Employability By Industrial Awareness Through Education

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Abstract: *Detailed analysis points out that Indian education is approaching a crisis point where the conversion of education to employment is low, and in a labour intensive densely populated country like ours, that can be a critical issue. The present paper tries to point out solutions through a systematic approach, creating curricula through studying industrial needs and specific competencies.*

Keywords: *Employability, Industrial Awareness, Education, Skill Development, Workforce Integration*

Introduction: The present world is one that challenges definitions and boundaries, due to unprecedented advances in technology and AI, which have made us relook at the human form, life as well as capabilities. Traditional ways of looking at livelihoods as well as occupations have changed too, as occupations and livelihoods are dependent on the requirements of human society in terms of services, survival activities and quality of life. Manual or low-level intellectual skills have very easily been taken over by machines, challenging our perceptions and choices about what is it that we would like to take up as a profession or career. This process of thought is strengthened and supported by education systems, as we essentially rely on formal education to prepare us to take up certain professions. But the basic format of Indian formal education has ignored preparations for many other professions essentially labeled as 'blue collar jobs', that make for what we understand as the unorganized sector, where most Indian jobs are relegated today.

In today's VUCA (Volatile, Uncertain, Complex, and Ambiguous) world, it is these blue-collar unorganized sector jobs that could be the most important aspect of human civilization, as we grapple with massive environmental challenges. These challenges make it essential for us to focus on reuse, reduce, recycle and conserve resources, materials, with the help of a workforce which is equipped for such work.

Designing industry-oriented school education involves equipping students with the skills, knowledge, and mindset required to meet the demands of the modern workforce. Vocational education is a skill specific program that equips students with the knowledge and hands on activities in a trade or profession essential for society. This is indeed the career education that a typical Macaulay's model of memory-based pedagogy and evaluation has not been able to provide, particularly for young adults just out of school. Vocational education, in essence, provides application-based training rather than purely theoretical knowledge, which are needed by the industry to provide jobs to a huge potential workforce, who sometimes unnecessarily waste their time

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getting a graduation degree just for the sake of job eligibility.

Stigma around vocational education as inferior

The idea that vocational education is a lesser option than college, simply isn't true. Also to believe that it is for people who can't do well academically, is completely wrong. On the contrary vocational education provides students to excel in hands-on learning and prepares for rewarding careers in skilled trades. Skills which are high in demand, like coding, culinary, plumbing, carpentry, automotive repair, problem solving skills can lead to good career options as well. Vocational education is all about celebrating different strengths, which will equip students with valuable, in-demand skills for fulfilling careers. We see multiple instances where vocational interests and skills are sacrificed by students because of social or family pressure due to a prevalent bias in India around blue-collar jobs. Every student deserves the opportunity to pursue the path that ignites their passion, be it vocational training or college.

So how do we teach vocational subjects? Moreover, what are the major thrust areas we start talking to teachers, so that they teach vocational education with interest and passion?

Here are specific methodologies that can be integrated into school education to make it more industry-relevant:
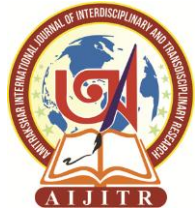
1. Project-Based Learning (PBL)

• Methodology: Students work on real-world projects that mirror industry challenges, such as designing prototypes, creating marketing strategies, or developing digital tools. Also, the services industry needs a workforce for a circular economy, wherein students can learn to repair and reconstruct machinery, reuse materials and create waste management models.

• Industry Relevance: Projects encourage problem-solving, collaboration, and innovation, as they simulate real workplace tasks. Students find it very interesting to engage in activities that mimic real life industry jobs, and also preparing students to become entrepreneurs and open small businesses catering to specific skill sets.

2. STEAM Integration (Science, Technology, Engineering, Arts, Mathematics) - Integrating STEAM into vocational education can make learning more engaging, creative, and relevant to real-world applications. Benefits of STEAM Integration in Vocational Education has vital implications such as:

• Enhances creativity and critical thinking, with continuous emphasis on Problem-Solving

and teaching students how to analyze and solve real-world problems using STEAM principles.

• Prepares students for technologically advanced industries.

• Improves employability by offering interdisciplinary skillsets.

• Methodology of STEAM integration: Combine technical disciplines with creativity (e.g., coding + design thinking). Project-Based Learning can be utilised to encourage students to work on interdisciplinary projects combining STEAM principles with vocational skills. Designing sustainable housing (involves construction skills, engineering, and environmental science), designing health boosting lifestyles using medicine, psychology, sports, yoga, meditation etc can be examples of this integration. Creative Arts Integration can bring in artistic aspects like design thinking, graphic design, or digital media in vocational curricula.

