

The Impact of Technology on Skill Development in India: Prospects and Challenges

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Abstract

India's large and young population presents a significant opportunity for socio-economic progress and prosperity, but only if this human capital is gainfully skilled. Skill development has emerged as a crucial imperative for India's sustainable growth and development. Technology has opened up new avenues for learning, making it more accessible, flexible, and work-integrated. It has also enhanced the quality and relevance of skill development by facilitating personalized feedback, benchmarking with global standards, and regularly updating course content. This article examines the prospects and challenges of technology-enabled skill development in India, exploring the opportunities and limitations of technology in transforming skill development. The article concludes that while technology has immense potential to revolutionize skill development, a coordinated effort among stakeholders is required to ensure that technology-enabled skill development is inclusive, equitable, and addresses the skill gaps in the labour market.

Keywords: Development; India; Impact; Prospects; Technology;

1 Introduction

Technology has increasingly contributed to the growth and development of economies around the globe. In India, technology has been integrated into various sectors, including education, health, agriculture, and infrastructure. This integration has provided numerous opportunities for skill development, which is essential for economic and social growth. The purpose of this essay is to examine the impact of technology on skill development in India, the prospects and challenges associated with it.

India is a country with a young and growing population, which means that it has a large pool of potential workers. However, in order to fully capitalize on this demographic dividend, India needs to ensure that its workforce is skilled and equipped to meet the demands of the 21st century economy [1].

Technology is playing an increasingly important role in skill development in India. New technologies, such as artificial intelligence (AI), online digital platforms, and machine learning, are creating new opportunities for learning and development. These technologies can be used to deliver training more efficiently and effectively, and to reach a wider range of learners.

The impact of technology on skill development in India is still unfolding. However, there are a number of potential benefits that can be expected. For example, technology can help to [2]:

- Make training more accessible. Online learning platforms can make it possible for people to learn new skills from anywhere in the world. This is particularly beneficial for people who live in remote areas or who have limited access to traditional educational institutions.
- Personalize learning. Technology can be used to track learner progress and to provide personalized feedback. This can help learners to learn more effectively and efficiently.
- Upskill and reskill workers. Technology can be used to provide workers with the skills they need to adapt to new technologies and to stay ahead of the curve in the job market.

However, there are also a number of challenges that need to be addressed in order to fully realize the potential of technology for skill development in India. These challenges include:

- The digital divide. Not everyone in India has access to the internet or to other digital technologies. This means that some people may be excluded from the benefits of technology-based learning.
- The quality of training. Not all online learning platforms offer high-quality training. It is important to ensure that the training that is available is relevant, up-to-date, and of high quality.
- The cost of training. Online learning can be more expensive than traditional forms of training. This may be a barrier for some people who are trying to improve their skills.

Despite these challenges, the potential benefits of technology for skill development in India are significant. If these challenges can be addressed, technology can help India to realize its demographic dividend and to build a more skilled and competitive workforce [3].

1.1 Impact of Technology on Skill Development:

Technological advancements have revolutionized the way individuals can acquire and develop new skills. In India, technology has facilitated the rise of online learning platforms, such as Coursera and Udemy, which provide access to a vast range of courses on diverse topics. The platforms have removed barriers to learning, such as geographical constraints and limited resources. The availability of instructional materials and interactive course content has made the learning process more efficient and engaging. Additionally, technology has enabled the creation of sector-specific training programs that cater to the needs of workers in various industries. For instance, training programs have been developed to enhance the skills of farmers, healthcare workers, and entrepreneurs.

Technology is rapidly changing the way we live and work. This is also true for the way we learn and develop new skills. In the past, skill development was often limited to traditional methods, such as classroom instruction or on-the-job training. However, technology is now opening up new possibilities for learning and development.

There are a number of ways in which technology is impacting skill development. For example, technology can be used to:

- **Make training more accessible:** Online learning platforms can make it possible for people to learn new skills from anywhere in the world. This is particularly beneficial for people who live in remote areas or who have limited access to traditional educational institutions.
- **Personalize learning:** Technology can be used to track learner progress and to provide personalized feedback. This can help learners to learn more effectively and efficiently.
- **Provide just-in-time training:** Technology can be used to deliver training that is relevant to the specific needs of learners. This can help learners to stay up-to-date on the latest skills and knowledge.
- **Enable lifelong learning:** Technology can make it possible for people to learn new skills throughout their lives. This is important in a world where the nature of work is constantly changing.



Fig. 1: Impacts of technology on skill development

The impact of technology on skill development is still unfolding. However, there is no doubt that technology is having a positive impact on the way we learn and develop new skills. Technology is making it possible for people to learn new skills more easily, more efficiently, and more effectively. This is leading to a more skilled and adaptable workforce, which is essential for economic growth and prosperity.

