

Answers to the Societal Demands with Education 5.0: Indian Higher Education System

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Abstract: The purpose of this paper is to show the required educational system which drives to the societal needs. In higher education programs, the quality edification continues to deteriorate irrespective of paying supplementary attention. There are many factors which influenced the education system and at each step our perception is changed and developed. The problem is arisen when industry 4.0 of the twenty-first century is came with emerged technologies, which takes one step ahead with automation technologies like IoT, Artificial Intelligence, Machine Learning in all manufacturing technologies and making smart industries. The motive of education is to realize the truth of current scenario of industries, society and country. The main challenge and constraint of education required changes in educators' attitude, textbooks, curriculum, education technologies, pedagogies, innovation, research, reforms and policies of education 4.0. The education 5.0 is more about people than technologies. All these challenging parts can be overcome by creating values to identify the creative potential of human beings by enhancing education system known as education 5.0. The answer of all societal problems is continuously overcome by problems solving attitude through rehumanizing values among students as well as in educators. In this regard, to know the all-education philosophy and update learning practices to implement education 5.0 has been discussed.

Keywords: Quality education, education philosophy, industry 4.0, education 4.0, education 5.0, smart industries, creating values, education technologies, societal problems.

1. Introduction

Today's education is not only a process of sharing and delivering an instruction to the students and after the covid-19 the paradigm of the education is shifted toward online mode. It seems that, the online education plays a very important role and creates long impact on society. The education 4.0 is require to cope up with the industry 4.0 and its new techniques [1,2]. Along with knowledge, students require different skills, values, innovation and research-based education. The student's class is the combination of heterogenous mind and having different learning abilities. To satisfy every student in online learning mode is not possible. At the world-wide level academic efforts are

continuously taken in the direction of improving academic programs to ensure better knowledge and skill that are needed by industry 4.0. As the industry 4.0 which involves automation, digitalization, collaboration of machine and human beings with creativity. To identify the gap between digital skill, science, technologies and learning pedagogies require studies/surveys in educational institutions to explore how job market changes the society and educational needs. In the next decades 90 percent of societal needs require digital skill. To fulfill these demands, institute should know about education evolution, curriculum and pedagogical framework, what reforms and policies are required. Also, to identify the trends, emerging technologies in education system requires planning for the future digital world. This paper will provide a critical view of education 1.0 to 4.0 and to enhance education system we proposed education 5.0.

This paper is organized as follows: section 2, described the overview of education system and different types of teaching-learning models and modes, section 3 highlights the statics of higher education in India. In section 4, teaching learning methods and its execution through implementation of education 5.0, creating values based on individual based, society based, professional based skills, and also provides enhanced Bloom's technologies. Section 5 include recommendation and discussion about the mentioned topics and also provide the comparison of all education system. In section 6 and 7 presents the conclusion and the future scope.

2. Overview of Education System

The evolution in an education system from 1.0 to 5.0 from ninth to twenty first century with their learning model type has been shown in figure.1. Here, the evolution of education system has been described. Education 1.0 is complete teacher centered-system and technology is completely forbidden in the class so the teacher has complete authority and students are completely passive. As the education system grows from 1.0 to 2.0, the communication and collaboration are also starting to grow. The system is completely exam and knowledge-based system in which knowledge is checked by exam and memory. In education 3.0, student centric approaches were given importance and the teacher is transformed into a coordinator/facilitator, advisor, learner and practice guide. Now new flip classroom teaching methods were in the picture instead of traditional

classrooms and students were researching. In the era of education 3.0, lesson plans are now called learning plans, more dialogue and use of technology. In education 4.0, outcome/action-based system were focused and learning is done at home or at outside due to digitalization.

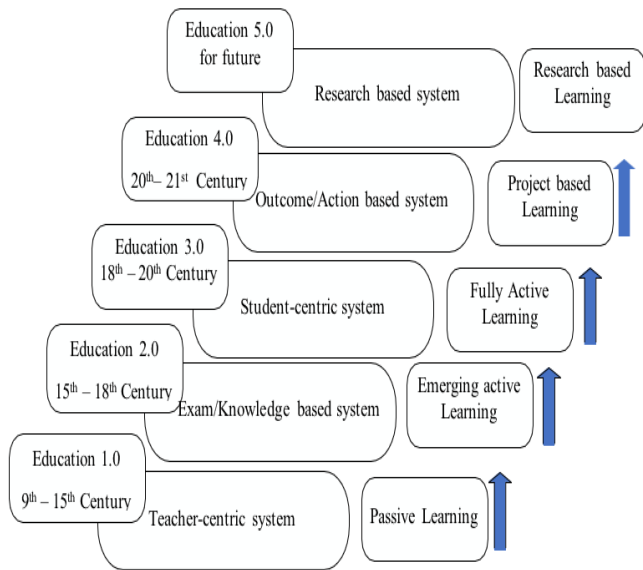


Figure 1: Evolution in education system

Due to the technology being free and/or easily available, Interactive flipped classrooms are applied with the use of virtual reality (VR). Learning plans are now creativity plans and co-creation and innovation is the centre. As the technologies are growing very fast, continuous training and development of new knowledge and skill is required for teachers and institutions. Now, the education 5.0 is a digital transformation driven by the use of advanced technologies and placing learners and teachers at the centre of the real-world teaching learning process to enable them to govern their own academic, social, professional and individual growth. Education 5.0 promotes research-based education system in which many barriers and series of innumerable challenges are jumped over in a race from education 1.0 to education 4.0. To reshape and match the existing education system with advanced digital technologies requires continuous growth and open mindset. Education 5.0 aims to value creation, human to human interaction, research skill, problem solving attitude and combined all stakeholders, teachers, institutes and industry professionals to implement all advanced technologies with the preparation social transformation.

Education 5.0 promotes tools and techniques to improve personalized learning of the students with more humanity approach. In this era, personalize learning makes students' performance better. When students entered in the real world after achieving his/her required education, then professional skills are more important to understand the societal demand. Here, the main challenges of implementing education 5.0 and shift from education 4.0 to 5.0 are:

- Q1. Does the organization have the capabilities to achieve education 5.0.
- Q2. What is the expectation and where are improvements needed?

2.1. Types of Learning Model

A. *Passive learning model (PLM)*: This method includes instruction in which the educator has a content knowledge proficient and the responsibility to be pass on material to the learners. In this case, the student is a passive observer of the system's behaviour who does not converse and only receiving instructions. A method of instruction in which the teacher gives a lecture whereas the students listening subtly with little personal communication.

