Education 4.0 in the Era of Fourth Industrial Revolution

Dr. Nitin Shrigiriwar[1] and Dr. Vaibhav Bhalerao[2]
M.Sc (Electronics), MBA, Ph.D., SET Qualified[1]
Assistant Professor, Department of MBA[1]
Kamla Nehru Mahavidyalaya, Nagpur, Maharashtra, India[1]
M.Com., MBA , M.Phil , MA , Ph.D.[2]
Assistant Professor, NIT Graduate School of Management, Nagpur, Maharashtra, India[2]
shrigiriwarnitin123@rediffmail.com[1] and vaibhavbhalerao@nitmba.edu.in[2]

Abstract: *The current study facilitates the discussion on implications of the Fourth Industrial Revolution (4IR) on education. World technological development and digitalization are unmistakable tokens of the 4IR; they will undoubtedly have a positive impact on transition to Education 4.0. Authors examine the key challenges and features of the 4IR for the Russian educational system. The fourth industrial revolution (IR4.0) is changing the world around us. IR4.0 has a key role in the evolution of education system. Within range of this article, the author focuses on researching important impacts of the fourth industrial revolution in coming time: training activities of higher education institutions; curriculum content, teaching methods , learning environment, methods, materials, equipment, demand and process of learners have many changes. On that basis, the author analyzes some orientations for the higher education development in the context of the fourth industrial revolution.*

Keywords: Industrial Revolution 4.0, Education 4.0, Education System

I. INTRODUCTION

The World Economic Forum Davos-2016 heralded the fourth industrial revolution and predicted a "major shift to the future of work". Disruptive technologies, fueled by Industry 4.0, have begun to fuel a world that was once turbulent, changing, complex and ambiguous and impacting our lives and relationships. , as well as the future of our work. Technological breakthroughs are rapidly changing the boundaries between tasks performed by humans and those performed by machines. In 2018, an average of 71% of all tasks performed by humans in industries in 12 selected areas; but by 2022 it is predicted to drop to just 58%. , a new set of jobs will emerge, where human skills and EQ will be most important and valued. As artificial intelligence increases, education must create better human skills to advance MI and AI. Industry 4.0 is defined by connected network physical systems, powered by IoT and powered by data, creating a fully interconnected society. In such a disruptive, hyper-connected world, education has no choice but to adapt to these changes in the industry brought about by disruptive technologies. The solution is to deploy Education 4.0

As Education 4.0 represents changes, in line with Industry 4.0, we see that lectures and memorization (Education 1.0), Internet-based learning (Education 2.0) and knowledge-based education knowledge (Education 3.0) is not enough. It's time to focus on innovation-based education (Education 4.0). What is Education 4.0? Education 4.0 is a focused approach to learning that aligns with the Fourth Industrial Revolution and transforms the future of education using advanced technology and automation. Technology begins to permeate the educational process in the new millennium, and students and teachers begin to use technology in fundamental ways (Education 2.0). Education 3.0 emerged as technology advanced, especially the widespread adoption of the user-generated Internet. This gives students access to their own resources, e-learning capabilities, and platforms to communicate with teachers and other students. Education has become more connected, with students having direct links to a variety of sources of knowledge, rather than focusing on back-and-forth exchanges between students and teachers. Education 4.0 is a learning technique associated with the fourth industrial revolution and focuses on transforming the future of education through advanced technology and automation. Smart technology, artificial intelligence and robotics are part of this industrial revolution. Adaptive learning that integrates artificial intelligence and machine learning in education will keep students up to date. Students

must be able to master the skills required by rapidly changing technology, they must be guided rather than instructed, and knowledge must be given to them, not passed on to them. . Creativity is the foundation of Education 4.0. It emphasizes the need to prepare students to face challenges, face-to-face.

Education 4.0 will require a gradual paradigm shift:

1. Need-based education instead of supply-based education
2. Skills-based rather than knowledge-based education
3. Lifelong learning instead of face-to-face learning
4. Emphasis on EQ rather than just IQ
5. Keeping up with change requires revisiting traditional educational models with a futuristic approach.

Students must master skills defined by rapidly changing technology; they must be led, but not guided; information must be made accessible, but not made available.

General education and vocational education should aim to prepare students to compete with outside job worker.