1.2 Prospects of Technology on Skill Development:

India is home to a vast pool of human resources that require training and upskilling to meet the demands of an evolving job market. Technology provides the necessary tools and resources to accomplish this task. India's government has recognized the importance of skill development and has established various initiatives to promote it. The Skill India Mission, for example, aims to train over 400 million Indians in different skills by 2022. The mission has leveraged technology to provide e-learning, recognition of prior learning, and employer-friendly accreditation. Furthermore, technology has provided opportunities for remote work, thereby expanding the job market and creating new prospects for skill development.

There are some of the prospects of technology on skill development:

- Making training more accessible: Technology can make it possible for people to learn new skills from anywhere in the world. This is particularly beneficial for people who live in remote areas or who have limited access to traditional educational institutions.
- Personalizing learning: Technology can be used to track learner progress and to provide personalized feedback. This can help learners to learn more effectively and efficiently.
- Providing just-in-time training: Technology can be used to deliver training that is relevant to the specific needs of learners. This can help learners to stay up-to-date on the latest skills and knowledge.
- Enabling lifelong learning: Technology can make it possible for people to learn new skills throughout their lives. This is important in a world where the nature of work is constantly changing.
- Improving the quality of training: Technology can be used to create more engaging and interactive learning experiences. This can help learners to retain information more effectively.
- Lowering the cost of training: Technology can make it possible to deliver training at a lower cost. This can make training more affordable for people who are looking to upskill or reskill.

Overall, technology has the potential to revolutionize the way we learn and develop new skills. By making training more accessible, personalized, and affordable, technology can help people to acquire the skills they need to succeed in the 21st century economy.

Here are some specific examples of how technology is being used to improve skill development:

- Virtual reality (VR) and augmented reality (AR) are being used to create immersive learning experiences that allow learners to practice skills in a safe and realistic environment.
- Machine learning is being used to personalize learning experiences and to provide learners with tailored feedback.
- Big data is being used to track learner progress and to identify areas where learners need additional support.
- Social media is being used to create learning communities where learners can connect with each other and share resources.

These are just a few examples of how technology is being used to improve skill development. As technology continues to evolve, we can expect to see even more innovative ways to use technology to learn and develop new skills.

1.3 Challenges of Technology on Skill Development:

Despite the numerous benefits of technology on skill development, some challenges must be addressed. Firstly, access to information and technology is still unevenly distributed, with many rural areas lacking access to stable internet connectivity. This has limited the effectiveness of e-learning platforms in these areas. Secondly, the quality of instructional content needs to be improved to ensure that it meets industry demands and standards. Lastly, the fast pace of technological change requires constant upskilling and reskilling of workers, which could be a challenge to some individuals and organizations. India is home to one of the world's largest and youngest populations, with around 65% of the population below the age of 35. This demographic advantage presents a significant opportunity for India's socio-economic progress and prosperity. However, this potential can only be realized if this human capital is gainfully skilled. Skill development has thus emerged as a crucial imperative for India's sustainable growth and development.

In recent years, technology has emerged as a key enabler of skill development, transforming the traditional models of skill acquisition and recognition. Technology has opened up new avenues for learning, making it more accessible, flexible, and work-integrated. It has also enhanced the quality and relevance of skill development by facilitating personalized feedback, benchmarking with global standards, and regularly updating course content.

There are some of the challenges of technology on skill development:

- **The digital divide:** - Not everyone has access to the internet or to other digital technologies. This means that some people may be excluded from the benefits of technology-based learning.
- **The quality of training:** - Not all online learning platforms offer high-quality training. It is important to ensure that the training that is available is relevant, up-to-date, and of high quality.
- **The cost of training:** - Online learning can be more expensive than traditional forms of training. This may be a barrier for some people who are trying to improve their skills.
- **The lack of skills and knowledge among educators:** - Many educators do not have the skills and knowledge necessary to use technology effectively in the classroom. This can hinder the effectiveness of technology-based learning.
- **The lack of motivation among learners:** - Some learners may not be motivated to learn new skills through technology-based methods. This can be due to a number of factors, such as a lack of interest in technology, a preference for traditional learning methods, or a lack of confidence in their ability to learn through technology.

1.4 Technology Opens New Avenues for Learning

Technology has opened up innovative opportunities for learning, making it more accessible, flexible, and work-integrated. Online platforms provide universal access to educational resources and online courses, making it possible for anyone with

an internet connection to learn new skills. Massive open online courses (MOOCs) offer a gateway to learning skills through self-learning, with many prestigious universities and institutions offering free online courses.

Skills-based micro credentials allow granular learning and certification of specific skills, providing learners with the opportunity to acquire industry-relevant skills in a shorter period. Online assessments can evaluate skills acquired through different modes in a standardized way, providing a fair and objective measure of a learner's proficiency.