B. *Active learning model (ALM)*: In ALM, brainstorming sessions, discussions, debate, training, teaching, task completion, group work, focused listening, framing questions, articulating, notetaking, explaining, and role playing all are important parts. In this mode of teaching, that entails actively engaging students with course content through discussions, problem solving, situation-based questions, case studies, role plays, and other methods. The ALM is further divided into further parts

- a. Project based learning.
- b. Outcome based learning.
- c. Innovation based learning.
- d. Inquiry based learning.

The different methods of ALMs are discussed below:

- **Project based learning Model (PBL):**
 - i. Recognize/identify a unique problem
 - ii. Investigate a problem using inquiry process and generate ideas
 - iii. Explore the ideas and challengers by collaborating activities
 - iv. Utilize ideas and inquiry process to design a product
 - v. Developed the product that discourse challenges

- **Outcome based learning Model (OBLM):**

OBLM is a learning system in which each stage is to set for achieving specific goals. Each student should have completed the goal by the end of program through OBLM practice. In OBLM, there is no single prescribed style of assessment or teaching-learning; rather, programs, modules, teaching and assessments should all work collectively to support students to achieve the expected outcomes. Depending on the outcomes level, the educator's role changes to that of a teacher, guide, instructor, trainer, facilitator or mentor.

- **Innovation based learning model (IBLM):**

In IBLM, students can participating in a variety of activities to help them determine what they are passionate about and primary focus while studying for all of their courses as shown in figure 2.

In other words, from the moment students arrive on campus until they leave, they will anchor their learning on their passion.

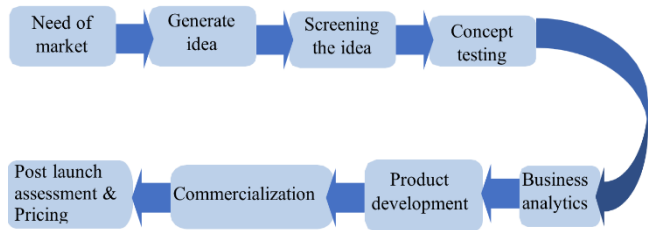


Figure 2. Different stages of innovation based learning model

- **Inquiry based learning model (IBL):** There are many approaches to integrating teaching and research at the undergraduate and post graduate level. In this system, research practice can shift from an instructor-centered to a training environment. IBL allowing students to make direct relationships through research and rising asking questions. It is a learning approach that encourages students to engage in problem-solving and experiential learning [3,4].

2.2. Mode of Teaching Learning

The explanation for all modes of teaching learning has been shown and discussed below:

- A. **Face-to-Face learning mode (FLM):** The face-to-face education system is oldest and most popular method. Most of the education system adopted and still using for effective teaching learning in the institute on daily basis.
- B. **Online learning mode (OLM):** Due to Covid 19 online teaching come into the picture and widely used form of distance education. This online teaching-learning is handled through internet and expected to be continue in future. It is also known as "e-learning," which is an umbrella term for today's different learning systems that takes place over time and not in a traditional classroom.
- C. **Virtual learning mode (VLM):** Digital education takes into account of teaching-learning methods that supports the active use of digital technologies.

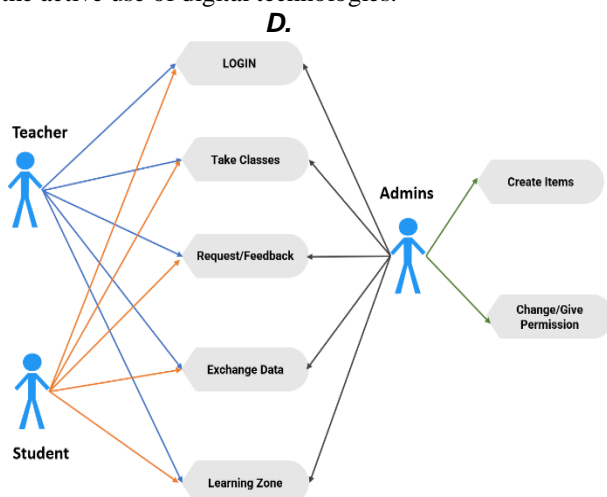


Figure 3: Virtual learning mode

By using digital educational technologies, educators will engage in different form of teaching learning methods by exploring digital techniques [3]. Therefore, educators are involved in planning, teaching-learning, evaluating opportunities of blended, hybrid, or fully online courses as shown in figure 3. The benefits of using a virtual learning approach include a more engaging face-to-face learning experience, access to educational content at a time or location that is convenient for the learner, and the option of a more personalised learning experience. It offers well-integrated hybrids of digital and traditional modes of learning. Allow for more interaction between students and teachers both inside and outside of the classroom.

D. Blended learning mode (BLM): Blended learning mode gets much popularity in existing education system. Blended learning mode can be fulfilled by virtual classroom, online, training, face to face training, webinars, web-links, simulations, assessment, evaluation and one-on-one tutoring.



Figure 4: Blended learning mode

It combines online educational sources/material and interactions with conventional classroom methods. In professional expansion, training, teaching and learning in blended type mode plays very imperative role.

E. Hybrid learning mode (HLM): The global pandemic created uncertainty as well as opportunities as a result, many educational institutions have adopted a HLM in teaching and learning. It allows students to attend classes in both online and offline modes as shown in figure 5(a).



Figure 5 (a). Hybrid learning mode

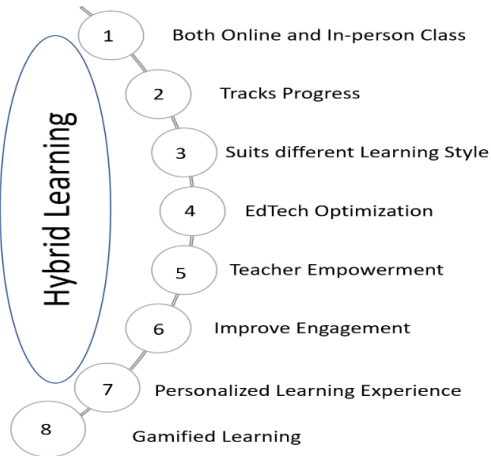


Figure. 5 (b). Different parameters of Hybrid learning mode

F. Web based real learning mode (WBRLM): In web-based learning designers/teachers can create interactive course materials with online activities, animations, and simulations using programming and "plug-ins. All these enhance the learning and make it more enjoyable and meaningful for students which includes correct processes as shown in figure.6.