Megatrends in Education 4.0

1. More personalized learning - This implies that there will be individual learning processes for each student. This will certainly have a positive impact as it will allow students to learn at their own pace. It will also help teachers identify each student's strengths and weaknesses and guide them accordingly.
2. 2) Accelerating opportunities for distance learning - The foundation of Education 4.0 is to provide you with learning anywhere, anytime through a suite of online learning tools that promote distance learning and at your own pace. The concept of Active Blended Learning (ABL) is evolving, where students can actively participate in learning beyond the classroom. In this way, students will master both hands-on and experiential learning
3. Selection of instructional tools - This means that students will be able to choose the tools and techniques they wish to acquire. get this knowledge. Techniques such as associative learning and flipping classes are some examples.
4. Domain-specific experiences - When the integration of technology into specific domains facilitates greater efficiency; The curriculum will now contain more skills that require human knowledge and personal interaction. As such, the current curriculum will include specialized in-depth knowledge that can help students with internships, projects, and more.
5. Easy and accurate test sample - A more convenient assessment method is introduced with Education 4.0. There are online and offline assessments and students are assessed on projects, assignments, and fieldwork. With Education 4.0, we have begun to build a peer-to-peer learning atmosphere where students can learn collaboratively and with each other.
6. The teacher's role is that of the moderator - Curriculum and learning outcomes focus on complex 21st century skills including problem solving, critical thinking, creativity, people management, teamwork and collaboration, emotional intelligence, judgment and decision making,
7. Redesigning curriculum with a special focus on future subjects - Building digital skills Turning to digital tools for virtual (face-to-face) learning environments (VLE). Classrooms are built with technology. The flipped classroom is a model of learning that reverses traditional methods. The flipped classroom concept includes active learning, student engagement, and podcasting. In the flipped classroom, material is provided through learning videos that students must watch at home. Instead, classroom sessions are used for group discussions and homework. Here, the teacher acts as a coach or mentor.

In a 2019 report, the World Economic Forum identified "eight essential characteristics" of Education 4.0. Features include global citizenship, creativity, technology skills, interpersonal skills, personalization and self-paced, accessibility and inclusion, problem-oriented and collaborative, student-focused and lifelong. It's an approach that requires learners to be playful and curious, get out and experiment with ideas, innovate with technology, and communicate in a variety of texts.

Learners must be in the real world, encouraged to solve problems and use their curiosity and creativity vigorously. While technology is inherent in most Education 4.0 models, it is not the engine but the catalyst. The goal of this learning revolution is to highlight the human qualities we bring to work that can be enhanced by technological innovation.

To change your reading and learning habits, you need to develop smart new teaching skills. Thanks to the rapid development of Industry 4.0, The development of modern research shows that education must catch up with the world of students and provide them with a safe and sustainable future. Keeping up with a changing world is important and Education 4.0 is the method used by educational institutions to achieve this. Research has shown that student learning outcomes can improve as education becomes more individualized. In Education 4.0, this personalized research is possible. In fact, Education 4.0 uses a smart school management system, learning management software, communication tools and other teaching and learning tools. Personalized learning with Education 4.0 fosters understanding and gives students access to materials that are truly engaging, more professional, and more memorable

In recent years, under the leadership of the education sector, higher education institutions have actively innovated content, curriculam, and teaching methods in the direction of a competency approach, improving applied skills and practice; linking training with the job market, proactively grasping the needs of enterprises or building training programs with the participation of enterprises. Scientific research work of universities and institutes has also achieved many positive results.. The training program is still heavy on theory, light on practice, lacks practicality, has not created a consensus on linking educational goals with job search goals for learners; there has not been a link between national and international higher education standards; The link between universities and companies in training activities, scientific research and technology transfer is still weak ¦ Therefore, the number of unemployed graduates is high. Given this situation, in the era of the fourth industrial revolution, how will the higher education of be affected? First of all, the fourth industrial revolution affects the training activities of higher education institutions: The fourth industrial revolution has created a society - a smart economy. In all fields, artificial intelligence, robotics, internet, nanotechnology, biotechnology... will still have a strong impact on social life. Therefore, training activities of higher education institutions such as training programs, teaching methods, student management, assessment methods, assessment of output standards, etc. have changed, must be associated with the application. Apply science and technology and meet the requirements of the industry. Revolution. This is a challenge for higher education in the current period, because in many higher education institutions the use of modern machinery, equipment and software in training, management, teaching and learning are not popular. Limited funding, lack of high-quality human resources are some of the reasons why the application of science and technology has not been widely applied in universities and academies.