Digital skills frameworks map skills across different contexts, enabling visibility, comparability, and portability of skills. This enhances the recognition of skills acquired through non-formal and informal learning, thereby creating new opportunities for people to enter the workforce. Block chain-based credentials provide tamper-proof records of skills with potential for wider recognition and acceptance.

Technology is also enabling new apprenticeship models with enhanced learning through simulations and immersive technologies like virtual/augmented reality. This creates new opportunities for learners to acquire skills in a safe and controlled environment, without the need for high-cost infrastructure.

1.5 Technology Enhances Quality and Relevance

Technology improves the quality of skill development by facilitating adaptive learning, personalized feedback, and benchmarking with global standards. Adaptive learning uses algorithms to personalize the learning experience based on the learner's needs, pace, and learning style. Personalized feedback provides specific guidance to learners on areas that need improvement. Benchmarking with global standards ensures that learners acquire skills that are relevant and competitive in the global marketplace.

Technology also enhances the relevance of skill development by facilitating regular updation of course content and alignment with emerging industry needs. Virtual labs and simulated environments provide experiential learning opportunities without high costs or safety issues. Online resources cater to learners with diverse needs, learning styles, and from all geographical locations.

There are some of the ways that technology opens new avenues for learning:

- **Personalized learning:** Technology can be used to track learner progress and to provide personalized feedback. This can help learners to learn more effectively and efficiently.
- **Just-in-time training:** Technology can be used to deliver training that is relevant to the specific needs of learners. This can help learners to stay up-to-date on the latest skills and knowledge.
- **Enabling lifelong learning:** Technology can make it possible for people to learn new skills throughout their lives. This is important in a world where the nature of work is constantly changing.
- **Improving the quality of training:** Technology can be used to create more engaging and interactive learning experiences. This can help learners to retain information more effectively.
- **Lowering the cost of training:** Technology can make it possible to deliver training at a lower cost. This can make training more affordable for people who are looking to upskill or reskill.



Fig. 2: Five Ways that technology opens new avenues for learning

In addition to these, here are some specific examples of how technology is opening new avenues for learning:

- **Virtual reality (VR) and augmented reality (AR):** VR and AR are being used to create immersive learning experiences that allow learners to practice skills in a safe and realistic environment.
- **Machine learning:** Machine learning is being used to personalize learning experiences and to provide learners with tailored feedback.
- **Big data:** Big data is being used to track learner progress and to identify areas where learners need additional support.

- **Social media:** Social media is being used to create learning communities where learners can connect with each other and share resources.

These are just a few examples of how technology is opening new avenues for learning. As technology continues to evolve, we can expect to see even more innovative ways to use technology to learn and develop new skills.

1.6 Challenges of Access, Equity, and Integration

Despite the opportunities, technology also poses significant challenges. The digital divide must be addressed to ensure equitable access, especially for disadvantaged groups. Technology cannot replace critical on-ground learning processes and human mentorship, which are essential for the holistic development of learners.

Reskilling at scale requires partnerships and integrated strategies across education and industry. Policy and regulatory support is needed to formalize alternative credentialing mechanisms and ensure their recognition and acceptance in the labour market. There are also concerns around data privacy, bias, and job disruption that need to be addressed.

Here are some specific examples of these challenges:

- **Access:** In some countries, there is a large digital divide between those who have access to technology and those who do not. This can make it difficult for students from low-income families or rural areas to participate in technology-enabled learning.
- **Equity:** Even if everyone has access to technology, there may still be inequities in the way that technology is used. For example, students from wealthier families may have more access to high-quality technology and resources than students from poorer families. This can lead to a widening of the achievement gap between these groups of students.
- **Integration:** Technology can be difficult to integrate into traditional learning environments. This can be due to factors such as teacher training, curriculum, and assessment. For example, teachers may not be trained in how to use technology effectively in the classroom, or the curriculum may not be designed to be used with technology. This can make it difficult for teachers to integrate technology into their teaching practice.

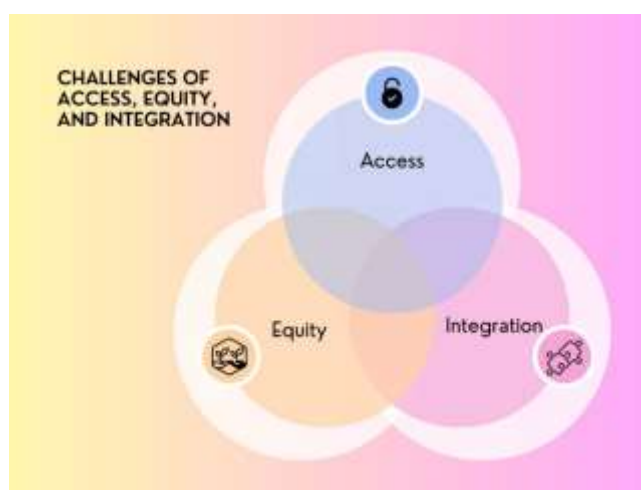


Fig. 3: Challenges of Access, Equity, and Integration

2 Technology Opens New Avenues for Learning

Technology is opening up new avenues for learning, making it more accessible, flexible, and work-integrated. Here are some of the key ways in which technology is transforming skill development in India:

1. **Online platforms for universal access to educational resources and courses:** Online platforms provide universal access to educational resources and courses, making it possible for anyone with an internet connection to learn new skills. These platforms offer a wide range of courses, including those related to technical skills, specialized skills, and general education.
2. **Massive open online courses (MOOCs) for self-learning of skills:** MOOCs offer a gateway to learning skills through self-learning, with many prestigious universities and institutions offering free online courses. MOOCs provide learners with the opportunity to acquire knowledge and skills in a flexible, self-paced manner.
3. **Skills-based micro-credentials for granular learning and certification:** Skills-based micro-credentials allow granular learning and certification of specific skills, providing learners with the opportunity to acquire industry-relevant skills in a shorter period. Micro-credentials are modular and stackable, making it possible for learners to acquire multiple credentials and build a portfolio of skills.
4. **Online assessments for standardized evaluation of skills:** Online assessments can evaluate skills acquired through different modes in a standardized way, providing a fair and objective measure of a learner's proficiency. Such assessments can be used to measure learning outcomes and provide feedback to learners and educators.

5. **Digital skills frameworks for visibility, comparability, and portability:** Digital skills frameworks map skills across different contexts, enabling visibility, comparability, and portability of skills. This enhances the recognition of skills acquired through non-formal and informal learning, thereby creating new opportunities for people to enter the workforce.
6. **Block chain-based credentials for tamper-proof records of skills:** Block chain-based credentials provide tamper-proof records of skills with potential for wider recognition and acceptance. These credentials can be used to verify the authenticity of skills acquired by learners, making it easier for them to enter the workforce or pursue further education.
7. **New apprenticeship models with immersive technologies:** Technology is enabling new apprenticeship models with enhanced learning through simulations and immersive technologies like virtual/augmented reality. This creates new opportunities for learners to acquire skills in a safe and controlled environment, without the need for high-cost infrastructure.

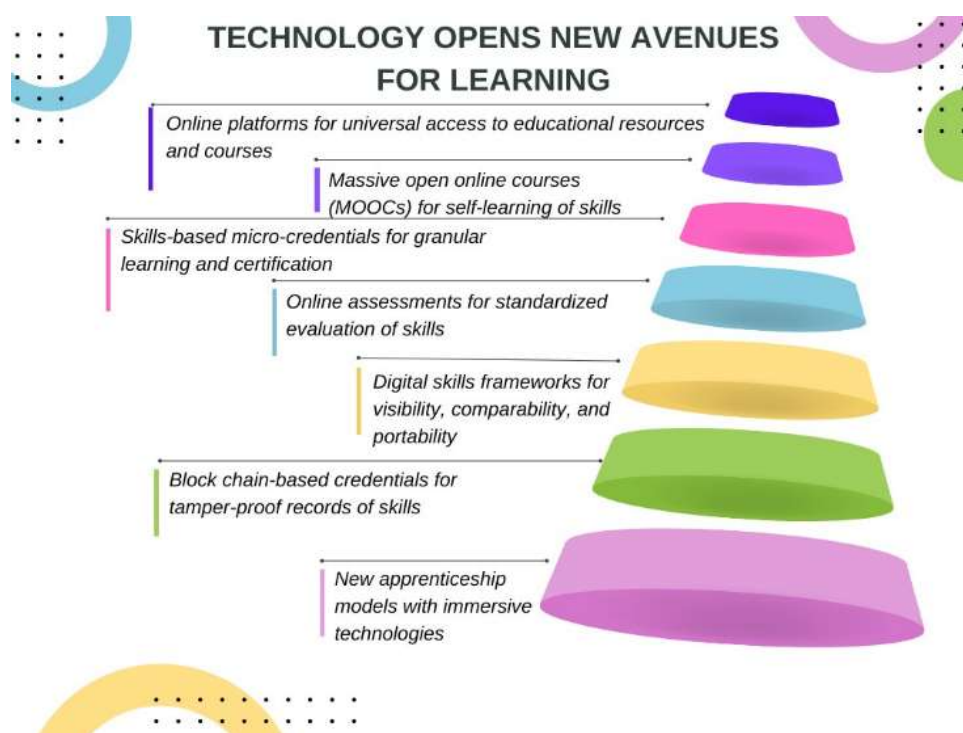


Fig. 4: Technology Opens New Avenues for Learning

3 Technology Enhances Quality and Relevance

Technology enhances the quality and relevance of skill development in several ways, including:

1. **Adaptive learning, personalized feedback, and benchmarking with global standards:** Adaptive learning uses algorithms to personalize the learning experience based on the learner's needs, pace, and learning style. This ensures that learners can acquire knowledge and skills at their own pace, in a manner that is most effective for them. Personalized feedback provides specific guidance to learners on areas that need improvement, thereby enhancing their learning outcomes. Benchmarking with global standards ensures that learners acquire skills that are relevant and competitive in the global marketplace.
2. **Regular updation of course content and alignment with emerging industry needs:** Technology facilitates the regular updation of course content and alignment with emerging industry needs. This ensures that learners acquire skills that are relevant and up-to-date, thereby enhancing their employability.
3. **Experiential learning through virtual labs and simulated environments:** Virtual labs and simulated environments provide experiential learning opportunities without high costs or safety issues. This enables learners to acquire practical skills in a safe and controlled environment, thereby enhancing their learning outcomes.
4. **Catering to diverse learners with different needs and learning styles:** Online resources cater to learners with diverse needs, learning styles, and from all geographical locations. This ensures that learners can acquire knowledge and skills in a manner that is most effective for them, regardless of their background or circumstances.



Fig. 5: Technology enhances the quality and relevance of skill development

There are some of the ways that technology opens new avenues for learning, with figures:

- **Personalized learning:** Technology can be used to track learner progress and to provide personalized feedback. This can help learners to learn more effectively and efficiently. For example, Khan Academy uses adaptive learning to personalize the learning experience for each student.

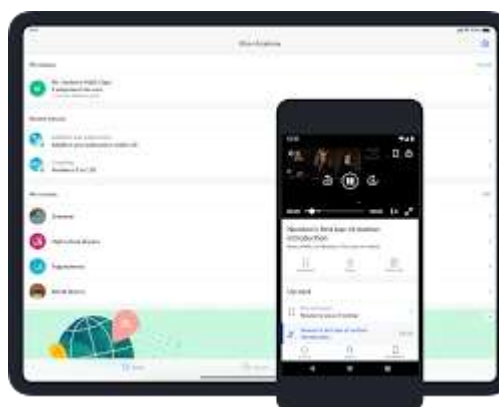


Fig. 6: Khan Academy website [4]

- **Just-in-time training:** Technology can be used to deliver training that is relevant to the specific needs of learners. This can help learners to stay up-to-date on the latest skills and knowledge. For example, LinkedIn Learning offers a wide range of courses that can be accessed on demand.

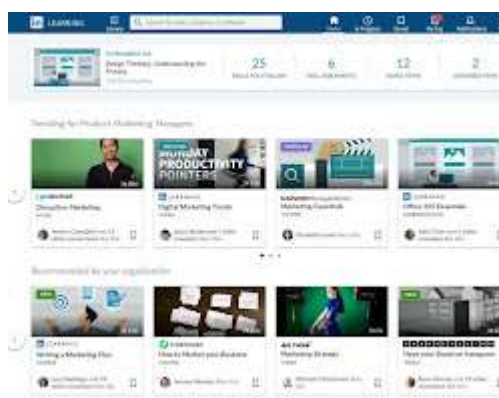


Fig. 7: LinkedIn Learning website [5]

- Enabling lifelong learning: Technology can make it possible for people to learn new skills throughout their lives. This is important in a world where the nature of work is constantly changing. For example, edX offers online courses from top universities around the world.



Fig. 8: edX website [6]

- Improving the quality of training: Technology can be used to create more engaging and interactive learning experiences. This can help learners to retain information more effectively. For example, Google Classroom allows teachers to create interactive learning activities that can be accessed by students on any device.