• Industry Relevance: Develops skills in emerging fields like AI, robotics, and creative

technologies, preparing students for STEM-based industries. Collaboration with Industries, particularly partnering with local industries provide students with internships and real-world projects require STEAM-based solutions are a way of connecting STEAM concepts to industry-specific challenges. Moreover, these local exposures can make students aware of problems in their own backyard that require inputs and solutions, so there is tangible application of their knowledge. There can be collaborations with automotive companies for projects involving AI or robotics in vehicle repair, or with chemical industries or food industries for ecofriendly and health products. Sustainability-Focused Projects are a major element now in the industry as well as in education, as student interns can develop eco-friendly solutions through STEAM and vocational education. Clean power and green electricity are areas where vocational training in electrical trade courses can work wonders. Also, there can be the use of 3D modeling software (technology and arts) and other CAD software (engineering and technology) for all design-related trades such as in carpentry, interior design and fashion design courses, particularly in a fashion design course, one can use mathematics for pattern-making and digital technology for virtual fittings. Another area of interest here is training vocational educators to incorporate STEAM concepts into their teaching methodologies through workshops and certifications.

3. Internship & Apprenticeship Programs

• Methodology: Students participate in short-term internships with local businesses, startups, or industries. Integrating Technology into their curriculum at every stage is very beneficial as students can be introduced to tools like coding, robotics, and simulation software as vocational training subjects. Thus even service providers can become technology backed entrepreneurs, the exposure for which can begin right in school. Use of robotics is a common feature in most industries now, and seeing those functions, working with them, can do wonders for vocational education.

• Industry Relevance: Provides practical exposure, builds industry connections, and helps students understand workplace dynamics early.

4. Skill-Based Learning

• Methodology: There is need to focus on industry-demanded skills such as digital literacy, financial literacy, data analytics, and soft skills like communication and leadership. Today, students need to be made employable at an early age, where they have functional domain knowledge, practical application knowledge, high emotional intelligence and ability to approach and overcome challenges creatively.

• Industry Relevance: Aligns curriculum with the requirements of modern sectors like IT, finance, and healthcare, and also traditional sectors like infrastructure (plumbing, masonry, electrical work), food processing, machine accessories, repairs etc.

5. Entrepreneurship Education

• Methodology: Teach entrepreneurial skills through modules on business planning, marketing, and pitching ideas. The theoretical aspects need to be studied at length along with practical exercises and projects to reinforce those ideas and competences. Techno India University has developed a comprehensive program called the ESD, or Entrepreneurship Skill Development wherein diverse groups of students combine their unique abilities to develop business ideas into workable models, that can be scaled up with the help of incubation and providing seed capitals. On a simpler level, such projects need to be brought in for school students as well, and students from vocational streams can really benefit from it. Right at their educational institution, they can get the experience of what they can do after finishing their class 12 education, they can also be inspired to finance their own higher education as and when they choose to pursue it.

- **Industry Relevance:** Prepares students to become self-starters and innovators, critical for thriving in a gig economy, which is the future of the way we view jobs. We are in the world of a market that thrives on need-based skill-based project based short term employment. The gig economy is made up of companies, workers and consumers. All gig workers aren't the same. They include the following:

- freelancers who get paid per task;

- independent contractors who perform work and get paid on a contract-to-contract basis;

- project-based workers who get paid by the project;

- temporary hires who are employed for a fixed amount of time; and

- part-time workers who work less than full-time hours.

A skilled individual is able to fit oneself in any of these formats and earn a comfortable living, wherein a job satisfaction is also achieved, because the skills of the individual are appreciated and compensated by a much larger audience.

- **Gamification and Simulation**

Educational Gamification can be a revolutionary step in improving student performance and interest in today's day and age, where attention spans are getting very low. Gamification and Virtual Reality are also part of this cohort. Teaching can become very interesting and learning can be much easier with the use of gamified platforms and VR tools to simulate real-world scenarios.

- **Methodology:** Use tools like simulation software, virtual labs, and role-playing games to mimic workplace scenarios. AI-Driven Games use gamified learning platforms that adapt to students' levels using deep learning, thus also individualising teaching according to student personality. Games that teach coding or STEM concepts, adjust difficulty dynamically for various academic and lab activities, teach strategic decision making and design, communication and commerce, are a great way to stimulate student interest, creativity, team work and collaboration.

