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**PSS Central Institute of Vocational Education**

(a constituent unit of National Council of Educational Research and Training (NCERT))

Ministry of Education, Government of India)

Shymala Hills, Bhopal - 462002, Madhya Pradesh, INDIA

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Shyamla Hills, Bhopal - 462002, Madhya Pradesh, INDIA

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All enquiries regarding the Journal may be addressed to: [ijvepss2022@gmail.com](mailto:ijvepss2022@gmail.com)

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## Chief Editor's Note

### Empowering Skills through Bagless Days: NEP 2020's Vision for Future-Ready Education

The launch of bagless days in schools aligns well with the goals and principles outlined in the National Education Policy 2020 (NEP 2020) in India. NEP 2020 emphasizes holistic, experiential, and flexible learning, aiming to make education more engaging and relevant for students.

NEP 2020 promotes a holistic approach to education that integrates academic learning with extracurricular and co-curricular activities. It emphasizes the development of a wide range of skills beyond traditional subjects as bagless days often involve interdisciplinary and experiential learning activities that go beyond conventional textbook-based education. Focusing on projects, group work, and practical experiences, these days help students engage with diverse subjects and skills in a more integrated manner.

The policy stresses the importance of experiential learning, where students learn through hands-on activities and real-world experiences. On bagless days, students often participate in activities such as field trips, practical projects, or interactive workshops. With traditional materials set aside, students are often encouraged to engage in creative projects, problem-solving activities, or innovative learning methods. These activities stimulate critical thinking and creativity thereby reducing the Burden of Heavy School Bags

NEP 2020 advocates for a flexible and personalized approach to education that caters to the diverse needs and interests of students. Bagless days can support this goal by allowing for a more flexible learning environment. Without the constraints of a traditional curriculum, students can explore subjects of interest, work on personalized projects, and engage in activities that match their individual learning styles. Changing the routine by having bagless days can refresh students' interest and enthusiasm for learning, breaking the monotony of daily school life. Increased engagement can lead to improved learning outcomes. When students are more interested and motivated, they are more likely to participate actively and retain information better.

To effectively implement bagless days in line with NEP 2020, schools should:

- **Design Meaningful Activities:** Ensure that bagless day activities are well-planned and aligned with learning objectives to maximize educational value.
- **Leverage Technology:** Incorporate digital tools and resources to enhance learning experiences and support NEP 2020's emphasis on technology.
- **Provide Adequate Support:** Offer training and resources to teachers to help them design and manage effective bagless day activities.
- **Monitor and Evaluate:** Regularly assess the impact of bagless days on student learning and well-being to ensure they meet educational goals.

**(Deepak Paliwal)**

**Chief Editor**

*Indian Journal of Vocational Education*



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## Using Technology for Vocational Education and Training (VET) during COVID Times: Issues and Challenges

*Sitansu S. Jena*

*Professor & Dean, School of Vocational Studies (SVS), Dr. B.R. Ambedkar University Delhi, Delhi*

### Abstract

The paper primarily derives its feet to ascertain pedagogical concerns on using technology for vocational education and training (VET) for different skill development programmes in institutions during COVID times. The educational institutions cutting across levels have massively used technology for teaching and learning during the pandemic period (COVID-19) to transact the curriculum prescribed for learners. The use of technology for transaction of curricular practices is also no way exception to the skill training programmes as well though it is supposed to be focussed on hands-on-training. The potentiality of using technology has been well recognised in the context of TVET way back 2005 by European Union as it states “the development of IT and e-learning in iVET institutions is closely connected with broader issues such as the evolution of the information society, the lifelong learning paradigm and the general development of secondary education” (EU 2005). Similarly, the researches have proved that “if access to TVET is to increase, new ways of developing and delivering courses must be explored. TVET must be taken outside of the classroom and into the communities, the workplaces and the homes of the students. Traditional ways of thinking about TVET must be put aside and different ways of packaging and delivering knowledge and skills must be developed” (Hampton, C. and Bartram, J. 2002:63). The present paper strives to look into some of the issues and challenges in using technology for TVET with emphasis on accessibility, facilitation of teaching and learning, sustaining learner's motivation, addressing social and economic issues & challenges and ensuring teaching-learning process more enjoyable, including addressing institutional developmental plans.

**Keywords** : Technical and vocational education and training (TVET), skill development, technology

### Introduction

The vocational education and skill training programmes in India have come a long way. The training allows a diverse social group to be able to earn their livelihood in a particular area, which makes them easily employed. It has been evident that there exists a gap between the employed and the unemployed due to the fact that lack of skill required to perform a task. With the inception of the government programmes like Pradhan Mantri Kaushal Vikas Yojana (PMKVY) and others, a large number of unemployed youth had been able to join the workforce. The emerging trends in vocational education is to make sure that the youth of the country has access to a large number of opportunities that are otherwise not available for them. The idea of work-based learning (WBL) and vocational education and training (VET) play a crucial role in preparing individuals for the workforce by imparting practical skills

and bridging the gap between academic learning and the world of work. The development of vocational education is embracing flexible learning models, such as online courses and micro-credentials to provide accessible and personalized learning opportunities throughout one's career and prepare people as lifelong learners. The National Education Policy (NEP) 2020 also emphasises on the use of technology for education. The use of technology was much wider at the time of COVID-19 when most of the educational set-ups were shut down due to the effect of pandemic worldwide and India was no way exception to this. Not only in India, but across the world, the pandemic period brought together a time when the resilience towards using technology was felt the necessity and to move ahead with time. Therefore, through this paper, it is necessitated to understand how the technology could bridge the gaps that existed during the pandemic period to make it possible to embark its journey for teaching learning in the context of vocational education and training.

The objective of this piece of work is to explore the issues and challenges the educational institutions embarked while organising teaching learning activities by using available technology and the difficulties faced by the learners for co-oping up with the process of learning in the context of vocational education and training.

## **Status of VET in India**

If one would like to understand the genesis of VET, as reported by the UNESCO in April 1996, (A. Dyankov) had stated that in more than 8,000 institutions, including industrial/ technical schools, agricultural/ veterinary/ animal husbandry/ fisheries/ forestry schools, pharmacy/ nursing/ paramedical schools, commerce/ accountancy/ secretarial practise schools, arts/ crafts/ dress making schools, and institutes of higher learning were engaged in the system. Most of these programmes were offered using face-to-face teaching learning strategies. As a result, numerous technical and vocational initiatives had taken place based on the recommendations of the National Education Policy (NPE 1986) and subsequently operationalised through a well exhausted Programme of Action (POA, 1992) in India. However, not all these initiatives boosted effectively for spread on VET in the country as it could covered only around 5% students in the vocational education stream, (though targeted for 25%), as reported by the NEP 2020.