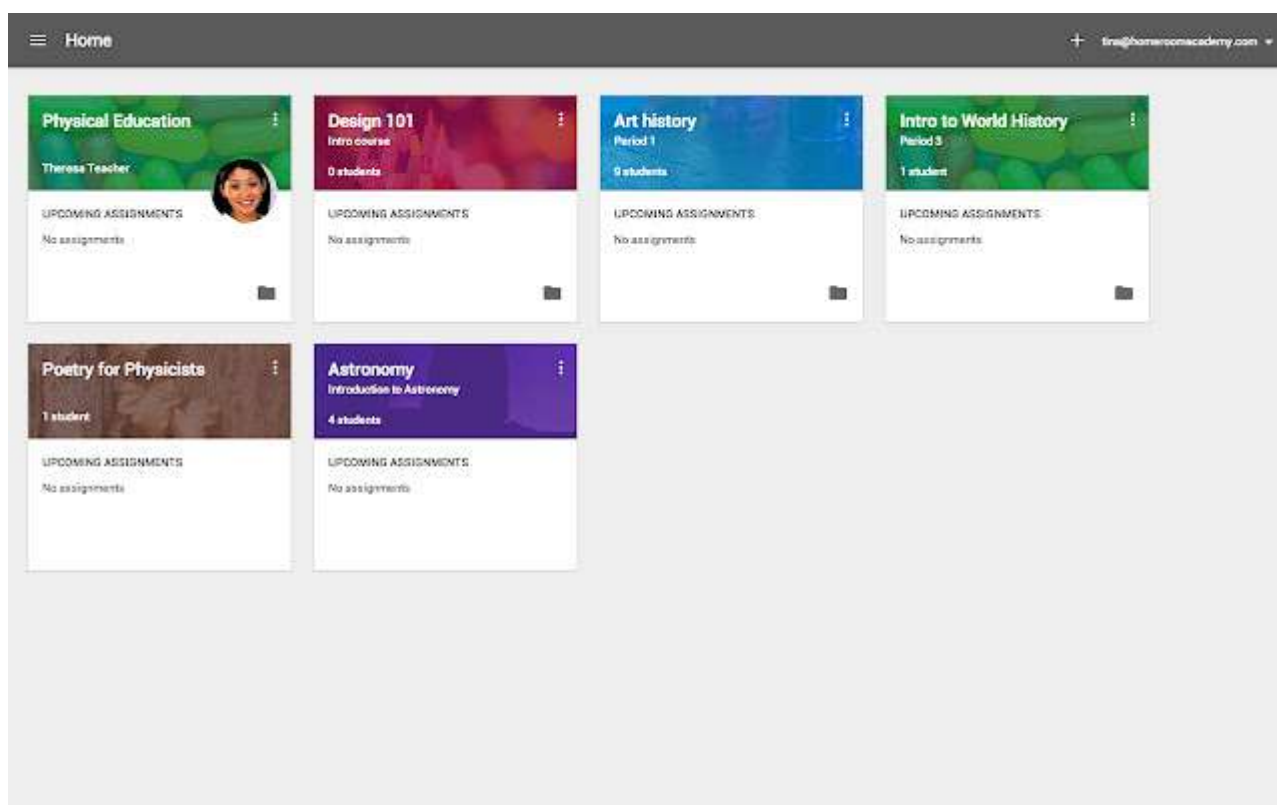


Fig. 9: Google Classroom website [7]

- Lowering the cost of training: Technology can make it possible to deliver training at a lower cost. This can make training more affordable for people who are looking to upskill or reskill. For example, Udemy offers a wide range of courses at a variety of price points.



Fig. 10: Udemy website [8]

In addition to these, here are some specific examples of how technology is opening new avenues for learning:

- Virtual reality (VR) and augmented reality (AR): VR and AR are being used to create immersive learning experiences that allow learners to practice skills in a safe and realistic environment. For example, Google Expeditions uses VR to take students on virtual field trips to places like the Great Barrier Reef or the International Space Station.



Fig. 11: Google Expeditions website [9]

- Machine learning: Machine learning is being used to personalize learning experiences and to provide learners with tailored feedback. For example, Cognia uses machine learning to track student progress and to recommend personalized learning activities.



Fig. 12: Cognia website [10]

- Big data: Big data is being used to track learner progress and to identify areas where learners need additional support. For example, Pearson uses big data to provide teachers with insights into student learning.



Fig. 13: Pearson website [11]

- Social media: Social media is being used to create learning communities where learners can connect with each other and share resources. For example, MOOCs (Massive open online courses) often have active online forums where learners can ask questions and discuss the course material with each other.

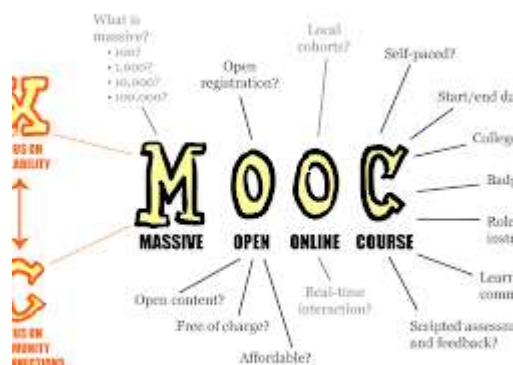


Fig. 14: MOOCs website [12]

These are just a few examples of how technology is opening new avenues for learning. As technology continues to evolve, we can expect to see even more innovative ways to use technology to learn and develop new skills.

4 Challenges of Access, Equity, and Integration

Despite the opportunities, technology-enabled skill development in India faces several challenges that need to be addressed, including:

- Access: Not everyone has equal access to technology. This can be due to factors such as income, location, or disability. For example, in the United States, there is a digital divide between rural and urban areas, with rural areas having less access to technology.