Figure 6: Web based real learning mode

3. Statics of higher education in India

To emphasis on current digital education requires detailed data to expand the vision of higher education at the various level. To target on the future's education development, the current scenario should be known. Here, different statics of education in India has been shown in figures from 7 to 12 [11]. The overall available universities along with their

types as shown in figure 7. Total 1169 universities are available for higher education. As the growth of higher education institute/colleges is continuously grows from F.Y. 2016-17 to F.Y. 2020-21 from 39071 to 45000 in numbers as shown in figure 9. The increment of higher education institutes in quantity but quality still remain a question for India. The highest number is available for general universities followed by rural universities where as language universities are only 11 as per the data shown in figure 7. India still required more univerities with quality education to reach knowledge of every field at nearby places. The figure 11 and 12 shows the enrollment staus in india for different courses such as diploma, UG, PG, PhDs, and other certification courses .

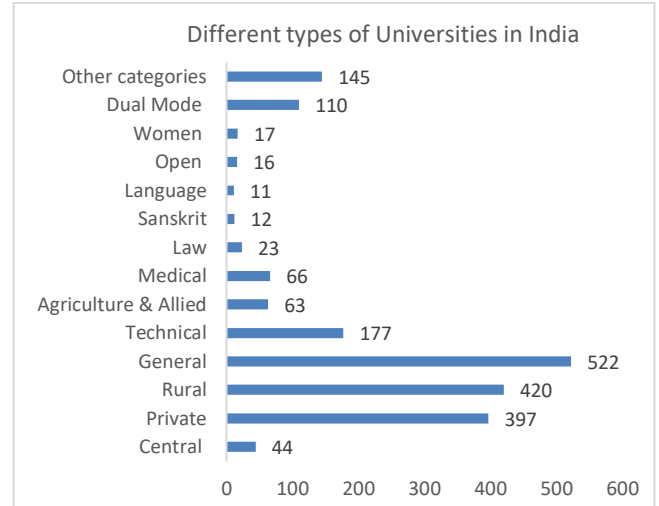


Figure 7: Number of universities in India

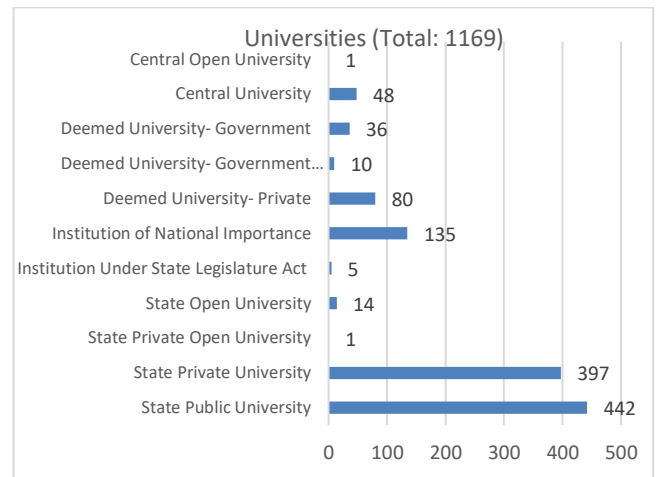


Figure 8: Different categories of universities

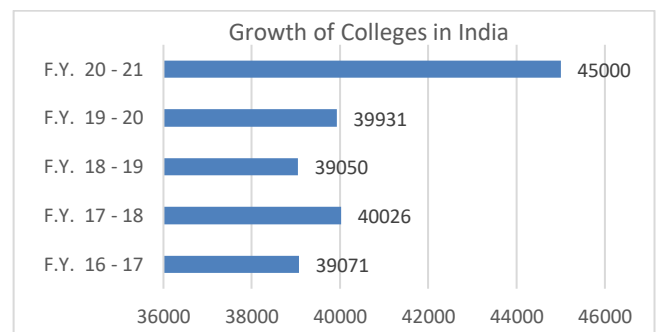


Figure 9: College growth from F.Y. 16-17 to F.Y. 20-21

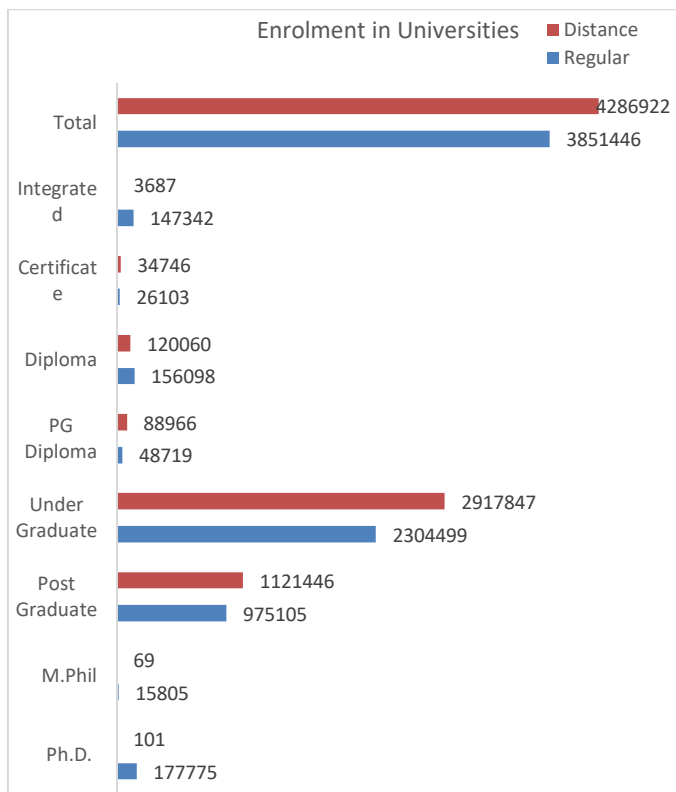


Figure 10: Status of enrolment in universities

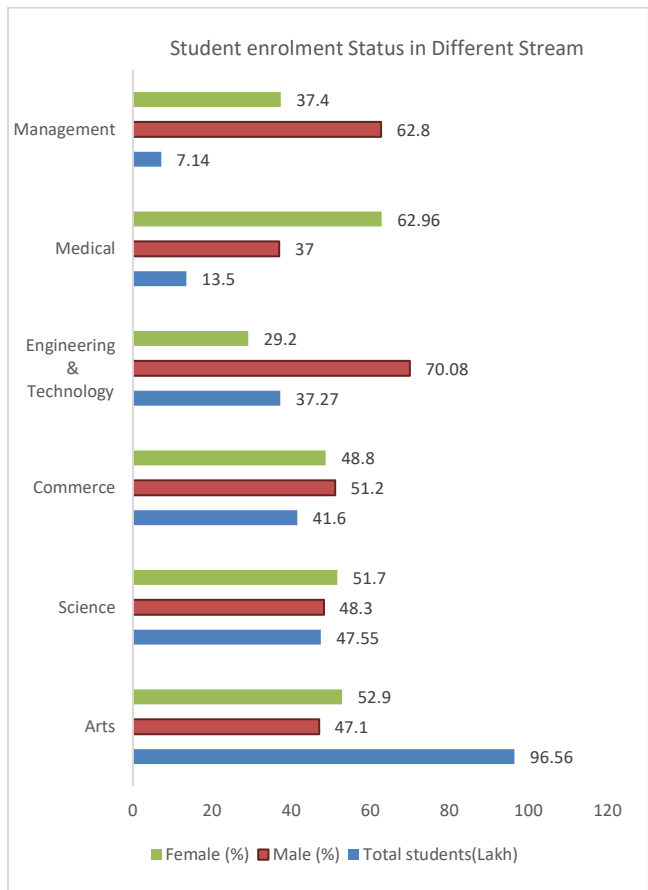


Figure 11: Student enrolment status in different stream

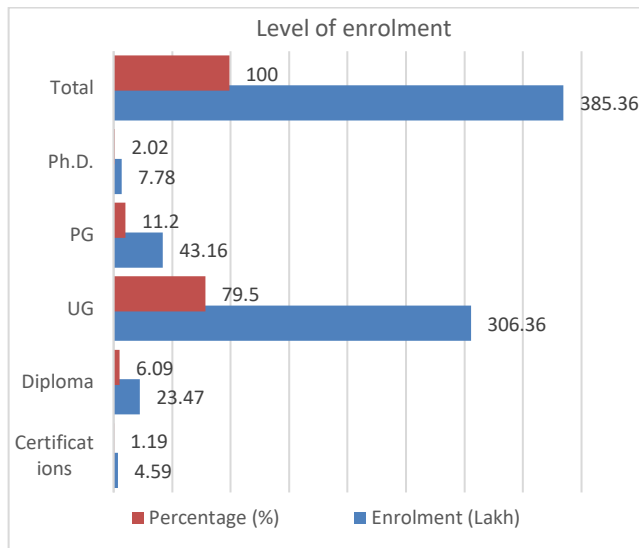


Figure 12: Enrolment status in higher education

4. Implementation of Education 5.0

Millions of students are enrolled as regular or in open courses like diploma, degree colleges and in universities as shown in the graphs from figure 7 to 12. The current digital world of education requires different type of skills, innovations, research along with of activity-based learning, creativity and human value creation. The following points should be considered to implement education 5.0:

- a) Requirement of Education 5.0
- b) Human value creation amongst students
- c) Modification in existing Bloom’s technology

4.1. Requirement of Education 5.0:

Education is ongoing process and considered as a natural part of life. Now a days, education is possible anywhere and anytime because of improvements in technologies. In education 4.0, the world dominated by technologies thus less human to human interaction and decision making is also depends on machines. To rehumanizing education, the education 5.0 comes into the picture. The education 5.0 look far beyond the technologies and bring humans to the centre of the education. Today’s all such technologies have been using in education to enhance a teaching-learning experience, with the goal of exploring skills through education and learning consistency. The drastic reformation in education still requires improvement. The education 5.0 will provide opportunity to maintain thinking and problem-solving skills along with human values alive throughout the learning and development process. The issue arises once digitalization of a twentieth era arrives, which necessitates understanding of technologies, abilities to use of the technologies and accept the advancement. Mostly in era of industry 4.0, market was inconsistent and modifying at a fast

rate, and education 3.0 and 4.0 seems unable to untangle with previous approaches and necessitate innovative challenge expertise. In order to ascertain what to do to resolve issues in changing trends expertise, understanding, and empiricism are required. To deal with such a scenario, education 5.0 has been developed and transform the national curriculum with innovation. A fast-changing educational framework for better social and professional education is obliged [10]. The main component of education 5.0 are teaching learning process, ICT technologies, Infrastructure, competencies and skills as shown in figure 13.

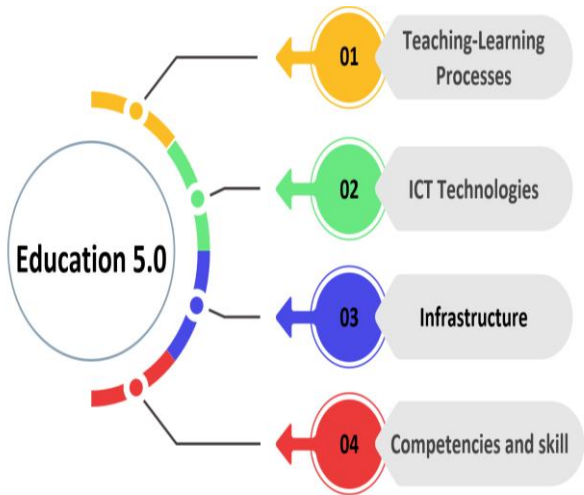


Figure 13: Main component of education 5.0

A. *Teaching learning Process:* The education 5.0 adopt because it uses new technologies to provide more humanize teaching learning to cultivate values by development of social, emotional and professional skills. Education 5.0 try to provides solutions that improves humanity in the society. The existing and required teaching learning model and methods are shown below in figure 14:

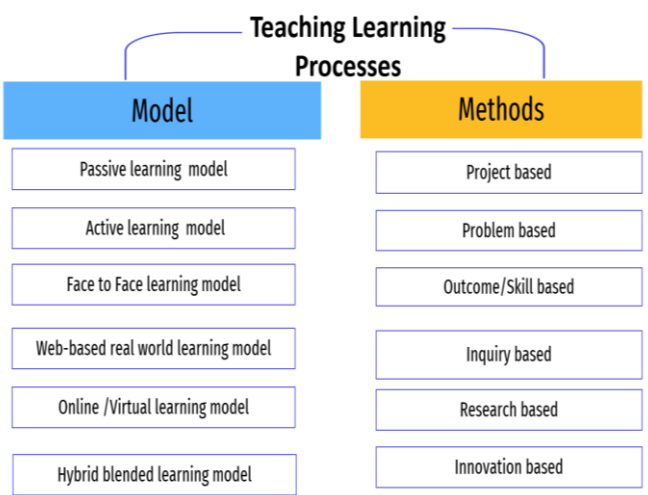


Figure 14: Present teaching-learning processes

B. *IC Technology:* The delivery mechanism plays very important role in education. To make the effective education require identification of most suitable techniques and tools which are best suited for

achieving the objective of education 5.0. Some of the availability of IC technologies as shown in figure 15. Sometime use of many technologies at a time makes learning more ineffective. So, it is necessary to which technology may or may not be preferred as a most suitable delivery approach.