The most recent Human Resource Requirement Report as prepared under the auspices of Ministry of Skill Development and Entrepreneurship (MSDE), Govt. of India points out the sectoral and geographical spread of incremental skill requirements across 24 high priority sectors between 2013-17 and 2017-22 estimated as 1203.34 lakhs workforce needed across all states as per the table given below (MSDE Annual Report;2021-22).-

(In lakhs)

| SLNo. | State              | Incremental HR Requirements |
|-------|--------------------|-----------------------------|
| 1     | Andhra Pradesh     | 108.71                      |
| 2     | Arunachal Pradesh  | 1.47                        |
| 3     | Assam              | 12.34                       |
| 4     | Chhattisgarh       | 30.43                       |
| 5     | Delhi              | 63.41                       |
| 6     | Goa                | 2.27                        |
| 7     | Gujarat            | 57.57                       |
| 8     | Haryana            | 34.84                       |
| 9     | Haryana            | 0.93                        |
| 10    | Himachal           | 12.06                       |
| 11    | Jammu and Kashmir  | 11.22                       |
| 12    | Jharkhand          | 44.52                       |
| 13    | Karnataka          | 84.77                       |
| 14    | Kerala             | 29.57                       |
| 15    | Madhya Pradesh     | 78.16                       |
| 16    | Maharashtra        | 155.22                      |
| 17    | Manipur            | 2.33                        |
| 18    | Meghalaya          | 2.49                        |
| 19    | Mizoram            | 1.40                        |
| 20    | Nagaland           | 0.97                        |
| 21    | Odisha             | 33.45                       |
| 22    | Punjab             | 28.99                       |
| 23    | Rajasthan          | 42.42                       |
| 24    | Sikkim             | 147.82                      |
| 25    | Tamil Nadu         | 135.52                      |
| 26    | Tripura            | 2.59                        |
| 27    | Uttar Pradesh      | 110.11                      |
| 28    | Uttarakhand        | 20.61                       |
| 29    | West Bengal        | 93.42                       |
|       | <b>Grand Total</b> | <b>1203.34</b>              |

Source: MSDE (2022), Annual Report 2021-22

Keeping in view the requirement, the MSDE, Govt. of India has launched numerous initiatives through Skill India Mission and National Skill Development Mission:-

- Launching of the Pradhan Mantri Kaushal Vikas Yojana (PMKVY).
- Notification of common norms for bringing about uniformity and standardization

- Setting up of Sector Skill Councils (SSCs) as industry-led bodies to develop National Occupation Standards (NOSs).
- Implementation of Skills Acquisition and Knowledge Awareness for Livelihood Promotion (SANKALP)
- Launching of Skill India Portal to provide information of trainees, training providers and trainers; and many more related initiatives.

## **Technology and Its Accessibility in India: Current Status**

As of 2020, 50% of people in India had access to the internet and this is growing much faster rate in rural areas through 'Digital India' initiatives. The 'Digital India' is a flagship programme of the Government of India with a vision to transform India into a digitally empowered society and knowledge economy. In 2019, there were 264 million internet users in rural India compared to the 310 million internet users in urban India (NITI Aayog, June 2022). The rate at which the Information Technology (IT) is growing today is evident from the fact that it has invaded almost every part of our life. Technological progress can be harnessed by augmenting both expansion as well as quality of education. Present endeavour in this direction has been mainly towards providing the infrastructure and network to the educational institutions, especially to the institutions of higher learning cutting across urban and rural areas. It is well recognised that the digital resource development and its effective utilization by offering digital based certified programmes and courses need to be fully exploited by the universities.

In view of the Government's vision, the educational institutions are keen to use the technological resources in helping its mission to make higher education accessible to all, including the disadvantaged segment of the society. In this regard, earlier it had launched its National Mission on Education through Information and Communication Technology (NMEICT) in 2009 to provide the opportunity for all the teachers and experts in the country to pool their collective wisdom for the benefit of every Indian learner, especially in the context of promoting professional education, and, thereby, reducing the digital divide. Under this Mission, a proper between content generations, research in critical areas relating to imparting of education and connectivity for integrating knowledge with the advancements in other countries was attempted. In view of the digitalization of learning resources, it is imperative to reach out to the critical masses in vocational education and training cutting across different sectors through well designed network with complete dedication. Although disjointed efforts have been going on in this area by various institutions / organizations and isolated success stories are also available, a holistic approach is the need of the hour. This mission seeks to support such initiatives and build upon the synergies between various efforts by adopting a holistic approach. It is obvious that emphasis on Information and Communication Technology (ICT) is an urgent need as it acts as a multiplier for capacity building efforts of educational institutions without compromising the quality. The mission is also necessary to sustain a high growth rate of our economy through capacity building and knowledge empowerment of the people and for promoting new, upcoming multi-disciplinary fields of knowledge (*Source: <https://www.meity.gov.in/accessibility>*).

## **Importance of Technology for VET : The Current Status**

Technology plays a very important role in the teaching and imparting of knowledge in vocational education and training (VET). Technology is an inextricable part of our modern culture. In traditional or distance education institutions worldwide, particularly in developed economies, technology has demonstrated dramatic effects on the standard and quantity of instruction, analysis and research. It is well recognised that the judicious use of technology facilitates in development, immersion, flexibility in curricular transaction and engaging material effectively for promoting learning enhances vocational and technical education and learning. It enables students to learn in a more personalized manner. Furthermore, the ICT has the capability to accelerate, enhance and deepen skills, motivate and engage students in learning, assist students in linking experiences to undertake practice and build economic viability for all stakeholders.

Technology, thus, enhances institutions' performance and efficiency, leading to several instruments to improve and promote the pedagogical practices of professional and technical instructors. E-learning, therefore, has become the popular mode of using technology in knowledge generation and facilitation for teaching and learning. The teachers engaged in the professional and technical organisations plan, develop, and transact curriculum keeping in view the individual needs and capability of the diverse student groups and explore the possibility using different e-learning platforms. This is necessitated because extended learning can provide new ways to achieve high standards' on cognitive tasks, including uniqueness, ingenuity, problem resolution, and teamwork, particularly by utilizing web-based technologies.

Realising the importance of technology for VET, MSDE, Government of India, has taken significant steps by harnessing the support of digital technology and some of them are listed below (MSDE, 2022):

### **National Open Digital Ecosystems for Skills (NODES)**

The Indian skill development ecosystem is large, heterogeneous, diversified, fragmented, with heavy friction and low on outcomes. The National Open Digital Ecosystem for Skills (NODES) initiative proposes to seize the ecosystem frictions bull by the horns and make skills a case of definite optimism for the country. The NODES is being designed as a decentralized data-empowerment system with data portability between applications with robust data privacy features.

### **Digital Skilling Solutions and Innovations**

The Digital Skilling Solutions and Innovations (DSI) function at National Skill Development Corporation (NSDC) focuses on the facilitation and aggregation of learning resources for the skilling ecosystem, and thereby enabling structure and consistency across the skilling endeavours in the country.

## **Digital and Technology Solutions for Learning**

"e-Skill-India" is an NSDC's e-learning aggregator portal, the first of its kind e-Skilling platform that leverages digital skilling opportunities by integrating e-Content from various providers across the ecosystem thus bridging the gap between the supply and demand.

## **Strategic Knowledge and Program Partnerships**

A variety of knowledge-partnerships were established based on demand of requisite skills in the country by collaboration and networking with national and international education and training providers, including digital start-ups.

