Indian Journal of Vocational Education
Vol. 35 April 2023 - September 2023

Future of Work: Mentoring, Tinkering and Skilling

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Abstract

Potential alterations and systematic changes are the need of the hour in this ever changing G20 world. This explains the universal concept that change is the unchangeable law of nature. Human society, its eco-system as well as patterns and practices change with the march of time. Technological advancement and scientific progress have resulted in a significant paradigm shift in the world of work. This shows the changing trends of future of work that have paved the way for human resource building through use of science, technology, innovative pedagogy and their integration through mentoring, tinkering skilling and upskilling. In other words, development of human potential by applying innovation, creativity, experiments, critical thinking, problem-solving and technological interventions like robotics, drone technology, artificial intelligence, virtual reality, augmented reality and the like.

A rising trend in the world of work is vocational education and vocationalization of education. Accordingly, changes are required in curriculum, pedagogy, textbooks, teacher training, resource support and even bringing digital resources and innovative teaching-learning materials. This paper is a collection of and reflection upon different perspectives of future of work and skill development through particularly by mentoring, tinkering, skilling and upskilling. As such it reflects upon the rising trends of the world of work with new opportunities, new technologies, new market-places, productive jobs and even techno-savvy human resources. Rapid advancement in coding, automation, digital technology and use of robotics together with innovative and integrated pedagogical practices are the future trends of work and occupation which constitute the core concern of this paper. What is certain is that future is uncertain. Therefore, efforts are to be made for mentoring, tinkering and skilling the work force by using technological interventions.

Introduction

The entire world has gone under significant changes particularly in the areas of science, technology and vocational education. The changing perspectives of the world of work are better reflected in the name of 'Skill Development', 'Future Skills Education' and 'Life Skills Education'. In our country, they are better understood through 'Skill India', 'Digital India', 'NIPUN Bharat', 'Atmanirbhar Bharat,' Make in India' and other national schemes. All these require a paradigm shift or significant changes in vocational education and techno-savvy vocational practices including policy perspectives, curricula, textbooks, teaching-learning materials, teacher training, resource support and even pedagogy of practice and teacher-pupil interactions. Use of digital resources and innovative models of vocational and technical education is the need of the hour. According to the National Education Policy-2020, "Only a very small percentage of the Indian workforce in the age group of 19-24 (less

than 5%) received formal vocational education, whereas in countries such as the USA, the number is 52%, in Germany 75% and in South Korea it is as high as 96%. These numbers only underline the urgency of the need to hasten the spread of Vocational Education in India" (*Source: NEP-2020, Page-43*).

Future of work highlights strategic planning and implementation for employment and education in this digital era. This emphasizes on better policies for better lives. The Organization for Economic Co-operation and Development (OECD) is a unique forum where the governments of 37 democracies with market-based economies collaborate with each other to develop policy standards to promote sustainable economic growth. India is one of the many non-member economies with which the OECD has working relationships in addition to its member countries. The OECD has been co-operating with India since 1995. As highlighted in the National Education Policy-2020, "Knowledge creation and research are critical in growing and sustaining a large and vibrant economy, uplifting society and continuously inspiring a nation to achieve even greater heights. A robust ecosystem of research is perhaps more important than ever with the rapid changes occurring in the world today" (Source: NEP-2020, Page-45). According to Jacob Morgan, **"**The way we work is changing. It's not going to stop changing anytime soon, in fact, the change is only going to speed up. Organizations have made progress in adapting for the future of work, but we still have a long way to go".

Objectives

This is a systematic study based on individual interactions, institutional networking, documentary analysis and inputs from massive online available resources. The major objectives of the study were:

- To discuss the principles and strategies of Mentoring, Tinkering and Skilling for the Future of Work.
- To explore the best practices of Mentoring, Tinkering and Skilling through collaborations, partnerships, innovations and incubations in the light of the future of work.
- Addressing the issues on the linkage of Vocational Education, Skill Development and Capacity Building through Mentoring, Tinkering and Skilling.
- To highlight the practices of techno-savvy teachers, future-skilled learners and technology-pedagogy integration in skill development and vocational education.
- To explore the strategies for Life Skills Education and Future Skills Education through innovative and integrated mentoring, tinkering and skilling.