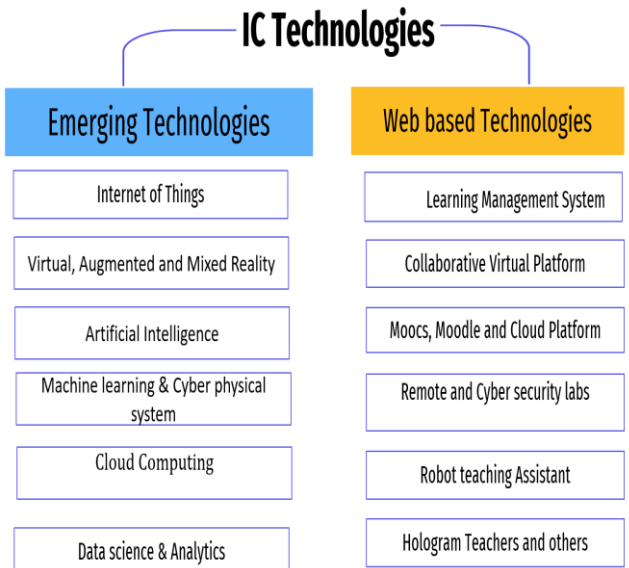


Figure 15: Information and communication technologies

C. *Infrastructure:* The education 5.0 require investment in technology as well as training to be imparted in educators towards technology and shift their interest towards human values in education. Different types of classroom and institute level, technologies are shown in figure 16 to revamp the education system.

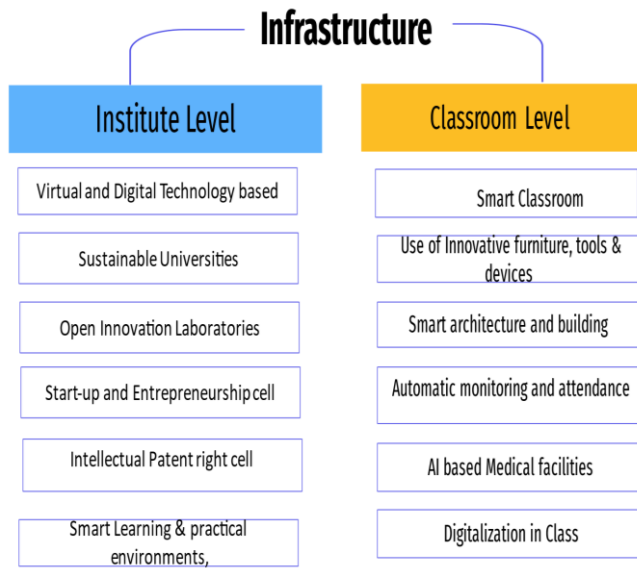


Figure 16: Required infrastructure for education 5.0

D. *Competencies and Skills:* The education 5.0 is not about technology, digital infrastructure, connectivity and tools. The main objective of education 5.0 is to prepare our students skills towards society, human values, emotions as an individual growth along with academics. The various soft and hard skills are shown in figure 17.

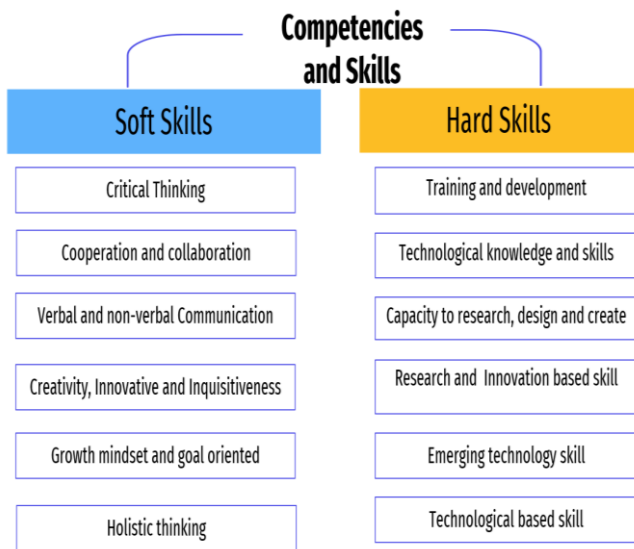


Figure 17: Required skills for education 5.0

Steady growth is required to revamp the current education system to meet the emerging national curriculum according to education 5.0. Education 5.0 will explore different learning activities by creative thinking, collaboration among all decision makers, educators, academic institutions, and experts, to enact all innovative technology and tools. The primary concerns for implementing education 5.0 are indeed the following: organization, eco system, innovations and humanities. The system of education has progressed from 1.0 to 4.0, with plans to reach 5.0 in the future. While researchers discuss a path of education from 1.0 to 5.0 that contributes significantly towards societal sphere [6, 7].

4.2. Human Value Creation

The human value creation is very important parameter which must be inculcate in the students concurrently. The real learning can be only implemented in the students by creating social values and professional skills. Students have to learn each and every aspect of life by open minded and will apply in professional as well as in personal life as shown in figure 18. The role of teacher is very important to drag the student from fixed mind set to open mind set for learning.

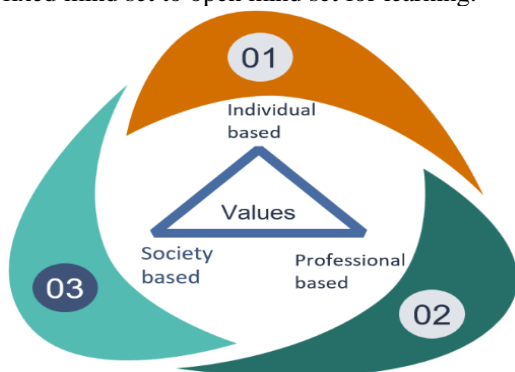


Figure 18: Human value creation parameters

The human value creation is classified on the basis of individual, professional and social as shown in figure 18.

A. Individual based

- Self- Assessment
- Vision and purpose
- Inquisitiveness
- Anticipation and optimism
- Flexibility and resilience

B. Professional based

- Verbal and non-verbal communication
- Problem-solving and critical thinking
- Inventiveness and entrepreneurship
- Grit and goal oriented
- Growth mindset

C. Society based

- Collaboration across social networks
- Liveliness and adaptability
- Holistic thinking
- Society wellbeing
- Empathy and Stewardship

4.3. Bloom's Technologies

The execution of sound teaching-learning process is going with proper execution of educational plan, course, curriculum, study material with content, textbooks, notes, services, actions, different pedagogies, evaluation, practices and results. The direct measures and outcomes attainment is accomplished by examinations and rubric analysis, which improves the teaching-learning processes effectively. Bloom's technology and rubrics plays a very decisive role to enhance the capability and skills of student as well as educators. Rubrics helps teachers, educators, and students to identify the level of quality work. In 1956, an educational psychologist Benjamin Blooms structured a tool for developing students intellectual. Bloom's taxonomy helps teachers to understand how students reflect on particular topics. Figure 19. shows the pyramid comprises at the bottom lower thinking skills and the higher thinking skills at the top [5].