Second, the fourth industrial revolution affects training content and programs, With the great development of technology, the appearance of robots equipped with artificial intelligence with functions has the ability to replace people, even more optimally. Demand in certain professions such as IT, biotechnology, automation, mechatronics, IT applications, IT, etc. will experience expecting training knowledge as well as specialized skills.. In other words, the Fourth Industrial Revolution requires higher education institutions to comprehensively innovate, moving from the "teach what is learned" education, focusing on equipping learners with knowledge. to an education that comprehensively develops the qualities and capabilities of learners, "teaching what the market and businesses need", or even further, "teaching what the market and businesses are going to need"

training market for higher education institutions. Third, the entrepreneurship knowledge of training in higher education institutions has become easier: one of the features of the fourth industrial revolution is the foundation of some technologies. Basically combined with a highly globalized technology infrastructure, it is a good condition to start a business. Startups can be deployed with anyone, anytime, anywhere, in any field. This is an opportunity to bring the spirit of entrepreneurship into training activities of higher education institutions.. Fourth, teachers' organizational and teaching methods will change: the development of information technology, digital tools, networks will be means for teachers to change . Through school management software, information about the school, students and faculty will be digitized into a storage place, and at the same time provide a data system to help lecturers understand the activities of the school and colleagues, monitor events and quickly solve problems arising in the learning process of students. . Moreover, with the explosion of science and technology, many new teaching and learning methods are easily applied. This is a good condition for teachers to innovate teaching methods. But it also requires teachers to constantly innovate, create and use and master technology, how this tool supports and creates freedom and creativity in teaching is also a challenge. Fifth, the learning environment, methods, materials and equipment for learners have changed: In the fourth industrial revolution, teaching and learning equipment and lessons are not just textbooks and books. Traditional or

reference material that will be numerous on the information channels such as Facebook, YouTube, google... Learners will now easily find the information they need with just a smartphone or tablet. In addition, the learning space will also be more diverse, instead of having to go to the classroom, traditional lab or simulation room, learners will experience learning through virtual classrooms, online learning through software and systems. network system.. At that time, knowledge will not be limited and exclusive to anyone, by any organization, learning will not be confined to the lecture hall. Therefore, learners have the opportunity to learn anytime, anywhere and the process of accessing and accumulating knowledge is also faster. It is practical for building a learning society with lifelong learning needs, meeting people's requirements in the 4.0 era.

Sixth, learners' needs and learning journeys will change: each student and learner has different learning needs and abilities. The technological advancements of the Fourth Industrial Revolution will create modern educational software that allows learners to follow programs and pathways that meet their own needs. In many countries around the world, this adaptive learning software has rapidly replaced part or the entire role of textbooks. Teacher Education Competencies and Skills 4.0 The world is changing and developing to a new level, not everyone can resist technology, so in order not to be crushed by it, teachers must have the will to learn constantly. Changes in the world by technological advances need not be a threat, but face it positively, learn and adapt, and look forward to sharing with your colleagues, both success and failure. Optimal results are difficult to achieve individually without the cooperation of others. Therefore, teachers must have a strong will to collaborate and learn with and/or from others. This skill is essential for today and tomorrow. It's not too complicated, because the world is already interconnected, so there's no reason not to collaborate with others. Creativity is one of the essential skills in the Top 10 skills; creativity will create a structure, an approach or a method to solve authentic problems. Teachers need to model this creativity and implement how this creativity is integrated into their teaching. Educators also do not need to be too afraid to make mistakes, but are always ready to face the risks that arise. Mistakes are common at the beginning of learning activities and are not obstacles to progress; errors must be corrected. In the various theories of learning, we assume group and individual learning. In addition, in recent times, individuals' learning and learning preferences are increasing. Therefore, teachers today need to see students as unique, including their families and how they learn,