Future of Work

The future of work refers to an informed perspective on what businesses and other organizations need to know about how work could shift (given digitization and other trends), plus how workforces and workplaces can prepare for those changes, big and small." Certain trends of the future of work are the cloud, data science, internet of things, robotics, automation, AR-VR, collaboration platforms and other innovative technologies those are changing the way we work and live.

Mentoring

Generally, the dictionary meaning of mentoring is "when someone shares the knowledge, skills and experience with another person to help him/her to progress and develop skills".

Here, mentoring is both individual as well as organisational. In other words, "mentoring is a process of using specially selected and trained individuals to provide guidance, pragmatic advice, and continuing support that will help the people in their learning and development process". Dedicated mentors do mentoring through established resource centres and also in schools, colleges and other institutions as per the mentoring schedules. Mentoring by Higher Education Institutions like IITs, NITs, IISERs and Universities is for example. In the field of education and learning, mentoring is "a protected relationship which supports learning and experimentation and helps individuals develop their potential. A mentoring relationship is one where both mentor and mentee recognise the need for personal development. Successful mentoring is based upon trust and confidentiality". The process of mentoring includes contemplation, initiation, facilitating growth and maintenance, decline and dissolution and redefinition for achieving the objectives specified for such mentoring.

Tinkering

Concept of tinkering is based on the work of a tinker. It is to work in the manner of a tinker. Especially to repair, adjust or work with something in an experimental manner. In other words, tinkering is to make small changes to something in order to improve upon it. Here, in the spectrum of technology-pedagogy integration and innovations thereby tinkering refers to tinkering activities by learners, teachers, mentors, research scholars and other stakeholders inside the classrooms and laboratory setups as well as beyond such formal setups. For example, tinkering activities are better understood with the outcomes of the TINKERING CARNIVALS and similar tinkering programmes.

Skilling

One can understand skilling better by analysing the 'Skill India' initiative in our country. It is the process of developing and enriching the skills of the individuals or citizens of the country for meeting the requirements of the world of work and even future work requirements. It is needless to repeat that both education and employment are interlinked and skilling adds efficiency and effectiveness to employment services by enhancing employability of the man power.

The Integrated Approach

As our policy says, "This policy aims to overcome the social status hierarchy associated with vocational education and requires integration of vocational education programmes into mainstream education in all education institutions in a phased manner. Beginning with vocational exposure at early ages in middle and secondary school, quality vocational education will be integrated smoothly into higher education. It will ensure that every child learns at least one vocation and is exposed to several more. This would lead to emphasizing the dignity of labour and importance of various vocations involving Indian arts and artisanship (Source: NEP-2020, Page-44). While talking about the integrated approach, there is the need of integrating Life Skills Education, Future Skills Education, Tinkering Labs, RAA Labs, Innovation Hubs, Incubation Centres, Experiential Learning, Virtual Skill Labs, Vocational Education and Training, Professional Development of Teachers and many other emerging trends of mentoring, tinkering and skilling for nation building. Credit goes to India for assuming the role of the presidency of the Group of Twenty (G20) forum on 1st December, 2022. The strength of the country lies with diverse cultural initiatives, progressive innovations, practical and life skills and even various Jan Bhagidari Activities. All these are the results of modern trends of the world of work and innovative integration through effective mentoring, tinkering and skilling.

Methodology

Data Collection and Analysis: Data was collected from individual stakeholders, organisations and selected institutions and more specifically from web portals with regard to future of work, skill development, institutional networking and programs and activities on future skills education, life skills education, mentoring, tinkering, skilling, innovation, incubation and entrepreneurship. Analysis of data was based on the major parameters of future of work, skill development and dimensions of mentoring, tinkering and skilling. Qualitative data analysis methodology was followed for analysis of data, interpretation of results and findings thereby.

Future of Work and Skill Development: Principles

For meeting the rising demands of the global ecosystem and current trends of the world of work, organisations, institutions as well as the individuals need to adhere to certain principles which decide the potential of work culture and skill management by nurturing the vocational and technical aspects of work and education. Below are some of such principles:

1. **Local and Global Presence**: Future of work requires skilled man-power and networking of organisations with employees located locally as well as globally. It is to create a pool of talents and skilled human resources for meeting the rising trends of future.

2. **Connected Workforce**: From the interactions with individuals as well as organisations, it was commonly agreed that connected workforce is a global need for future of work. It is great to have a global team around the world and hence, it is not possible to work effectively from all over without being able to stay connected with others. Technology is the best means for such global and local connections.