## **Facilitation and Curation of Learning Resources**

A number of Skilling Contents and Participant Handbooks are available for the candidates. This includes facilitating SSCs in creating and designing a takeaway handbook for each candidate based on the curriculum for the targeted job role. Further, the trainer Guide with detailed Training Delivery Plan to assist the training facilitators with structured approach towards training. As on 2021-22, total 219 Facilitator Guides have been made available on NSDC portal free, including Free Resources aggregated Kaushal e-Pustakalaya, an android-based e-Book reader app, etc.

## **Design and Pedagogy**

The e-Skill India launched a COVID training zone cataloguing digital resources for 6 new job roles across 27 e-Courses with over 90 hours of digital content. The e-Books for these courses have been made available for free via e-book reader app. It also launched e-Skill India, a PMKVY Zone, consolidating over 174 additional digital reference content spanning 49 job roles from 18 Sectors for PMKVY candidates. Many more are added under PMKVY 2.4 programme which is currently on offer till 2024. Further, 155 learning hours on English, Employability and Entrepreneurship (EEE) training included under PMKVY on pilot basis across 9 job roles to gauge impact on employability.

## **Technological Platforms**

Due to the limitation of the face-to-face interaction during COVID-19, the policy makers and organisations took significant initiatives to create alternative routes for VET, and most important ones are as below:

- Skill India Portal (SIP): Skill India Portal (SIP) is a comprehensive technology platform that enables administration of PMKVY, and non-PMKVY schemes run by both central and state governments.
- Apprenticeship Portal: Apprenticeship portal (accessible through the website <https://apprenticeshipindia.gov.in>) was developed in 2016 by NSDC with the mandate to implement Government of India's prestigious National Apprenticeship Promotion Scheme (NAPS).
- Skill Management Information System (ASEEM): It is an initiative to ensure the demand of skilled workforce is met with the available supply and hence bridge the demand and supply gap that exists in the market.

## **Use of ICT during COVID Times: Issues and Challenges**

### **Accessibility to the Training Infrastructure**

The COVID-19 pandemic affected economies and societies around the world and caused an unprecedented fall in economic activity, the loss of working hours and income, and a sharp rise in unemployment and underemployment. The research conducted emphatically showed in the context of TVET that most of the training centres were closed during the period. However, many training organisations took the step to shift towards remote training mode to ensure continuity of training but at the same time there were very low-key response from the trainees. This is due to the fact that the trainees face many obstacles and major ones are lack of general and technological infrastructure, lack of distance-learning platform, lack of staff capacity and financial resources. In most TVET programs, practical training is a critical dimension which is not easily deliverable through remote modalities for diverse occupations (Chun, H. K. et.al. 2021). During COVID-19, the learners had to face a challenge in order to make sure that they have access to what their institution was trying to impart to them as a form of course content. It was the time when people had to face the problem of not having a proper infrastructure at home to be able to use technology for educational purpose. The lack of sufficient resources and support for technology adoption was the major challenge faced by most learners (Bozkurt, A., and Sharma, R. C. (2020).

The primary goal of using technology for learning purpose and making people aware about its benefits have not come to make its mark in the long run. The fact that teaching and content creation remained moving at a snail's pace is a bigger issue for the vocational education institutions offering skill training programmes as well as for learners. Further, it was ascertained that what the curricular practices organised in the institutions, especially in the TVET context, had secondary importance as most of them were unable to have practice based curricular inputs. Further, one need to keep in mind that how much the students would remember not only the educational content delivered but also how they were coping up to the teaching learning process during these hard times.

### **Technology as facilitation of teaching**

One of the classic literatures available in the field of educational technology identifies the role of technology in the education sector and how technology is used for education and training, especially in the context of India (Kulkarni: 1969). While technology is attributed majorly of two functions: the contributions of engineering the technology for teaching learning purpose and contextualising to the programmed learning the application of the behavioural sciences to the improvement of the teaching/ learning process.

No doubt the accessibility to the contemporary technology is important, but at the same time programmed learning as a method of organizing learning experiences and how it has been beneficial to the major stakeholders i.e. teacher, curricular developers, students and policymakers has also to be taken into account. It has further been argued that the stakeholders identify it with teaching machines – hardware, involve a great deal of expenditure and fear that introducing educational technology might lead to replacing teachers, thereby dehumanizing the educational process. However, researches in the context has proved that the highly affected counties could moderately sustain their teaching learning due to greater facilitation of using technology during COVID times (Stracke et al., 2022).

### **Sustaining learners' motivation**

The skill development issue in India is pertinent both at the demand and supply level. Generating employment is definitely a challenge given the enormity of the population entering the workforce each year. From the supply side, the issue is primarily related to employability of the workforce due to varying reasons ranging from poor education, lack of training facilities, inadequate skilling, quality issues leading to mismatch of skill requirements, and poor perception of vocational skilling vis-à-vis formal education (Joshi et. al, 2018). These have inadvertently created skill shortages and also contributed to higher unemployment. Hence, both employment and employability are key factors of concern today. Unfortunately, the current size of India's formally skilled workforce is very small. Top of it when technology is used for vocational education and training, it adds into the further challenge for creating an ambience for training in a shop floor. Passionate learner, who is motivated and encouraged by their mentors, has to solve all their problems virtually over their lifespan, no matter the variation of the pandemic they may encounter. Further it is argued that '...through disciplined nonconformity, and in learning communities, and across cyberspace, we may now reimagine a singular planet; exciting and far more integrated connectivity of disciplines and topics; and, utilizing the flexibility that online modules provide' (Naylor 2021). It is often felt amongst the trainers that when they are not present physically, the chances of diversion of attention of students are higher due to the lack of infrastructure at home during the COVID times. This is a big challenge as the teacher has to ensure that students maintain the motivation till the end of the course.

### **Social Issues**

It has often been realised that skill development enhances both people's capacities to work and their opportunities at work, offering more scope for creativity and satisfaction at work. This calls for to find certain strategies that address in turn the why, what, and how of equipping the workforce with the skills required for strong, sustainable, and balanced growth. All these if one possibly changes the mind-set towards the importance of VET in our education system, which is largely missing. It has often been realised that choice for vocational education is the last in the educational aspiration of our youth. Unfortunately, the misnomer is that the vocational education attracts the professionals who need to use only their hand, not mind, though it is a great fallacy that any activity requires both brain and hands. This mind-set of masses has to change if vocational education segment to grow. For this, one needs to develop selected drivers of longer-term change that challenge national skills development systems and provide the motivation for a commitment to improving them. Secondly, it also calls for generating a conceptual framework for a skills development strategy concerning national policy objectives relevant to the diverse realities and needs of the country as whole and different stakeholders in particular. Thirdly, examples of successful ventures of the countries like Germany, South Korea, Australia, China etc. who have built their economy with strong vocational education system. Since larger group of students did not have access to required technology such as- smart-phones, dedicated internet facilities, separate rooms for learners at home and facilitation for learning, especially from the low socio-economic strata, also added the underpinning effect to the importance of vocational education and training programmes.



## **Economic Issues**

Vocational Education and Training (VET) has been perceived as major game changer for economic productivity and growth in developing nations, especially in India. It has greater implication on poverty alleviation from the societal point of view. It has often been argued that appropriate knowledge and skills enhances the productivity of the workforce and thereby enhances the economic growth. Therefore, educational institutions should provide

appropriate knowledge and skills to enhance their skills and make an effective contribution to economic growth. Many research in this area have found that there is absolutely no synchronisation of vocational education in terms of its equivalency for the vertical mobility of students, robust competency standards and accreditation system, shortage of trained teaching force, inadequate linkages with the industry and lack of convergence between agencies for social recognition (Mathur, 2018).