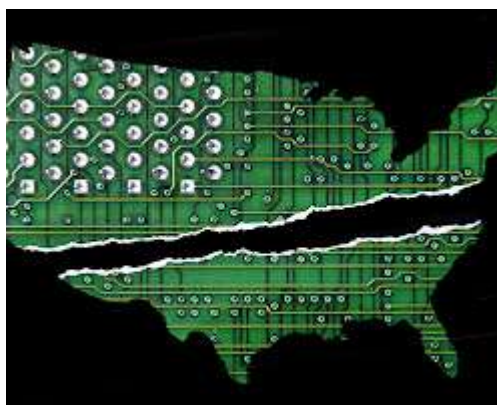


Fig. 15: Digital divide in the United States [13]

- **Equity:** Even if everyone has access to technology, there may still be inequities in the way that technology is used. For example, students from wealthier families may have more access to high-quality technology and resources than students from poorer families. This can lead to a widening of the achievement gap between these groups of students.
- **Integration:** Technology can be difficult to integrate into traditional learning environments. This can be due to factors such as teacher training, curriculum, and assessment. For example, teachers may not be trained in how to use technology effectively in the classroom, or the curriculum may not be designed to be used with technology. This can make it difficult for teachers to integrate technology into their teaching practice.

Here are some specific examples of these challenges:

- **Access:** In some countries, there is a large digital divide between those who have access to technology and those who do not. This can make it difficult for students from low-income families or rural areas to participate in technology-enabled learning. For example, in India, only about 40% of households have access to the internet.

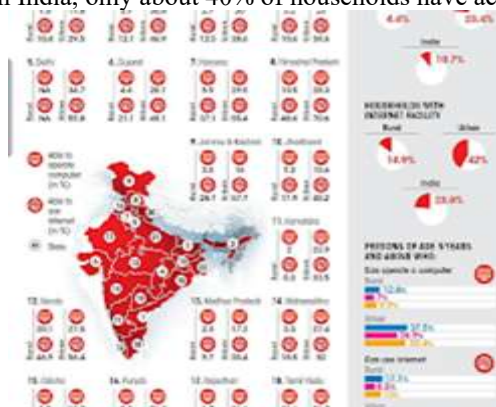


Fig. 16: Digital divide in India [14]

- **Equity:** Even if everyone has access to technology, there may still be inequities in the way that technology is used. For example, students from wealthier families may have more access to high-quality technology and resources than students from poorer families. This can lead to a widening of the achievement gap between these groups of students. For example, a study by the Pew Research Center found that students from high-income families are more likely to use technology for homework than students from low-income families.



Fig. 17: Pew Research Center study on technology use [15]

- **Integration:** Technology can be difficult to integrate into traditional learning environments. This can be due to factors such as teacher training, curriculum, and assessment. For example, a study by the National Education Association found that only about half of teachers feel confident in their ability to use technology in the classroom.



Fig. 18: National Education Association study on teacher confidence in technology [16]

These are just some of the challenges of access, equity, and integration in technology-enabled learning. These challenges need to be addressed in order to ensure that everyone has the opportunity to benefit from technology-enabled learning.

5 Prospects for Skill Development in India

Skill development plays a crucial role in the progress of India's workforce, and technology offers several prospects in this regard. The importance of skill development has been widely recognized, and efforts have been made through institutional and regulatory mechanisms to promote it. Moreover, skill development is considered an antecedent for technology adoption, as individuals with relevant skills are more likely to embrace and utilize technology effectively. Additionally, skill development has been found to contribute to women empowerment by providing them with the necessary skills to participate in the workforce. Integrating skill development with secondary education has also been identified as a potential avenue for enhancing the employability of students. Furthermore, labour market reforms are crucial for skill development, ensuring that the workforce's skills align with the demands of the market [17].

However, despite these prospects, there are challenges that need to be addressed for effective skill development in India. The disconnect between central policies and regional needs poses a significant challenge, as the skill requirements may vary across different regions. Disparities between renewable energy (RE) potential and development costs also hinder skill development in the renewable energy sector. Additionally, planning for better grid management systems is essential to ensure the effective utilization of renewable energy sources. Intensive capital market development is crucial to attract investments in skill development initiatives. Moreover, addressing the energy needs of the rural population and promoting off-grid solar power and micro grids are essential for inclusive skill development. These challenges highlight the need for further research and policy interventions to overcome the barriers to skill development in India [18].