3. **Entrepreneurial Skills:** Effective mentoring, tinkering and skilling is based on the concept of academia-industry-entrepreneurship relationships. It means several traits of the human beings and organisations are to be interlinked for innovation, creativity, forward-thinking and organisational networking. Such entrepreneurial spirit acts as a potential for skill development and resource creation and utilization.

4. **Changing Leadership:** Leadership and change of leadership decides the path of skilling and upskilling. For bringing changes and cultivating innovations in education as well as employment, leaders must have positive mind sets and progressive outlook to accept technological advancements and its integration with diverse dimensions of mentoring, tinkering and skilling.

5. **Operational Strategies:** Strategic operations and operational strategies are the basic requirements for mentoring, tinkering and skilling for the future of work. No matter how many employees you have, rather the organisation need to be agile and adaptable so that it can yield the best of the potential of its man-power.

6. **Institutional Networking:** Institutional networking at different levels is a prerequisite for mentoring, tinkering and skilling for future of work. It helps in purposive skill development and entrepreneurship. Starting from grassroot level to national and international, institutional networking facilitates micro, small and medium enterprises and promotion and development of MSMEs in the light of various policy recommendations.

7. **Forward Looking Principle:** People with progressive and dynamic outlook are always ready to accept changes and adapt these changes faster to bring innovations. The world is moving at a faster rate and hence, we can no longer afford to take a "wait and see" approach. Rather, to succeed, individuals and organizations have to look forward and act swiftly to bring changes and cultivate innovations.

8. **Innovation Everywhere:** The best way to have successful mentoring, tinkering and skilling for future of work is to have innovation and necessary integration everywhere. Individuals as well as organizations have to allow anyone to come forward with a new idea as innovations come from a certain department or level of hierarchy. People have hundreds of ideas with them and what is required is turning these ideas into something that leads to innovation and innovative practices.

9. **Runs in the Cloud:** Use of innovative technology and technological integration is the basic requirement of this digital era. Individuals as well as organizations have to adhere to a variety of such technological interventions which operate purposively for the achievement of the set objectives. Prominent among such interventions are cloud computing, data science, data analysis, data architecture, data engineering, cyber security, cloud engineering, big data analysis, digital marketing, social media etc.

10. **Empowering Women:** Women empowerment and increased women participation in industry, academia and entrepreneurship is the royal road to effective mentoring, tinkering and skilling for meeting the future trends of work. We need to see women in key roles of technology-pedagogy integration and implementation of various modern technologies in diverse fields if life and society. By digitalizing women and strengthening women entrepreneurship we can have the success of skill development, life skills education as well as future skills education.

Requirements for Future of Work

With the changing circumstances, future of work requires changes in infrastructure as well as manpower. Some of such requirements are digital infrastructure, online learning platforms, techno-savvy teaching-learning processes, institutional networking, resource sharing, virtual labs, tinkering labs, RAA labs, pedagogy-technology integration, online teacher training platforms, ICT-based initiatives, digital repository, e-contents, learning games and simulations, Augmented Reality and Virtual Reality, content creation and dissemination, Artificial Intelligence, Robotics, Coding, Data Science, systemic improvements and collaborative multiple solutions. All these are the responses collected from various stakeholders of States/UTs and HEIs as well.

Major Findings

Mechanisms of Mentoring, Tinkering and Skilling

Education is the potential vehicle of national development and international understanding. It prepares the workforce for the future of work by ensuring training and capacity building of human resources for meeting the changing employment landscape and global ecosystem. In other words, the citizens of the nation are to be well versed with latest technology and skills to meet the rising demands of the global ecosystem and thereby achieve the sustainable developments.

1. **Online Education:** Individuals as well as agencies are interested in learning and education through online along with the traditional offline mode. Pilot studies are going on the same by organisations and agencies like, NCERT, CIET, RIEs, PSSCIVE, IGNOU, NIOS, IITs, NITs, IISERs, Universities and others for integrating education with online education by using e-contents and virtual communications. Mobile Apps, Internet and e-learning platforms are on full swing for achieving this aspect of future of work and skill development.