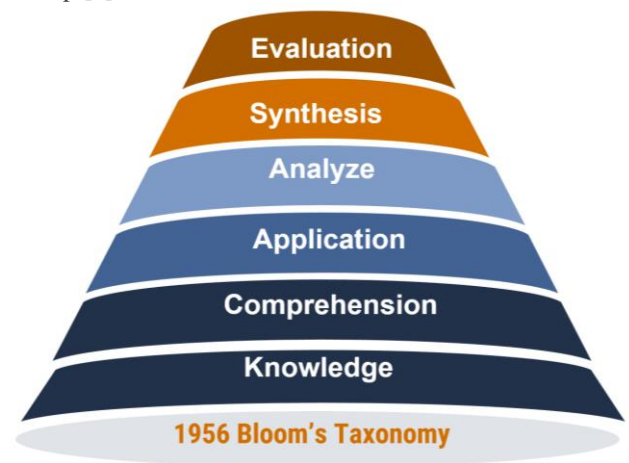


Figure 19: 1956 Bloom's Taxonomy structure

The 1956 blooms taxonomy has been a very widespread and valuable tool for several years. In the 1990's, some changes to the original by reordering the levels and altering the terms from nouns to verbs. In this revised taxonomy, levels of skills are travel from remember, understand, apply, analyse, evaluate and finally create as shown in figure 20.

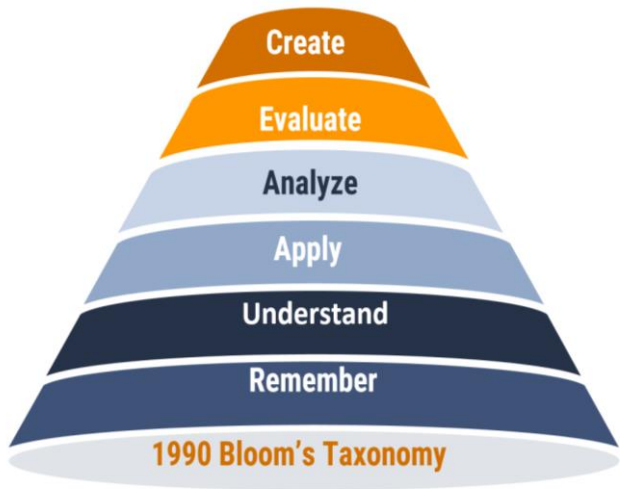


Figure 20: 1990 Revised Bloom's Digital Taxonomy structure

Bloom's revised taxonomy as per the digitalization and demand of the world. It was a helpful and great but at some points this taxonomy became obsolete due to the swift incorporation of technology into the classroom. After the creation level of the students, they need professional skills and values creation to contribute as a professionally and responsibly towards society and nation. So, a professional skills and values should be a now necessary part of the students, which will be indoctrinate amongst the students as a part of holistic approach in curriculum along with all levels as shown in figure 21.

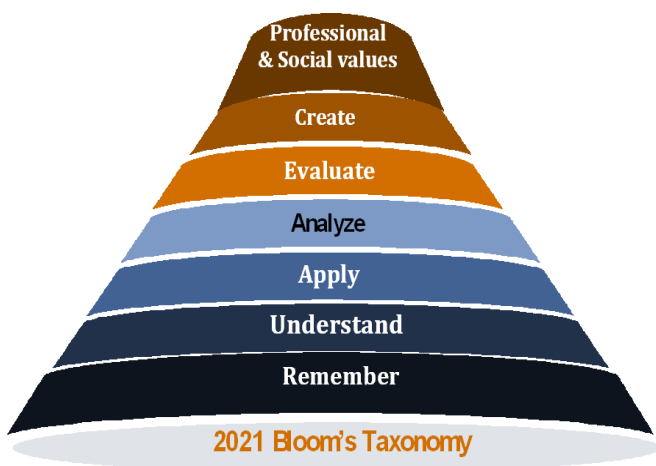


Figure 21: Required Bloom's Digital Taxonomy structure for 21st century

5. Recommendation and Discussion

To bring the education close to the reality along with theoretical concept and practical knowledge; the first step towards is to rise the research-based knowledge with

experiments and innovation for better outcome. Education 5.0 will focus more on practical reality with the approach of creating human values towards society and ultimately serving the nation [8-9]. The second step includes in which educational institute should studied the problems of nearby industries/business/society and start providing realistic and genuine solution. The requirement of industry and society from educational institute is to great exposure to real time entities. The system of education is designed in such a way to helps societal and national problems. In India, the main problems are lower employment rate, unbalance in courses, job creation, less manufacturing and fewer small-scale industries. Education 5.0 helps us to way out and solving the current scenario problem. Hence, higher education always adds values and transformed education towards the present expansion needs of nation.

- a) **Curriculum planning, design and promotion:** Curricula should be simple, realistic and futuristic in nature. A designing of well-planned curriculum requires all the stack holders right from parents, students, educators, industry person and management. Education is a relentless process which includes educational plan, curricular content, facilities, activities, teaching methodologies, and assessment practices, evaluation results to develop the program. For this process of update require rigorous brainstorming session to identify the thoughtful prerequisite of the nation and educational allocations. This step requires identifying and eliminating nonvalue-added process. Universities, reformers and policymakers should work together with communities for solving pertinent societal challenges.
- b) **Promotion and expansion of intellectual infrastructure:** Such infrastructure requires various new and innovative skill sets in educators as well as students which should be support by proper finance, training and strategies.
- c) **Promotion of technical and non-technical infrastructure:** Today's world is going towards the path of digitalization in every field requires changes educational field as well. The use of both technical and non-technical resources and materials makes the experimental learning platform more fruitful. The involvement of these latest technologies such as data science(DS), artificial intelligence (AI), Internet of things (IoT), machine learning(ML), cloud computing (CC), virtual reality (VR), augmented reality(AR) should be encouraged. As mentioned in figure 22, technologies lead to make better tomorrow which required continuous interactions among the stakeholders, educators and management would supports towards societal needs. At the same time education field also updated by this digital era and changing the face of education. The major technologies will be incorporated to enhance the teaching learning methodologies to bring the joy of learning.
- d) **Promotion of innovative, inquiry and research-based attitude amongst the students:** As per the researchers and experts in the field of education of the 21st century educational institutes still preferred fractional passive

teaching learning methods. There should be proper industrial collaboration, case study base learning and research based along with human approach is included to make education 5.0 successful.