One aspect of skill development in India has been explored in the context of predicting winter precipitation over northern India. Acharya et al. (2014) analysed the skill of five general circulation models (GCMs) in predicting winter precipitation. The study finds that the models are able to reproduce the climatology and internal standard deviation to varying degrees. It also highlights the improvement in prediction skill through the use of multi-model ensemble approaches [19]. Tiwari et al. (2014) identified a teleconnection between sea surface temperature (SST) and winter precipitation, with the SST over the Pacific Ocean affecting precipitation in north India [20]. The share of population with vocational education and training in India has declined over the years, while the unemployment rate remains high (Tara & Kumar, 2016). This finding suggests a mismatch between the skills acquired through vocational training and the demands of the labour market. The study also compares the outcomes between formal and non-formal vocational trainees, indicating the need to address the quality and relevance of vocational training programs in India [21].

The development of distance education programs in India has been driven by the need for skill-based manpower and the inability of formal higher educational systems to meet the demand (Agrawal, 2014) [22]. A comparison with China reveals the growth of distance education programs as a means to bridge the skill gap in both countries. The paper highlights the importance of course design, enrolment trends, and recognition/accreditation processes in distance learning for skill development. Skill development is recognized as a crucial factor in India's economic growth and job creation (Pilz & Wilmschöfer, 2015) [23]. The government has initiated programs such as "Make in India," "Skill India," and "Digital India" to address the skill gap in various manufacturing sectors. These initiatives aim to develop a cohesive environment for new-age manufacturing and future-ready manpower in India. The role of "new-age" skills in accelerating the manufacturing sector is emphasized, highlighting the need for continuous skill development (Chenoy, Ghosh, & Shukla, 2019) [24].

The acquisition of skills among children in developing countries, including India, is influenced by various factors such as household resources, early nutrition, caregiver literacy, and schooling experience (Narayanan, 2015) [25]. The study finds that early enrolment in school benefits children in disadvantaged contexts and that schooling can compensate for household disadvantage to some extent. However, skill disparities re-emerge during the later years of schooling, suggesting the need for interventions to address these disparities. The literature review highlights the importance of institutional and regulatory mechanisms for skill development in India. These mechanisms play a crucial role in coordinating and implementing skill development programs effectively. The review also emphasizes the integration of skill development with secondary education and the need for labour market reforms to promote skill development and employment opportunities. The skill capacity of the Indian workforce is low, with a significant portion being illiterate or having below primary education. The implementation of skill development programs faces unresolved issues and challenges. These challenges include addressing the skill gap, improving the quality and relevance of vocational training, enhancing the effectiveness of institutional and regulatory mechanisms, and ensuring the successful implementation of public-private partnerships (Chenoy, 2013) [26].

6 Conclusion

In conclusion, technology has the potential to revolutionize skill development in India. It has opened up new avenues for learning, enhanced the quality and relevance of skill development, and provided opportunities for reskilling and upskilling. However, to harness the potential of technology for skill development, a coordinated effort among stakeholders is required. Education providers, industry, policymakers, and civil society must work together to ensure that technology-enabled skill development is inclusive, equitable, and addresses the skill gaps in the labour market. Efforts must be made to ensure

equitable access to technology, complement technology-enabled learning with on-ground learning processes and mentorship, develop partnerships and integrated strategies for reskilling at scale, and provide policy and regulatory support for alternative credentialing mechanisms.

The benefits of technology-enabled skill development for India's workforce in the digital age are immense. It can facilitate the creation of a skilled and prosperous workforce that can contribute to India's socio-economic progress and prosperity. Therefore, it is essential to harness the potential of technology for skill development in India and ensure that it benefits all sections of society, especially those from disadvantaged backgrounds.

Ethics Approval and Consent to Participate

All procedures involving human participants received approval from the Ethics Committee of the Government College of Engineering, Kalahandi, Odisha, India. Informed consent was secured from all individual participants included in the study.

Consent for Publication

Participants granted written consent for the publication of the study results, assuring the confidentiality of their identities. To safeguard privacy, any potentially identifying information has been either removed or altered.

Availability of Data and Material

The datasets generated and/or analyzed during the present study can be obtained from the corresponding author (Priya S.) upon reasonable request. Additionally, any materials utilized in the study are available upon request.

Competing Interests

Authors Priya S. and Subidita Pattanaik declare no competing interests, financial or otherwise, that might have influenced the results or interpretation of the presented work.

Funding

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Authors' Contributions

PS and SP jointly contributed to the conception and design of the study, shaping the research framework collaboratively. Both authors, PS and SP, actively engaged in the data collection process, ensuring the development of a comprehensive and well-rounded dataset. The subsequent analysis and interpretation of the collected data were conducted collaboratively by PS and SP, providing diverse perspectives to the findings. PS took the lead in crafting the manuscript, synthesizing the research outcomes into a coherent narrative. During the manuscript revision, SP offered critical input, refining the content, and ensuring its scholarly rigor. Together, PS and SP played integral roles in each phase of the research, collectively contributing to the development and enhancement of the study.

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