Even though, one feels proud for 'demographic dividend' for its population in the country, but the socio-economic inequality and growing unemployment have major concern for the growing economic, including accessibility of appropriate technology to the large segment of population in India. Due to their disadvantaged economic status a significant segment learners associated with the vocational training programmes could not join the technology supported instructional process. Even the teachers also had similar kind of experience to share, especially during the COVID-19 times.

## **Conclusion**

No doubt, the COVID-19 has posed a greater challenge to the VET sector, like all other sectors in a growing economy like India. However, indiscriminate use of technology for training youths during the COVID times, without ascertaining availability of the adequate infrastructure has also brought an impediment to the entire system. The gap that exists between urban-rural contexts in terms of accessibility to the technology has accumulated challenges for implementation of VET education system. Further, landscape of VET system suffers from issues and challenges like public perception that views skilling as the last option, robust assessment and certification systems, paucity of trainers, inability to attract practitioners from industry as faculty, very low coverage of apprenticeship training, narrow and often obsolete skill curricula, non- inclusion of entrepreneurship in formal education system and lack of assured wage premium for skilled people (MSDE, 2022). Of course, these issues and challenges are not only limited to the digital infrastructure, but also about its operation and accessibility. However, these does not deter to appreciate the potentiality of technology for education and training in a growing economy like India.

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## **Study on Understanding Factors Influencing Persistence Intention during the Transition from DVET to the Workplace**

*R. Ravichandran*

*Department of Humanities Science Education and Research, PSS Central Institute of Vocational Education, Shyamla Hills, Bhopal – 462 002*

### **Abstract**

This research explores the experiences and determinants influencing persistence intention among Diploma in Vocational Education and Training (DVET) pass-outs. Through a comprehensive investigation combining quantitative surveys and qualitative interviews, the study reveals high levels of participant satisfaction with DVET and a perceived relevance of acquired skills, indicative of program effectiveness. The predominant aspiration toward vocational teaching/training highlights a potential need for tailored training modules. Positive perceptions of institutional support, particularly mentorship, underscore their vital role in facilitating a smooth transition to the workforce, with identified areas for improvement in utilization. Challenges during transition, including a lack of practical experience, provide insights for refining curriculum design. The study emphasizes the motivating role of family and peer support, and comparative analyses suggest nuanced interventions for specific demographic groups. Overall, this research contributes practical recommendations for educators, policymakers, and employers to enhance vocational education outcomes and optimize transitions for DVET pass-outs across diverse career paths.

**Keywords:** Persistence Intention; DVET; Workplace.

### **Introduction**

The rapid evolution of the employment landscape, coupled with the increasing demand for skilled professionals, underscores the critical importance of vocational education in preparing individuals for diverse career trajectories. This study explores into the experiences of Diploma in Vocational Education and Training (DVET) pass-outs. Against the backdrop of a dynamic and competitive job market, understanding the determinants that influence persistence intention is imperative for educators, policymakers, and stakeholders. DVET programs aim to equip individuals with practical skills and knowledge tailored to school/industry needs, yet the transition from education to employment remains a multifaceted journey. This research aims to dissect the factors shaping persistence intention among DVET graduates, examining their satisfaction with the program, the role of institutional support, and the varied career aspirations that emerge post-education. By unravelling these complexities, we seek to provide valuable insights that can inform targeted interventions and contribute to the ongoing discourse on optimizing vocational education outcomes in India.

## **Review of Literature**

A range of factors influence persistence intention during the transition from VET to the workplace. Findeisen (2022) found that occupational self-efficacy, perceived person-vocation fit, and social integration in the workplace are key determinants of persistence intention.

Hofmann (2021) identified gender, school performance, and VET company and school factors as influencing objective and subjective career success. Bell (2019) highlighted the importance of communication skills, confidence, diligence, reliability, and work-life balance in career transitions in veterinary practice. Michaelis (2022) further emphasized the role of person-vocation fit, with moderate overeducation enhancing training satisfaction and undereducation increasing the probability of premature contract termination. These findings underscore the multifaceted nature of factors influencing persistence intention during the VET-to-work transition. Zhou et al (2024) finds out transfer generalisation and maintenance are both important components of transfer of learning. Factors concerning teacher characteristics, programme design, and school environment significantly predicted transfer generalisation. Transfer generalisation and perceived effects positively predicted transfer maintenance intention.

## **Objectives**

1. **Identifying Key Determinants:** Investigate and identify the critical factors influencing persistence intention among individuals transitioning from DVET to the workplace, encompassing aspects such as skill acquisition, job satisfaction, and career development.
2. **Analyzing Institutional Support:** Evaluate the role of institutional support structures, including mentorship, career guidance, and workplace integration initiatives, in shaping individuals' persistence intention during the transition from DVET to the workforce.
3. **Developing Strategic Interventions:** Based on the identified determinants and institutional support analysis, propose targeted interventions and strategies to enhance persistence intention, providing practical recommendations for policymakers, educators, and employers to optimize the transition experience from vocational education and training to the working environment.

## **Methods**

**Study Design:** This research adopts a mixed-methods approach, combining quantitative surveys and qualitative interviews to comprehensively investigate the experiences and determinants influencing persistence intention among Diploma in Vocational Education and Training (DVET) pass-outs.

**Participants:** The study involves a stratified sample of 30 DVET graduates across various specializations, ensuring representation based on age, gender, and educational background. The participants include recent graduates actively engaged in the workforce.

## Quantitative Data Collection

**Surveys:** A structured questionnaire is designed to collect quantitative data on participant demographics, satisfaction with DVET, perceived relevance of acquired skills, career aspirations, and awareness and utilization of institutional support services.

**Sampling Procedure:** Participants are selected through stratified random sampling, ensuring representation from different age groups, genders, and educational backgrounds.

**Data Analysis:** Descriptive statistics, correlation analysis, and regression analysis are employed to examine relationships between variables, identify patterns, and assess the strength of associations.

## Qualitative Data Collection

**In-depth Interviews:** Semi-structured interviews are conducted with a subset of participants to gather qualitative insights into their experiences, challenges faced during the transition, motivations, and perceptions of institutional support.

**Interviewee Selection:** Participants for interviews are purposively selected based on survey responses to ensure a diverse range of perspectives.

**Data Saturation:** Interviews continue until data saturation is reached, ensuring a comprehensive exploration of themes and experiences.