- **Industry Relevance:** Helps students experience real-time problem-solving in industries like logistics, manufacturing, and IT.

- **Deep learning in schools**

Integrating deep learning in schools can revolutionize education by enabling personalized learning, automating administrative tasks, and enhancing student engagement. Here's how deep learning can be implemented in schools:

- **Enhanced Classroom Interaction**

- **Speech and Gesture Recognition:** Use deep learning for interactive classroom tools, enabling hands-free teaching aids and improved student engagement. This aspect can take learning experience to an all-new level, by bringing in virtual teacher assistants and chat bots.

- **Example:** AI systems that transcribe teacher instructions or translate for multilingual classrooms.

- **Real-Time Assessment**

- • Automated Grading: Use deep learning models to assess essays, assignments, and objective tests quickly and fairly.

- • Example: Google's AI writing assistant evaluates grammar, structure, and relevance.

- • Behavior Analytics: Identify patterns of disengagement or understanding through facial recognition or voice tone analysis during lessons.

- Assistive Technologies

- • Support for Special Needs: Deep learning-based tools can assist students with disabilities.

- • Example: Speech-to-text systems for hearing-impaired students or predictive text tools for students with dyslexia or dysgraphia.

. Administrative Efficiency

- • Attendance Tracking: Facial recognition systems can mark attendance automatically.

- • Resource Optimization: Predict student enrollment trends and allocate resources effectively.

- Enhanced Security

- • Behavioral Monitoring: Detect unusual activity patterns to prevent bullying or ensure safety.

- • Access Control: Secure school premises with AI-based surveillance systems.

- Collaborative Learning with Industry Experts

- • Methodology: Industry leaders conduct workshops, mentoring sessions, and hackathons for students.

- • Industry Relevance: Offers insights into current trends, technologies, and expectations directly from professionals.

- Career-Based Curriculum Tracks

- • Methodology: Offer specialized tracks in high-demand sectors such as:

IT and Software Development for ease of living, ease of business, ease of getting jobs and ease of environmental sustainability
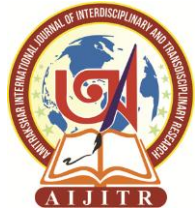
Healthcare and Biotechnology for precision medicine and life sustainability

Child care and household assistance for better service provision and employment sustainability

Creative Arts and Multimedia for entertainment and content availability

Renewable Energy for energy demand sustainability

- • Industry Relevance: Students can choose a career-oriented path based on interests and market trends.

- Integration of AI and Data Science

• Methodology: Introduce AI tools, coding, and data visualization as part of the curriculum. Particularly for the study of humanities, visualisation can have a very powerful impact on the student. The latest example is the phenomenal data sets being discussed for the Mahakumbha celebration of India. This can be a case study for students to learn planning, economics, management, social engineering as well as forecasting, and can be made an interesting and immersive learning experience with the help of technology.

• Industry Relevance: Prepares students for the growing reliance on AI and data-driven decision-making.

• Community and Social Impact Projects

• Methodology: Partner with local industries for community-driven initiatives like green technology implementation or smart city projects. Develop solutions for reducing waste in manufacturing processes. Students can be provided with an experience of working in real life scenarios to apply whatever they are learning in their classrooms. It also has a great impact in changing the mindset of the students and their guardians towards working with their hands in the manufacturing sector or even the services sector. Factory jobs, janitorial jobs, food and beverage industry jobs, nursing and caregiving jobs, all such roles would be experienced and appreciated by the students.

• Industry Relevance: Builds a sense of responsibility and develops skills in sustainable development.

12. Certifications and Micro-Credentials

• Methodology: Offer certifications in areas like coding (Python, Java), graphic design (Adobe), and digital marketing. Digital humanities is

• Industry Relevance: Validates students' skills, giving them a competitive edge in internships or early employment.

• Integrated Learning Platforms

• Personalized Learning with Adaptive Learning Platforms: Use AI-powered platforms to adjust the curriculum based on each student's pace and understanding.

• Example: Systems like DreamBox, Techno India University, Khan Academy can create tailored lessons using deep learning algorithms.

• Learning Analytics: Deep learning models can analyze student performance, predict outcomes, and suggest interventions and remedial lessons for struggling students.