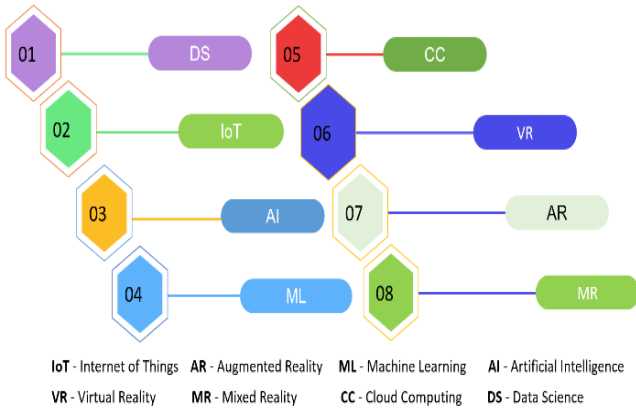


Figure 22: Emerging technologies in Education

- e) **Value Creation:** To achieve education 5.0 first we have to realize students to be active and dedicated toward work. To make environment for of 21st century students, the role of educators is very crucial to developed the various skills as an individual, professional and social.
- f) **Comparison of all education system**
To know the current and future requirements of educations, all education system has been compare based on each aspect for clear view. The comparative analysis of different education system criteria from education 1.0 to 5.0 as given in table 1. The Table. 2 given the comparison of features, weakness, consequences and outcome of education system from 1.0 to 4.0. along with the future requirement of education 5.0 is also proposed.

Table. 1: Comparison of different Transition of education system from 1.0 to 5.0

Education	1.0	2.0	3.0	4.0	5.0
Approach	Teacher-centric	Knowledge based	Student centric	Outcome based	Research and Innovation based
Period	9 th - 15 th Century	15 th - 18 th Century	18 th -20 th Century	Early 20 th - 21 st Century	Present
Parents demand	Care	Capability	Competitive	Co-operative	Creating values: Individual, Social and Professional
Educators' Role	Sage	Guide information source	Collaborator, curator, orchestrater	Facilitator, mentor, coach	Advisor, Reference guide
Student Role	Passive	Emerging active, owning of the knowledge	Active, Knowledge ownership, Initially independent	Active, Independent, Designer	Active, independent, designer, Creative, Innovative
Culture	Religion	Government	Government and private	Government, private and industry	All with innovative technologies
Philosophy	Essentialism, Behaviorism, Interactionalism	Andragogical, Memorization	Heutagogy connectivity	Heutagogy, Rdagogy, Cybergogy	Heutagogy, Hauntology, Pedagogy, Cybergogy
Way of Education	Impose	Inscription	Inspire	Collaboration	Research
Information Source	Standard text	Adapted text, Open source material (hardcopies)	Text book, e-books, Internet	Internet, online, Project-based outcome	Digital material with emerging technologies, research and Innovation
Learning resources	Religion-wise Standard books	Text books	Text book, Internet, Case studies	e-learning, Project based material	Experimental, Research and Innovation
Enablers	Mechanical printing, Handwritten	Computer, Electronics devices, Calculator	Computer and use of internet	CT tools with digitalization	ICT tools with digitalization of advanced technologies
Facilities	Universities and Classroom	Universities, Classroom and Laboratories	Flipped classroom and Laboratories	Blended classroom and Laboratories	Smart classroom and laboratories

Industrial technologies	Mechanical and steam power	Mass production, Electricity	Internet access, Automatization and control	Internet connectivity, Digitalization and Virtualization	Internet based control, Digitalization and Real-world virtualization
Goal	Spiritualism	Knowledge	Job/ service	Entrepreneurship	Research related to real world problems

Table. 2: Comparison of features and weakness of all types of education system

Education 1.0: Teacher Centric system	
Features	Consequences and Outcome
<ol style="list-style-type: none"> 1. It is a teacher centric way of learning, i.e., teacher to student 2. Lectures delivered by teacher, rote learning, and memorization. 3. The dependency of students towards teachers for knowledge. 4. Traditional copyright/text-based learning material. 5. Traditional essays, assignments, and tests were conducted. 6. Only campus-based learning. 7. Some group work with in the classroom. 8. Teaching, assessment, and accreditation were all provided by a single institution. 	<ol style="list-style-type: none"> 1. Promote passive learning. 2. Only standard text/study material was available. 3. No proper evaluation and assessment process. 4. No exposure with other institute. 5. No interaction with other institute's student. 6. Inadequate for rapidly changing world. 8. No teacher training was provided. 9. Monotonous type education. 10. Students were not feeling free to talk and share about their problem.
Education 2.0: Exam/Knowledge based system	
Features	Consequences and Outcome
<ol style="list-style-type: none"> 1. It is exam-based education, i.e, teacher to student and student to student. 2. Student's behavior has shifted from passive to active. 3. The professor served as a guide and a source of knowledge. 4. Copyright, free/open educational resources and e-learning resources were available to students within the institutions. 5. Traditional assignment approaches from education 1.0 are being adapted to open technologies. 6. Increased international university collaboration. 	<ol style="list-style-type: none"> 1. Promote memory-based knowledge. 2. Student will be assessing only on the basis of exam. 3. Not much interaction between student and teachers. 4. Only few open educational resources and learning material are available. 5. Traditional exam, assessment, assignment pattern still followed. 6. Project/ practice-based learning is totally ignored.
Education 3.0: Student centric system	
Features	Consequences and Outcome
<ol style="list-style-type: none"> 1. It is student centric based education, i.e. teacher to student and student to student. 2. It emphasizes the three C's – communicating, contributing, and collaborating. 3. The professor was an organizer of collaborative knowledge and creation. 4. E-learning is promoted with flipped classroom and student active participation is required so they have ownership on their education. 5. Open, flexible learning activities are conducted to allow for student creativity. 6. Free/open educational source created and reused by students across multiple institutions, disciplines, and nations. 7. Breakdown of regional and institutional boundaries 8. New entry of new institutions that provide higher education services. 9. Students participate in the creation of resources and opportunities, as well as active choice. 	<ol style="list-style-type: none"> 1. Learning is not outcome basis. 2. Do not talk about research, design and innovation. 3. No dynamic learning environment. 4. No holistic and cognitive skill development. 5. Project and innovation-based learning is totally ignored. 6. Innovation and research-based learning was overlooked. 7. Interdisciplinary education was completely unnoticed. 8. Society based problem was not involve in any curriculum. 9. Not adequate physical infrastructure. 10. Guideline and policies from government was blurred. 11. Only feeling of personalized education.
Education 4.0: Project based system	
Features	Consequences and Outcome