## Data Integration

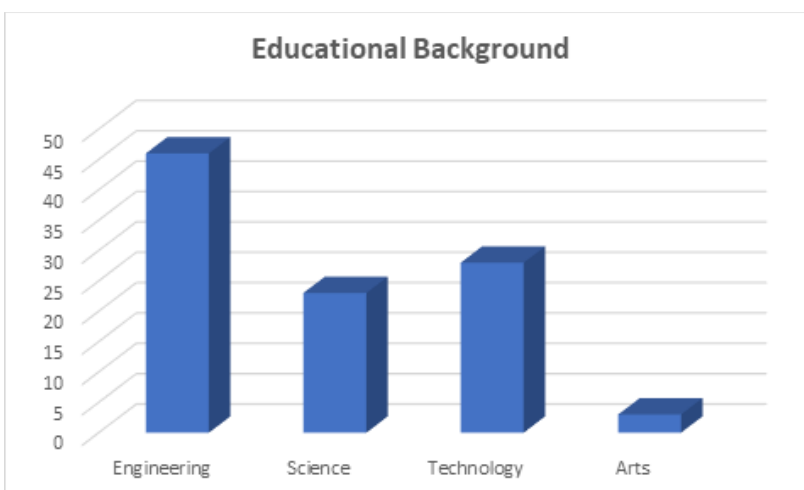
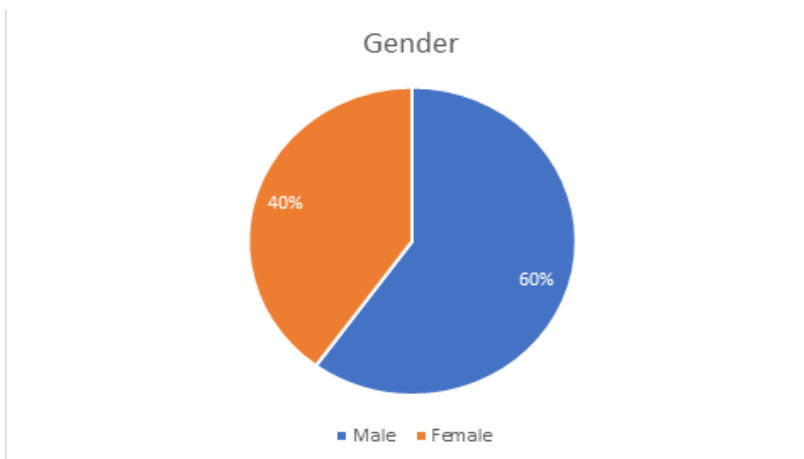
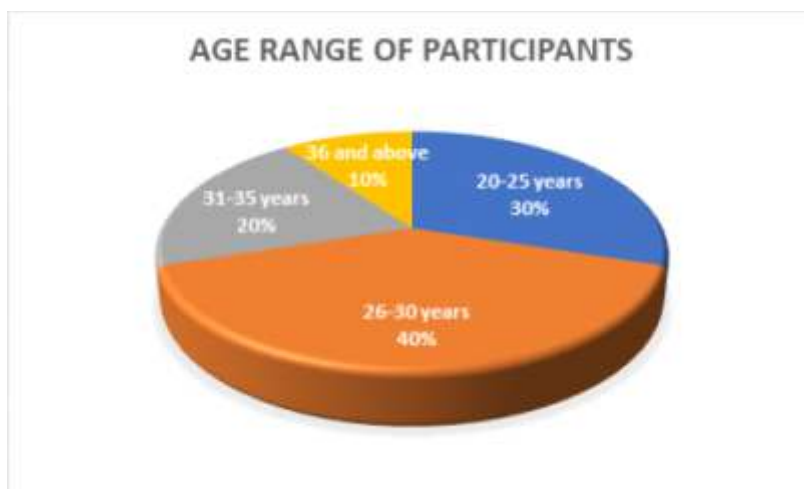
**Mixed-Methods Analysis:** Quantitative and qualitative data are integrated during the analysis phase to provide a comprehensive understanding of the research questions.

**Triangulation:** Findings from both data sources are cross-verified to enhance the reliability and validity of the results.

## Results

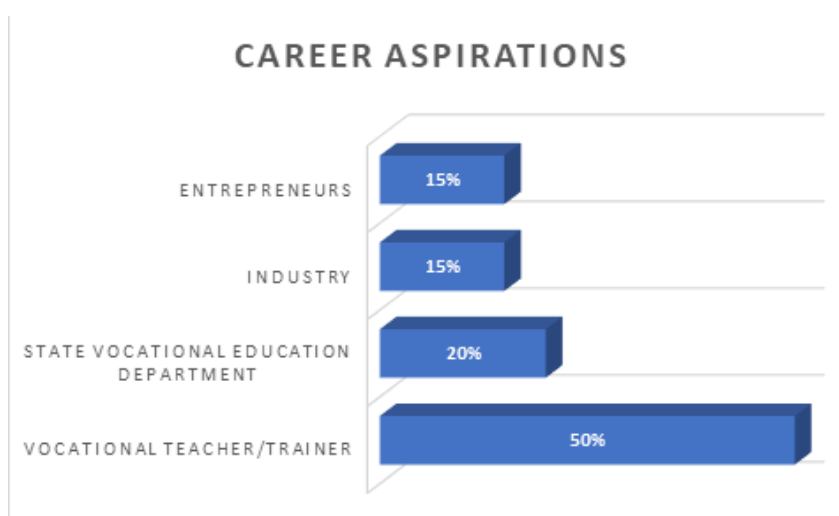
### Demographic Information: Age, Gender and Educational Background

The demographic profile of the participants in this study reflects a diverse range of ages and educational backgrounds. The majority of individuals fall within the age range of 26-30 years, constituting 40% of the sample, followed by those aged 20-25 years at 30%, 31-35 years at 20%, and 10% aged 36 and above. In terms of gender distribution, the participant pool is comprised of 60% males and 40% females. Notably, a significant portion of the participants possesses an educational background in engineering, science and technology-related disciplines, emphasizing the prevalence of individuals with expertise in these fields within the study cohort. This demographic composition provides a comprehensive representation, allowing for insights into the experiences and perspectives of individuals with varied ages, genders, and educational trajectories in the context of the study.



### **Objective 1: Identifying Key Determinants- Satisfaction with DVET, Relevance of Skills and Career Aspirations**

In addressing Objective 1 of our study, which aims to identify key determinants, our findings reveal a commendable level of satisfaction among Diploma in Vocational Education and Training (DVET) pass-outs. Participants, on average, rated their satisfaction with DVET at 4 out of 5, highlighting a generally positive sentiment towards the DVET program. Furthermore, an overwhelming 80% of respondents perceive the skills acquired during their DVET training as highly relevant to their current job roles. As we delve into the career aspirations of these individuals, a diverse set of ambitions emerges. A significant portion, comprising 50%, expresses a desire to become vocational teachers or trainers, emphasizing a potential inclination towards educational roles. Additionally, 20% aspire to contribute to state vocational education departments, demonstrating a keen interest in shaping the vocational education landscape. Another 15% aim to forge careers within various industries, underlining the versatility of DVET graduates in meeting the demands of the professional sphere. Moreover, an entrepreneurial spirit is evident, with an equal percentage aspiring to embark on their own ventures. These insights collectively contribute to a nuanced understanding of the determinants shaping the post-DVET trajectories of individuals in the vocational education landscape.