2. **Techno-savvy Learning:** Future work force can be created by preparing human resources who are technologically potential and skilled as per the needs of the world of work i.e. life skills, future skills, applied knowledge and skills and ability to catalyse quality of learning, cultivate holistic and multidisciplinary educational environment and creation of contexts and contents for re-vamping vocational education, technical education and skill-based education. The stakeholders at different levels emphasized on transformation of the regulatory system, institutional restructuring and consolidation and efficient resourcing for creation of techno-savvy teachers and curricular and pedagogical practices which are innovative, integrated, holistic, multidisciplinary, joyful, enjoyable and engaging.

3. **Virtual Labs:** With rich experience of COVID-19 pandemic and its effects, all agreed with the fact that digital education and virtual learning are the need of the hour. The entire world is undergoing changes having challenges as well as opportunities. Virtual labs can go a long way in meeting the skill development and future of work requirements as per the changing employment landscape and progressive global ecosystem. Various virtual labs can build the capacity of teachers, students, researchers, scholars, administrators, practitioners, community members and other stakeholders leading to in-depth mentoring, tinkering and skilling by linking the Higher Education Institutions as Mentoring Institutions. Virtual labs can also be utilised better for inter-disciplinary academic linkages and multidisciplinary curricular transactions.

4. **Online Teaching-Learning Platforms:** Mentoring, tinkering and skilling are done through offline as well as online mode with purposefully created learning environment and support systems for students, teachers and other stakeholders. It facilitates technology based high quality pedagogy applied online to meet the specified learning outcomes. Effective learning requires online teaching-learning platforms that provide online support through mentoring, tinkering and skilling for curricular transaction, engaging pedagogy, continuous assessment, innovative practices and support services for improving the level of achievement of learning.

5. **Collaboration with HEIs:** Development of vocational skills and critical life skills are the core concerns of all mentoring, tinkering and skilling for nation building. From local to global is the preparatory slogan and from innovative technology to experiential learning is the trends for such preparation. The organisation Unit of Science and Educational Development (UNISED) is an agency of IIT Alumni, Educationists and Innovators which is having its network of collaboration with HEIs like IITs, NITs, IISERs, Universities and other national and international organisations for the purpose of mentoring, tinkering and skilling. There is a dedicated centre of such collaborations i.e. Centre of Research & Excellence for Advanced Technology in Education (CREATE-UNISED) at Research Park, IIT Guwahati, Assam (INDIA) which is working for interlinking all emerging trends of research and innovation and technological advances for skill development and capacity building of the human resources.

6. **Technology Support to Community:** Under the holistic approach to achievement of the Sustainable Development Goals in the light of the National Education Policy-2020 in India,

CREATE-UNISED has been making efforts to reach the community even in the hilly and border States like Jammu & Kashmir, Uttarakhand, Nagaland, Arunachal Pradesh and others. By establishing the RAA Labs, Tinkering Labs, Astronomy Clubs, Aeromodelling Clubs, CAL Centres, ICT Hubs, Solar Operated Smart Classes, Innovative and Integrated Language Learning Theatres, Incubation Centres, Innovation Hubs, Bio-diversity Gardens and all other similar initiatives community involvement and community participation is ensured as local community and involved community members are potential pillar of success of any initiative as aforementioned.

7. **Improved Communication:** Healthy and effective communication is the basic requirement for future of work, skill development as well as mentoring, tinkering and skilling. The art of communication decides the treasure of skilling, upskilling and strengthening human resources as per the needs of society and the world of work. All the stakeholders agreed with this communication linkage with skill development for future of work.

8. **Others:** Among all other findings of the mentoring, tinkering and skilling for future of work are high-quality support centres, innovation hubs, incubation centres, multilingual facilitation, multidisciplinary research centres, holistic and integrated approaches to learning, Tinkering Labs, RAA Labs, soft skills education, social skills learning, continuous professional development, language linkages, involvement of IITs, NITs, IISERs and other premier institutions in the process of mentoring, tinkering and skilling for nation building.

Conclusion

By strengthening the manpower we can meet the requirements of the future of work. As such, we need purposive and holistic mentoring, tinkering and skilling for future of work and nation building. Innovative practices, integrated approaches and effective communication technology are the essential requirements for such progressive march. Indian Digital Campaign, STEM and STEAM Learning, Institutional Networking, Collaborative Ecosystem and Pedagogy-Technology Integration can go a long way for meeting the emerging demands of the world of work. Above all, we need systematic and successful mentoring, tinkering and skilling for 'transforming India into a digitally empowered society and knowledge economy' (Source: NEP-2020, Page-56).

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