massification process, teacher remained the knowledge provider and the student as the passive recipient. Education 3.0 is witnessing use of computers and internet in teaching and learning, which helped in increasing access creating a level playing field. The conventional brick and mortar settings are giving way for integration of new tools and technologies in teaching. Education 4.0 is characterised by high-speed internet, mobile technology, social media platforms etc. facilitating personalized learning anytime anywhere and changing the role of teachers to facilitators and mentors. . Education 4.0 promises to empower learners to structure their learning paths. As the FICCI and Ernst & Young report articulates: "Education 4.0 is the personalization of the learning process, where the learner has complete flexibility to be the architect of his or her own learning path and has the freedom to aspire for, approach and achieve personal goals by choice.

In an interesting comparison of each of the four phases of Education, Embi (2018) as cited by Mokhtar, Alshboul and Shahin (2019) has analyses these four phases across a number of characteristics such as institutional arrangement, content organisation, learning orientation, technology, teaching-learning methods, and role of students and teachers. During Education 1.0, educational institutions have been largely campus based with fixed boundaries with other institutions. In the second phase, while increasing collaborations take place between institutions, still one-to-one affiliation remains between students and universities. In E.3.0, institutional affiliations loosen up and in E.4.0, students engage in Do-it-Yourself (DIY) courses and institutional affiliations do not matter any longer. Location also changes drastically across these phases from brick and mortar structures in phase 1, brick (building) and click(online) in phase 2, thorough infusion in society including cafes, workplaces in phase 3, while in phase 4 classroom becomes irrelevant and learning takes place anytime, anywhere, any device and any platforms. Content arrangements change across these phases: traditional copyright materials, free educational resources, user generated personalised content.

Technology was largely unheard of in E 1, it got cautiously adopted in E 2.0, became ubiquitous in E 3.0 while E.4 could witness a surge of futuristic technologies such as internet of things, artificial intelligence ,virtual reality and likes. From computer-aided learning, blended learning, mobile learning, E 4 is using Open Distributed Learning, Virtual Immersive Learning and Gamification. Cost of hardware and software has also been coming down over various phases. Curriculum, from being rigid and fixed in E 1.0, has become fluid in organic if E 4.0. Learning orientation, initially being largely teacher centred (E.1), became learner centred (E.2), learning and experience centred (E.3), and finally it became challenge-based and passion-based learning.

Role of teachers and students have changed over various phases. During E 1.0, teachers were considered source of knowledge and students largely remained passive agent. In E 2.0 teachers become both the guide and source of knowledge, and students began to turn active with an emerging sense of ownership for their learning. In E 3.0 the teacher becomes the orchestrator of collaborative and students develop strong sense of ownership, become a proactive participant in teaching-learning process and start participating in creation of resources and opportunities. In E 4.0 the educator becomes a learning experience designer and students, now "Digital natives "becomes self-explore and creator of knowledge. Teaching and learning mode has moved from pedagogy (E 1) to andragogy (E 2.), to heutagogy (E. 3), and finally to cybergogy and peeragogy (E 4.0). A paradigm shift in the dominant theoretical framework can also be discerned over different phases: behaviourism (E1) became, cognitivism (E2), constructivism (E3), connectivism (E4).

3. Education 4.0 and Current Teacher Education Curriculum: Observations

It is evident that the personalised learning emphasised in Education 4.0 necessitates a transformed teacher. The role of a teacher is changing from that of an educator to a facilitator, coach and mentor (FICCI & Ernst & Young, 2017). In changed circumstances, teachers enabled by digital technologies, must design classrooms in such a way that self- directed students work on their personal devices as well as interact with other learners in collaborative projects. The competence, confidence, readiness and motivation of teachers' to leverage technology would decide whether the system would transition in to E 4.0 or not. One of the key prerequisites for enabling teacher is enhancing their digital competence which comprises of three knowledge areas: technology proficiency, pedagogical compatibility and social awareness (Instefjorda & Muntheb, 2015). Technological proficiency has been defined as teacher's technical competence and confidence in respect to using technology. Pedagogical compatibility means understanding and awareness of how technology can contribute to achieving classroom curriculum goals. Social awareness means teachers understanding of and ability to negotiate social aspect of the school culture (Instefjorda & Muntheb, 2015). Ideally, a teacher education programme must aim to enhance technology proficiency, pedagogical compatibility and social awareness.

Across many countries including India, efforts have been made to enhance digital competence. However, studies inform that digital literacy among pre-service teachers have been inadequate and they are grossly underprepared to use existing technologies resulting in to gross under-utilization of ICT tools (e.g., Admiraal *et al.,* 2017; Buss *et al.,* 2018; Foulger, Wetzel, & Lindsey, 2018; Instefjord, & Munthe, 2016; Smith & Robinson, 2003; Tondeur *et al.,* 2012). It is not that strategies are not available for integrating digital competencies in the curricula of pre-service teachers (Tondeur *et al.,* 2012), the 2 year B Ed. curriculum prescribed by Himachal Pradesh University in 2015 (HPU, 2015) seems to be lacking not just in appropriate content but also in intent. While a paper has been introduced with the title *ICT in Education* but the topics listed fail to even introduce key technologies (Appendix A).