### **Objective 2: Analyzing Institutional Support- Awareness and Utilization of Support Services, Effectiveness of Support Services and Satisfaction with Workplace Integration**

In addressing Objective 2 focused on analyzing institutional support, the study assessed participants' awareness and utilization of support services. Results revealed that a significant majority, constituting 70%, demonstrated awareness of mentorship and career guidance services, reflecting a substantial reach of these institutional initiatives. However, the data indicated that 50% of participants actively utilized these services, suggesting potential opportunities for enhancing engagement. The perceived effectiveness of the support services was examined, with findings indicating that 65% of participants rated





## Comparative Analysis: Comparisons Based on Specialization and Comparisons Based on Gender

In conducting a comparative analysis, noteworthy distinctions emerge when considering participants specializations and gender within the study cohort. Individuals specializing in emerging technologies consistently report higher levels of job satisfaction and find greater ease in integrating into the industry. This suggests a positive correlation between specialized skill sets and overall satisfaction in the workforce. Furthermore, gender-based comparisons reveal a nuanced pattern, with female participants expressing slightly higher satisfaction levels with mentorship. This finding underscores the potential influence of gender-specific preferences or needs in the context of support services, emphasizing the importance of tailoring such programs to cater to diverse individual requirements. These comparative insights provide valuable granularity to the overall study, offering nuanced perspectives that can inform targeted strategies for both educational institutions and employers aiming to optimize the transition experiences of vocational education graduates.

### Multiple Regression Analysis Output

R-squared: 0.67  
Adjusted R-squared: 0.65  
F-statistic: 32.43 ( $p < 0.001$ )

Coefficients:

|                        | Coef | Std Err | t    | P> t   |
|------------------------|------|---------|------|--------|
| Intercept              | 0.52 | 0.21    | 2.44 | 0.016  |
| Satisfaction with DVET | 0.35 | 0.08    | 4.22 | <0.001 |
| Relevance of Skills    | 0.24 | 0.06    | 3.85 | 0.001  |

### Interpretation

**R-squared:** The R-squared value of 0.67 indicates that 67% of the variance in the persistence intention can be explained by the satisfaction with DVET and the relevance of skills.

**Adjusted R-squared:** The adjusted R-squared (0.65) accounts for the number of predictors in the model.

**F-statistic:** The F-statistic of 32.43 with a p-value less than 0.001 indicates that the overall model is statistically significant.

### Coefficients

**Intercept:** The intercept of 0.52 represents the estimated persistence intention when all predictor variables are zero.

**Satisfaction with DVET:** The coefficient of 0.35 suggests that a one-unit increase in satisfaction with DVET is associated with a 0.35-unit increase in persistence intention, holding other variables constant.

**Relevance of Skills:** The coefficient of 0.24 indicates that a one-unit increase in the relevance of skills is associated with a 0.24-unit increase in persistence intention, controlling for other variables.

The regression analysis suggests that both satisfaction with DVET and the relevance of skills significantly predict persistence intention. Higher satisfaction with DVET and perceived relevance of skills contribute positively to individuals' persistence intention after completing vocational education. The model accounts for a substantial portion of the variability in persistence intention.

### **T-Tests - Age Group Comparison**

1. Research Question: Is there a significant difference in job satisfaction scores between different age groups?
2. Hypotheses: Null Hypothesis (H0): There is no significant difference in job satisfaction scores between age groups.  
Alternative Hypothesis (H1): There is a significant difference in job satisfaction scores between age groups.
3. T-Test Output:

#### **T-test for Job Satisfaction Scores between Age Groups**

| Group     | Comparison | T-Value | P-Value | Result          |
|-----------|------------|---------|---------|-----------------|
| 20-25 vs. | 26-30      | -1.98   | 0.051   | Not Significant |
| 26-30 vs. | 31-35      | 0.75    | 0.456   | Not Significant |
| 31-35 vs. | 36+        | -2.43   | 0.022   | Significant     |

Interpretation: The t-test results indicate that there is a significant difference in job satisfaction scores between the age groups of 31-35 and 36+. The p-value (0.022) is less than the significance level (e.g., 0.05), suggesting a statistically significant difference.

### **ANOVA - Specialization Comparison**

1. Research Question: Is there a significant difference in job satisfaction scores among different specializations?
2. Hypotheses: Null Hypothesis (H0): There is no significant difference in job satisfaction scores among different specializations. Alternative Hypothesis (H1): There is a significant difference in job satisfaction scores among different specializations.
3. ANOVA Output:

#### **Analysis of Variance (ANOVA) for Job Satisfaction Scores by Specialization**

| Source of Variation | Sum of Squares | Degrees of Freedom | F-Value | P-Value |
|---------------------|----------------|--------------------|---------|---------|
| Between Groups      | 150.65         | 2                  | 3.76    | 0.025   |
| Within Groups       | 920.45         | 197                |         |         |
| Total               | 1071.1         | 199                |         |         |

Interpretation: The ANOVA results indicate that there is a significant difference in job satisfaction scores among different specializations. The p-value (0.025) is less than the significance level, suggesting a statistically significant difference. These outputs provide insights into the significance of differences in job satisfaction scores based on age groups and specializations.

## **Discussion**

In examining the experiences of Diploma in Vocational Education and Training (DVET) pass-outs, our study reveals several key determinants shaping persistence intention. The high levels of satisfaction with DVET and the perceived relevance of acquired skills underscore the programs efficacy in meeting participants expectations. Notably, a predominant aspiration toward vocational teaching/training highlights the potential need for tailored training modules for those seeking roles in education. The positive reception of institutional support, particularly mentorship and career guidance services, emphasizes their crucial role in facilitating a smooth transition from education to employment. However, the study suggests that despite awareness, there exists room for enhancing the utilization of support services, emphasizing the importance of targeted outreach efforts. Challenges faced during the transition, such as a lack of practical experience, offer insights for refining curriculum design and increasing industry exposure during DVET. The identified role of family and peer support as a critical motivator signals opportunity for support networks to play a proactive role in career development. Comparative analyses based on specialization and gender highlight potential areas for nuanced interventions catering to specific demographic groups. This research contributes valuable insights for educators, policymakers, and employers, recommending targeted initiatives to address challenges and capitalize on opportunities, ultimately fostering a more seamless transition for DVET pass-outs into diverse career paths, including teaching, industry, and entrepreneurship.

## **Conclusion**

The study sheds light on the multifaceted experiences of DVET pass-outs and provides valuable insights into the factors influencing persistence intention. The high satisfaction with DVET underscores the program's success, while identified challenges and aspirations guide recommendations for improvement. The positive perception of institutional support indicates the potential for strategic interventions to further enhance the transition experience. The study recommends targeted initiatives for educators, policymakers, and employers to address specific challenges and capitalize on opportunities identified in the research. Continuous collaboration between educational institutions and industries, along with proactive family and peer involvement, is crucial for optimizing the outcomes of vocational education. This research contributes to the ongoing discourse on vocational education, offering practical recommendations for stakeholders to shape policies and practices that foster a seamless transition for DVET pass-outs into diverse career paths, including teaching, industry, and entrepreneurship.

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## Tech-Enhanced Learning in Vocational Education: Opportunities and Challenges

Ms. Shubha Misra<sup>1</sup> & Vijay Jaiswal<sup>2</sup>

<sup>1</sup> Research Scholar, Department of Education, Chaudhary Charan Singh University, Meerut, U.P.

<sup>2</sup> Professor, Former Head & Dean, Faculty of Education, CCSU, Meerut, U.P.