• Smart Content Delivery with Automated Content Creation and Intelligent Tutoring Systems (ITS): AI tutors can provide instant feedback and simulate one-on-one teaching, Generate practice problems, quizzes, or customized reading material based on students' proficiency levels. Many different EdTech tools such as Coursera, Khan Academy, or Code.org can be used for blended learning, that would combine online tutorials, face to face classes, online content and books.

• Example: Virtual assistants that help students with math problems using step-by-step explanations.

• Industry Relevance: Allows students to explore self-paced, industry-focused courses alongside
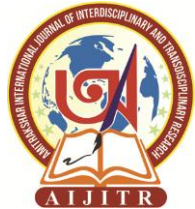
regular studies.

- Mentorship Programs

    • Methodology: Pair students with mentors from relevant industries for career guidance and skill development.

    • Industry Relevance: Provides personalized learning experiences and builds confidence.

By adopting these methodologies, schools can bridge the gap between traditional education and industry needs, fostering a generation of adaptable, skilled, and future-ready professionals.

Some of the major aims and objectives of vocational education in India are discussed below:

1. To boost the productive potential of the Indian economy.
2. To improve the economic standard of citizens of the country.
3. To eliminate unemployment by providing self-employment opportunities to the masses.
4. To make the most use of human resources.
5. To train youth as expert technicians.
6. To contribute to the equal distribution of the advantages of economic progress in order to ensure social and economic justice.
7. To assist youth in understanding the scientific and technological aspects of modern development.
8. To provide opportunities to accommodate the requirements of women, rural and tribal students, and marginalized members of society.
9. To make use of both material and human resources.
10. To use scientific and technological knowledge for the welfare of society.
11. To instill in students a passion for their work.

All of these objectives can be fulfilled by utilising the various strategies discussed above, as this education can bring forth a true realisation of potential in a population, for the economic, social, intellectual, entrepreneurial and civilisational progress of a community, a country and the entire globe. An economy energised by vocationally trained and motivated workforce will be able to execute multidimensional progress of human populations.

As is very obvious, all of these goals can be fulfilled by utilising the aforementioned techniques for providing vocational education for students in today's world. The following diagram provides a diagrammatic representation of the logical sequence of events for vocational education that is effective, fruitful and an asset to modern India. A discussion and simulation-oriented classroom, with real life industrial experience, furthur augmented by enrichment learning in schools for even better applications in industry.
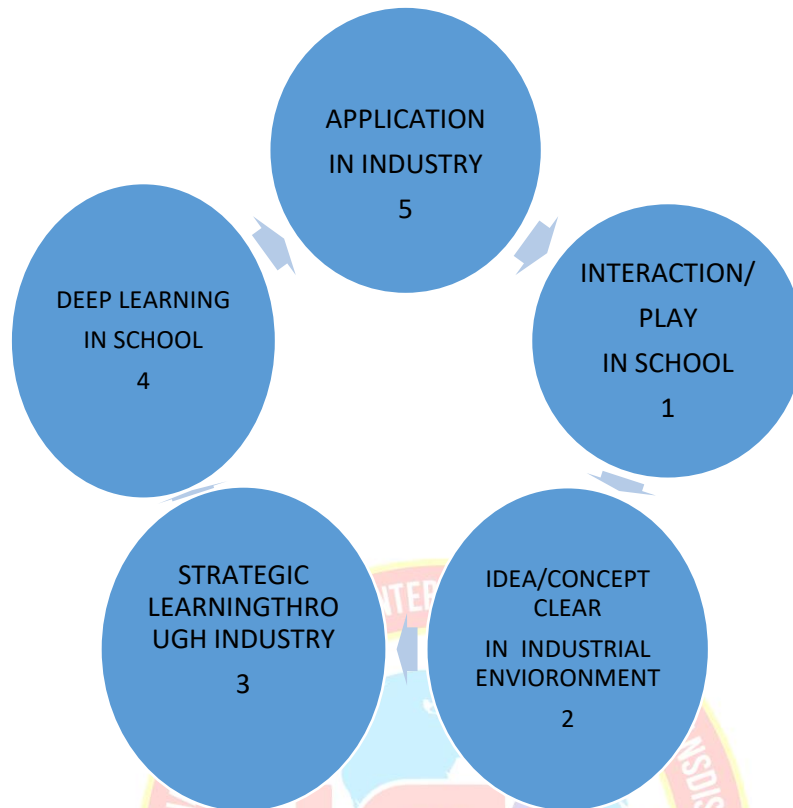
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