<ol style="list-style-type: none"> 1. Education 4.0 is outcome basis learning i.e. teacher to student, student to teacher, and student to student. 2. It emphasizes the three C's – connectors, creators, and constructivists. 3. Discussion/ outcome/ action-based teaching is practiced and teachers serve as mentors. 4. Students' behavior is active and show a high level of interest and effective learning. 5. Students are entrepreneurs and co-creators and personalized education is also an option. 6. It promotes students' holistic development and provides ongoing training. 7. It is up to date with fast-changing world and applicable to industries. That's why prepared for a variety of uncertain career. 8. Project-based learning and diverse learning activities. 9. It provides simple and accurate assessment with dynamic learning management system. 	<ol style="list-style-type: none"> 1. Do not talk about innovation and research-based learning. 2. No proper intellectual and technical infrastructure. 3. Very few or urban institution has physical infrastructure for education 4.0. remote are still to be connected with ICT technologies. 4. It does not give total response to societal demand, humanities and values. 5. Inefficient to building knowledge base for 2030. 6. Inadequate to develop transformation competencies. 7. No implementation of national and international curriculum interrelation. 8. Institute and teachers were not focusing on research /publication work. 9. Constantly interacts with students and amends the content offered based on their needs at the time.
Education 5.0: Research based system	
Features	Requirement
<ol style="list-style-type: none"> 1. It refers to the transformation of the existing educational system towards more rehumanizing, values, skills, innovation and research-based systems. 2. It will provide suitable planning, design, and promotion of appropriate curriculum for digital world. 3. It will promote intellectual, technical and non-technical infrastructure. 4. It will provide a rejoinder to societal demands. 5. It will develop transformational competencies, build knowledge base for 2030, and work in an anticipatory mode with timely feedback reflection. 6. Worldwide peer learning would indisputably lead to a timely and efficacious execution. 	<ol style="list-style-type: none"> 1. Still very few institutes especially private and remote colleges are having <ol style="list-style-type: none"> a. Innovation centers or cell b. Intellectual property right cell c. Patent facilitator center 2. Teachers still require rigorous training/workshop/seminars on universal human values, IPR, and publication ethics. 3. Training /workshop/seminars/conference related to measure the research and innovation work for teacher and student 4. Teachers research work should be require praiseworthy environment and rewards in terms of upgrading. 5. All educational institute should promote real time solutions to the industry/business

5. Conclusion:

This paper discussed about the overview of education system, statics of higher education in India, different teaching-learning methods and modes. It also provides the way to execute the education 5.0 by creating values on individual, social and professional basis to manage the radical changes in the education to cope up with current education requirement after the covid 19. To inculcate more human values, professional and social skill in students necessitate adaptation of education 5.0 universally. With the support of staff, the Educational Requirements Committee (ERC) shall modify the administration of the educational institutes. The successful establishment of education 5.0 require transformative proficiencies, knowledge, research-based approach for solving society's problems. Appropriate international/national survey will be organised on curriculum implementation and consultation with all stakeholder would definitely take us through a timely and successful execution of Education 5.0.

5. Future scope:

To know the reality of current education system needed more data and survey in order to address the real fact and what improvement require. Education 4.0 is largely driven by outcome-base and project-based education model with technology. Education 5.0 will evolve in the institutions by original strategies and reacts to the societal needs and humanity. For implementing education 5.0 in the institution, more research needs to be undertaken in class as well as outside of the class should be formalize. This requires

appropriate infrastructure like internets, digital networks, digital books library, internets, smart classrooms etc. To build such infrastructure promotes more smarter learning through education 5.0. So, educators and institutions continue to work in this direction to make education more feasible and cost effective and try to solve more societal problems.

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References

- [1] Alan Bonfield, Marie Salter, Alan Longmuir, Matthew Benson and Chie Adachi. Transformation or evolution? Education 4.0, teaching and learning in the digital age. Taylor and Francies; 2020. <https://doi.org/10.1080/23752696.2020.1816847>.
- [2] Jhonattan Miranda, Christelle Navarrete, Julieta Noguez, Jos e-Martin Molina-Espinosa, María-Soledad Ramírez-Montoya, Sergio A. Navarro-Tuch, Martín-Rogelio Bustamante- Bello, Jose-Bernardo Rosas-Fernandez, Arturo Molina a. The core components of education 4.0 in higher education: Three case studies in engineering education. Elsevier; 2021. <https://doi.org/10.1016/j.compeleceng.2021.107278>.

- [3] Anastasia Minina, Kaïs Mabrouk. Transformation of University Communication Strategy in Terms of Digitalization. IEEE; 2021. <https://doi.org/10.1109/COMSDS.2019.8709652>.
- [4] Divya.A , Abirami A.M , Nisha Angeline C.V , Raja Lavanya . Active Learning Environment for achieving Higher-Order Thinking skills in Engineering Education. IEEE; 2016.<https://doi.org/10.1109/MITE.2016.020>
- [5] Wisuit Sunthonkanokpong, Elizabeth Murphy, Sunti Tuntrakool. A Model of Engineering Education for Innovation. 7th World Engineering Education Forum (WEEF); 2017.
- [6] Ricardo A Ramirez-Mendoza, Ruben Morales-Menendez, Hafiz Iqbal, Roberto Parra-Saldivar. Engineering Education 4.0. IEEE; 2018. <https://doi.org/10.1109/EDUCON.2018.8363376>
- [7] Jhonattan Miranda, Claudia S. López, Sergio Navarro, Martín R. Bustamante, José Martín Molina, Arturo Molina. Open Innovation Laboratories as Enabling, Resources to Reach the Vision of Education 4.0. IEEE;2019. <https://doi.org/10.1109/ICE.2019.8792595>.
- [8] Rouvrais Siegfried, Gerwel Proches Cecile, Audunsson Haraldur, Chelin Nathalie, Liem Inggriani, Tudela Villalonga Lluís, Preparing 5.0 Engineering Students for an Unpredictable Post-COVID World. IEEE; 2020. <https://doi.org/10.1109/WEEGEDC49885.2020.9293661>.
- [9] Subandi , Joniriadi , Aulia Akhrian Syahidi , Amran Mohamed , Mobile Augmented Reality Application with Multi-Interaction for Learning Solutions on the Topic of Computer Network Devices (Effectiveness, Interface, and Experience Design). IEEE;2020, <https://doi.org/10.1109/ICVVEE50212.2020.9243292>.
- [10] Kari H. Voldsund, Harald Hasleberg, Judit Johnstad Bragelien, Entrepreneurship Education Through Sustainable Value Creation, IEEE;2020. <https://doi.org/10.1109/ICVVEE50212.2020.9243292>.
- [11] AISHE reports 2019-2020, 2018-2019, 2017-2018, 2017-2016, Ministry of Education, Government of India, https://www.education.gov.in/en/statistics-new?shs_term_node_tid_depth=384