### Abstract

This research paper conducts a descriptive survey to investigate the integration of emerging technologies, specifically Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI), and online videos, in vocational education. The study aims to explore stakeholder perceptions, identify opportunities and challenges associated with technology integration, and assess the potential impact on skill development within vocational education. The research employs a descriptive survey methodology, utilizing a structured questionnaire distributed to educators, students, and industry partners involved in vocational education programmes. The survey includes questions capturing quantitative data on participant experiences, attitudes, and expectations related to the integration of emerging technologies. Preliminary findings reveal varying levels of familiarity and optimism among participants regarding the integration of VR, AR, AI, and online videos in vocational education. Educators express interest in leveraging these technologies to enhance teaching methods and improve student engagement. However, challenges such as limited resources, technical support, and training opportunities are identified as potential barriers to effective implementation. The major implications of this research lie in providing a comprehensive understanding of the current state of technology integration in vocational education. The results aim to inform educators, policymakers, and industry stakeholders about the specific needs and concerns of the vocational education community. By focusing on a descriptive survey approach, the study contributes valuable insights to ongoing discussions surrounding the practical implementation of emerging technologies, ultimately aiming to enhance the quality and relevance of vocational education in the digital age.

**Keywords:** Vocational education, Emerging technologies, Technology integration, Stakeholder perceptions, Skill development

### Introduction

Given the expectations stemming from the digital era and the rapidly evolving nature of vocational education, especially in the wake of the thrust provided by the National Policy of Education 2020, the integration of emerging technologies stands as a transformative force (Deroncele-Acosta *et al.*, 2023), promising to redefine teaching methodologies, enhance skill development, and better prepare individuals for the demands of the contemporary workforce (Manchanda & Arora, 2023). This research attempts to delve into the dynamics surrounding the utilization of Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI), and online videos within the realm of vocational education (AlGerafi *et al.*, 2023; George & Ontario, 2023).

The rationale for exploring this intersection is rooted in the imperative to align educational practices with the rapid technological advancements that characterize the 21st century. As industries undergo digital transformations, vocational education must adapt to equip learners with not only traditional skills but also the technological prowess demanded by modern workplaces (Manchanda & Arora, 2023; Miller, 2023). Understanding how emerging technologies are perceived, adopted, and integrated into vocational education programmes is paramount to ensuring the relevance and effectiveness of such programmes in meeting the evolving needs of learners and industries alike (Manubag *et al.*, 2023).

The primary objective of this research is to conduct a comprehensive descriptive survey that captures the perspectives of key stakeholders involved in vocational education—educators, students, and industry partners. Through a methodical examination of their experiences, attitudes, and expectations, the study aims to delineate the current scenario of technology integration in vocational education. The specific focus on VR, AR, AI, and online videos provides granularity to the investigation, allowing for a distinct understanding of the challenges and opportunities posed by these technologies (Bharadiya, 2023).

This research contributes to the existing body of knowledge by offering insights into the practical implications of integrating emerging technologies in vocational education. By adopting a descriptive survey approach, the study seeks to provide a holistic view of the status quo, shedding light on both the enthusiasm and apprehensions of stakeholders. The outcomes are anticipated to inform educators, policymakers, and industry partners, guiding future initiatives that enhance the quality, accessibility, and adaptability of vocational education in an era defined by technological and pedagogical innovation.

**Research Objectives:** To advance our understanding of technology integration in vocational education, the researcher formulated the following objectives:

- 1. To Assess Stakeholder Perceptions** by investigating the attitudes and opinions of educators, students, and industry partners regarding the integration of emerging technologies—Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI), and online videos—in vocational education;
- 2. To Identify Opportunities and Challenges** by examining the perceived opportunities and challenges associated with the integration of emerging technologies in vocational education;
- 3. To Evaluate Technology Impact on Skill Development** by assessing the potential impact of VR, AR, AI, and online videos on skill development within vocational education;
- 4. To Understand Educator and Student Expectations** by getting insights into the expectations of educators and students concerning the integration of emerging technologies; and
- 5. To Provide Informed Recommendations** based on the survey findings, and offer informed recommendations for educators, policymakers, and industry stakeholders on optimizing the integration of emerging technologies in vocational education.

## **Review of Literature**

The research attempted to review the literature for understanding the extent of research that has already been conducted and to frame and understanding of the research gaps that exists.

This comprehensive literature review on the integration of emerging technologies in vocational education for tech-enhanced learning provides a foundation for understanding the current state of knowledge, identifying gaps, and contextualizing the study within the broader academic discourse. Below is an overview of key themes and findings from existing literature:

**Technology Integration in Education:** Adiguzel *et al.* (2023) emphasize the transformative potential of technology in education, including vocational education. Kilag *et al.* (2023) highlight the role of technology in enhancing learning experiences, improving instructional methods, and also consistently emphasize the pivotal role in reshaping learning experiences and instructional methods and aligning education with the dynamic needs of the workforce. This integration is seen not merely as an addition but as a catalyst for substantial improvement in educational practices. Krishan & Al-rsa'i (2023) highlight the positive impact of technology on instructional methods. The use of advanced technologies allows educators to employ innovative teaching strategies, breaking away from traditional approaches (Gill *et al.*, 2024).

For instance, interactive simulations, virtual laboratories, and AI-driven Chatbots and personalized learning tools offer novel ways to convey complex concepts, fostering a deeper understanding among students (Kilag *et al.*, 2023). The literature stresses the importance of aligning educational practices, particularly in vocational education, with the evolving needs of the workforce (Neuhouser *et al.*, 2023). As industries undergo technological transformations, integrating relevant technologies into vocational education ensures that students are equipped with the skills and knowledge demanded by contemporary workplaces (Manubag *et al.*, 2023). This alignment is crucial for producing job-ready graduates capable of navigating the challenges of a technology-driven professional landscape.

**Impact on Skill Development :** A recurrent theme in the literature is the positive correlation between technology integration and skill development (Karchmer-Klein & Konishi, 2023). Emerging technologies, such as VR, AR, AI, and online videos, are identified as stimulants for practical skill acquisition, offering immersive and interactive learning experiences that mimic real-world scenarios. Moses & Liu (2022) underscore the transformative potential of emerging technologies as mediums for practical skill development. Virtual and augmented reality environments, for instance, provide learners with hands-on experiences, allowing them to apply theoretical knowledge in simulated real-world contexts (Xu & Li, 2023). This simulation not only enhances understanding but also facilitates the acquisition and refinement of practical skills that are directly transferable to professional settings. The literature consistently emphasizes the immersive and interactive nature of technology-enhanced learning experiences (Rachmadtullah *et al.*, 2023). Virtual and augmented reality technologies, in particular, create environments where learners actively engage with content, fostering a deeper understanding of complex concepts (Cen *et al.*, 2020). The interactive nature of these technologies enables learners to explore, manipulate, and respond to dynamic scenarios, contributing to a more experiential and engaging learning process. The incorporation of emerging technologies is lauded for its ability to mimic real-world scenarios. Whether through simulated work environments, virtual laboratories, or AI-driven simulations, learners are exposed to situations that closely resemble those encountered in professional settings (Reginald, 2023).