II. CONCLUSION

The industrial revolution 4.0 has changed the way we think about education. There is an urgent need to update the education system to equip students with skills that will shape the future of work and the future of society. The Education Framework 4.0 provides a vision of how the school system can be updated to meet the future needs of children. This transformation requires changes in learning content to include both the technical and human skills needed to build inclusive and developing economies and societies, and changes in the Learning experiences more closely reflect the future of work. For higher education institutions in India, they need to be aware of the role and impact of the fourth industrial revolution on higher education; renewing the training program; renovating the training model; strengthen the application of science and technology in education and training activities, step up scientific research activities and technology transfer; strengthen international cooperation in education and training activities. In addition, students need to be active and active in learning; improve and develop skills; gain experience through hands-on activities. It is certain that activating a new education model will require greater efforts from all stakeholders - students, educators, university administrators, and civil servants. This initiative aims to mobilize key stakeholders in the transition to Education 4.0 by implementing new national education policies that integrate these changes in content and experiences into the education system. public education system; support teachers to realize this new vision through retraining and development; participate in an ongoing global exchange of best practices between schools and school systems; and develop mechanisms to measure progress against these goals. A systematic education policy and appropriate AICTE/UGC oversight of higher education institutions will propagate quality results relevant to the industry. New technologies are evolving at an exponential rate that will require skilled candidates .The contemporary education system must justify the challenges of recent advances, such as artificial intelligence (AI), robotics, internet of things, biotechnology and nanotechnology, 3D printing, materials science, quantum technology. The education system should create Massive Open Online Courses (MOOCs) and other e-learning platforms in teaching and learning. The

system must develop towards the social-digital-ecosystem. The physical and virtual dimensions must be intertwined to provide intelligent services.

REFERENCES

[1]. Priya Sharma, "*Digital Revolution of Education 4.0", International Journal of Engineering and Advanced Technology (IJEAT),*Volume-9Issue-2, December, 2019.

[2]. Anealka Aziz Hussin, "*Education 4.0 Made Simple: Ideas For Teaching", International Journal of Education and Literacy Studies* 6(3):92 · July 2018.

[3]. Rasika Lawrence, Lim Fung Ching, Haslinda Abdullah," *Strengths and Weaknesses of Education 4.0 in theHigher Education Institution*, *International Journal of Innovative Technology and Exploring Engineering (IJITEE)*, Volume-9 Issue-2S3, December

[4]. Penprase, B. E . The Fourth Industrial Revolution and Higher Education, ,Soka University of America, Aliso Viejo, CA, USA, e-mail: bpenprase@soka.edu

[5]. Grinshkun V. Teaching in the Fourth Industrial Revolution: Transition to Education 4.0 and Osipovskaya Elizaveta , Moscow City University, vadim@grinshkun.ru,e.osipovskaya@gmail.com

[6]. WEF report. The Future of Jobs 2018, https://www.weforum.org/reports/the-future-ofjobs-report-2018, last accessed 2020/10/12.

[7]. Cordes, F.; Stacey, N. Is UK Industry Ready for the Fourth Industrial Revolution? The Boston Consulting Group: Boston, MA, USA, 2017.

[8]. Li, G.; Hou, Y.; Wu, A. Fourth Industrial Revolution: Technological drivers, impacts and coping methods. Chin. Geogr. Sci. 2017, 27, 626–637. [CrossRef]

[9]. Thoben, K.-D.; Wiesner, S.; Wuest, T. "Industrie 4.0" and Smart Manufacturing—A Review of Research Issues and Application Examples. Int. J. Autom. Technol. 2017, 11, 4–16. [CrossRef]

[10]. Shahroom, A. A., & Hussin, N., 2018, Industrial Revolution 4.0 and Education, International Journal of Academic Research in Business and Social Sciences, 8(9), pp. 314-319.

[11]. Adekunle Oke and Fatima Araujo Pereira Fernandes, 2020. Innovations in Teaching and Learning: Exploring the Perceptions of the Education Sector on the 4th Industrial Revolution (4IR), Journal of open Innovation: Techenology, Market, and Complexity, pp. 1-22.

[12]. Priya Sharma, 2019, Digital Revolution of Education 4.0, International Journal of Engineering and Advanced Technology (IJEAT), 9(2), pp. 3558-3563.

[13]. Penprase B.E., 2018, The Fourth Industrial

[14]. A Dujin, C. Geissler, and D. Horstkotter (2014), "Industry 4.0 The new industrial revolution How Europe will Succeed, " Rol Berger Srateg. Consult, no. March, pp. 1-