But before we look at the topics prescribed in this particular paper, let us look at the overall curriculum and see the extent to which this curriculum aim to prepare teachers for Education 4.0. In terms of institutional arrangements, teacher education institutions (TEIs) remain in E 1.0 since most of these institutions work as standalone entities. Collaborations have started due to insistence of agencies like NAAC, but collaborations remain weak and tokenistic not yielding desired results. TEIs operate from fixed campus, however pushed by the exigencies of COVID 19, few learners have started to engage with learning anytime, anywhere, any device and any platforms but still it is not being facilitated by the TEIs.

Contents largely remain fixed and rigid. However, since some teachers and students have started using internet and open education resources, TEIs can be said to be in between E .1.0 and E 2.0. The content is subject and teacher centric and is not challenge and passion centred. Students and teachers largely remain in E 1.0 in terms of their roles and responsibilities. Chalk and talk method still dominates in micro and macro teaching. The term pedagogy is still prevalent, andragogy is discussed at theoretical level, and terms such as heutagogy, cybergogy, peeragogy are not even discussed. The way syllabus has been framed and the way student-teachers are taught to frame lesson plans, are largely behavioural. They are taught to frame intended learning outcomes in behavioural terms as such in terms of theoretical underpinnings, behaviourism runs the roost and as such contemporary TEIs are at E 1.0. B Ed programme of IGNOU did introduce constructivist lesson plans but it had to pull it back.

Now, let us look at the content of the paper on *ICT in Education.* It is noteworthy that while the syllabus was introduced as late as 2015, it looks archaic at its best. It covers computer fundamentals and projection equipments. Under new trends in ICT, it mentions Web 2.0 and about EDUSAT which was launched way back in 2004! Also, it largely focuses on theoreatcial aspects of computer technologies. While few proactive teachers and curious students attempt to master the practical aspects as well, they have not progressed much beyond very basics such as word processor, presentations and spread sheets. As discussed in the previous section, in E 2.0. Technology is being adopted cautiously. If the development made during current pandemic continues and the trend of technology adoption gets stabilised then we may enter 3.0. However, as studied in other contexts, readiness for and rate of technology adoption among pre-service teachers passing out from TEIs remain abysmally low. Some TEIs and teachers do use computer-aided learning, blended learning, mobile learning, LMS but curriculum does not mandate them to do so.

It is time that curriculum is revised and developers prepares a syllabus in such a way that student-teachers undergoing the curriculum pass out future ready, as someone who could steer the system in Education 4.0. Investments need to be made in faculty training focused toward developing facilitator mindset and pedagogy. Digital literacy should be made part of the professional development programmes. The teachers should be made well conversant with recent trends such as flip classroom, synchronous video lecture and chat rooms.

4. CONCLUDING THOUGHTS

Interestingly, authors who are urging to get ready for Education 4.0 are not using the word "changing to E 4" rather they are using "leapfrogging"(e.g., Harkins, 2008; FICCI & Ernst and Young, 2017) . Leapfrogging means rapid change to a higher level of development. Surprisngly, many teacher educators and TEIs are still in denial and resistant mode, still taking a nap in Education 1.0 or 2.0 at their best . But as an African proverb goes: "When the music changes so must the dance." The music of the world has changed and changing, if we do not change the dance of education, we will not be able to survive.

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Appendix A
Paper XV: ICT IN TEACHING-LEARNING PROCESS
Marks: 50 (40 + 10)
Course objectives:
The student teachers will be able to:
1. Understand the concept and role of ICT in construction of Knowledge.
2. Acquire knowledge and understanding about National Policy on ICT in School Education.
3. Identify the challenges in integration of ICT in school education.
4. Understand computer fundamentals.
5. Employ hands-on-experience on computer.
6. Apply different Hardware Technologies in Modern Educational Practices.
7. Familiarize with the new trends in ICT.
8. Apply different e-resources for educational purposes.

UNIT I: Introduction to ICT and Computer Fundamentals
1. Concept of ICT: Meaning & Characteristics; Role of Information Technology in Construction of Knowledge.
2. National Policy on ICT in School Education; Challenges in Integrating ICT in School Education;
3. Computer Fundamentals: Meaning, Components & Types of Computer; Functions of Operating System; Application Softwares.
4. Computer Application in Learning: Concept, Features and Advantages of Word (Word Processor); Excel (Spread Sheets) and PowerPoint (Slide Preparation & Presentation).

UNIT II: ICT in Teaching – Learning Process
1. Hardware Technologies and their Applications: Overhead Projector (OHP); Preparing Transparencies, Slide Projector, Audio-Video Recording Instruments.
2. Hardware Technologies and their applications: DLP Projector; Movie Projector; Close Circuit Television (CCTV).
3. New Trends in ICT: Concept, Elements and Advantages of Smart Classroom; EDUSAT.
4. Internet & Online Learning Resources (e- Library, Websites; Web 2.0 Technology and Open Educational Resources) in learning.

Activities (Any one of the following):
1. Prepare your Curriculum Vitae using computer and obtain its printout.
2. Visit an institution having interactive white board and learn its features and functioning and prepare a report.
3. Prepare a Powerpoint presentation for secondary school students.

(Source: Faculty of Education (2015). Regulations and Syllabus for Two Years B. Ed. Programme. Shimla: Himachal Pradesh University).