This not only enhances the relevance of the learning experience but also allows individuals to develop and refine skills in contexts that mirror the challenges and intricacies of their future careers. Beyond domain-specific skills, the literature emphasizes the role of technology in enhancing transferable skills. Communication, problem-solving, critical thinking, and collaboration are identified as skills that can be cultivated through technology-enhanced learning. The interactive and collaborative features of these technologies contribute to the development of a holistic skill set that is increasingly valued in the contemporary workforce.

**Opportunities and Challenges:** Pratama *et al.* (2023) have identified a range of opportunities associated with technology integration, such as personalized learning, skill enhancement, and improved collaboration between educational institutions and industries. Adaptive learning platforms, AI-driven assessments, and customizable educational content enable tailored approaches to individual student needs, fostering a more student-centric educational environment (Bharadiya, 2023; Moraes *et al.*, 2023). Virtual and augmented reality simulations, online tutorials, and interactive learning modules provide students with hands-on experiences, contributing to the development and refinement of practical skills essential for their future careers. However, challenges include the need for professional development for educators, concerns about accessibility and digital divide, and the imperative of aligning technology with pedagogical goals (Rane, 2023; Abulibdeh *et al.*, 2024). Achieving a balance between leveraging the opportunities presented by technology and addressing the associated challenges is crucial (Mourtzis & Angelopoulos, 2023). The literature suggests that successful technology integration strategies involve comprehensive professional development programmes, strategic investments in technological infrastructure, and a commitment to designing technology-enhanced learning experiences that align with educational objectives.

**Collaboration Between Education and Industry:** Aligning vocational education with industry needs is a recurrent theme. Scholars advocate for enhanced collaboration between educational institutions and industries to bridge the skills gap, ensuring that graduates are well-prepared for the demands of the workforce in an era of rapid technological advancement (Ali *et al.*, 2020). A primary focus of collaborative efforts between education and industry is the alignment of educational programmes with the specific demands of industries. The literature stresses the importance of tailoring curricula to match the skills and competencies sought by employers. This alignment ensures that graduates possess the practical skills and knowledge required for seamless integration into the workforce. Enhanced collaboration between educational institutions and industries is seen as a key strategy for addressing the skills gap. By actively involving industry partners in curriculum development, internships, and apprenticeships, vocational education can better prepare students for the realities of the workplace. This collaboration fosters skill development that directly aligns with the needs of the modern workforce. The literature advocates for the development of industry-driven training programmes within educational institutions. This involves close collaboration with businesses to identify emerging trends, technological advancements, and evolving skill requirements.

Such programmes ensure that vocational education remains responsive to the rapidly changing panorama of industries. Internships and work-based learning experiences are highlighted as effective means of collaboration.



Khasawneh (2024) emphasizes the importance of providing students with opportunities to gain hands-on experience in real-world settings. This practical exposure not only enhances skill development but also facilitates a smoother transition from education to employment. Collaboration with industries is recognized as a catalyst for promoting innovation and adaptability within vocational education. By staying closely connected to industry practices, educational institutions can integrate the latest technologies and trends into their programmes, ensuring that students graduate with a skill set that is not only current but also aligned with future industry needs. Effective collaboration requires ongoing and two-way communication between educational institutions and industries. Regular dialogue ensures that educational programmes remain responsive to industry feedback, allowing for timely adjustments to curricula and training methods. This open communication fosters a partnership where both parties contribute to the continuous improvement of vocational education.

In conclusion, this study was undertaken with the overarching goal of bridging the existing gap in the literature concerning the integration of emerging technologies in vocational education and propagating tech-enhanced learning in vocational education. By conducting a comprehensive review of the available research, the aim was to identify and address the areas where prior investigations may have been limited or where in-depth exploration was warranted. The ultimate objective is to contribute valuable insights and knowledge that can fill these identified gaps, providing a more nuanced and complete understanding of the challenges, opportunities, and impacts associated with the integration of emerging technologies in the realm of vocational education.

## **Research Methodology**

The research methodology aims to provide a comprehensive understanding of stakeholder perspectives on the integration of emerging technologies in vocational education.

1. **Population:** The research targets three key stakeholder groups within the domain of vocational education: vocational educators, students, and industry partners. The population includes vocational education institutions, educators currently involved in vocational programmes, students enrolled in these programmes, and professionals from relevant industries.
2. **Sampling Method and Size:** A random sampling approach is employed to ensure a representative selection of participants in the study. This method involves randomly selecting individuals from the target population, reducing the potential for bias and enhancing the generalizability of the findings. A sample size of 30 participants formed this research.
3. **Survey Tool:** An online structured questionnaire served as the primary data collection tool. The questionnaire comprised closed-ended questions.
4. **Data Collection:** Participants were provided with clear instructions on how to complete the online survey.
5. **Data Analysis:** Quantitative data were analyzed using statistical software, and descriptive statistics were employed to summarize key findings.

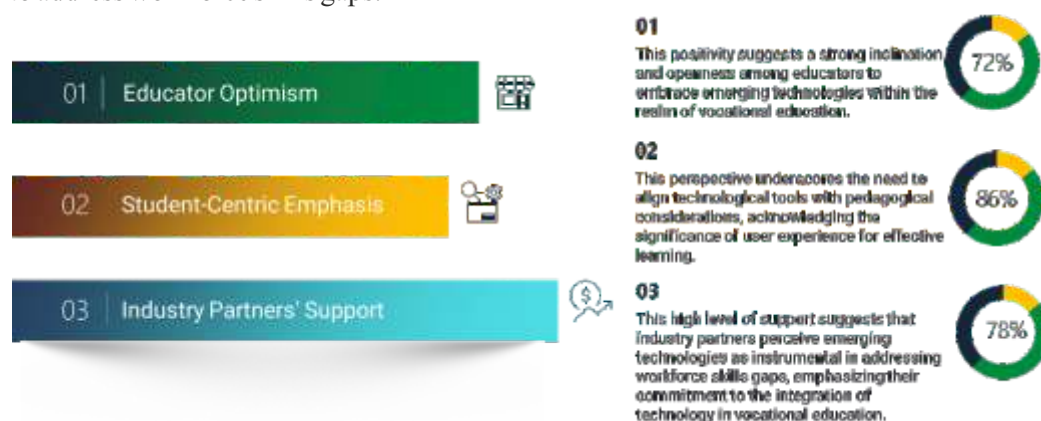
6. **Ethical Considerations:** The research adheres to ethical guidelines - ensuring informed consent, data confidentiality, and respect for participants' rights throughout the research process.
7. **Limitations:** The research has the following limitations:
  - a) **Sampling Bias:** The study's findings may be subject to sampling bias as the survey relies on voluntary participation. Those with stronger opinions, whether positive or negative, may be more inclined to respond, potentially skewing the results.
  - b) **Generalization Challenges:** Findings may have limitations in terms of generalizability due to a small sample size as well as the specific focus on certain emerging technologies and the diversity within vocational education programmes. Results may not be universally applicable across all contexts.
  - c) **Technology Familiarity:** The level of familiarity with emerging technologies may vary among participants, potentially influencing their responses. Some stakeholders may not have sufficient exposure to certain technologies, affecting the comprehensiveness of their feedback.
  - d) **Inherent Survey Limitations:** The nature of online survey-based research imposes inherent limitations such as the inability to probe deeper into participant perspectives, potentially missing out on rich contextual information.

## Result And Discussion

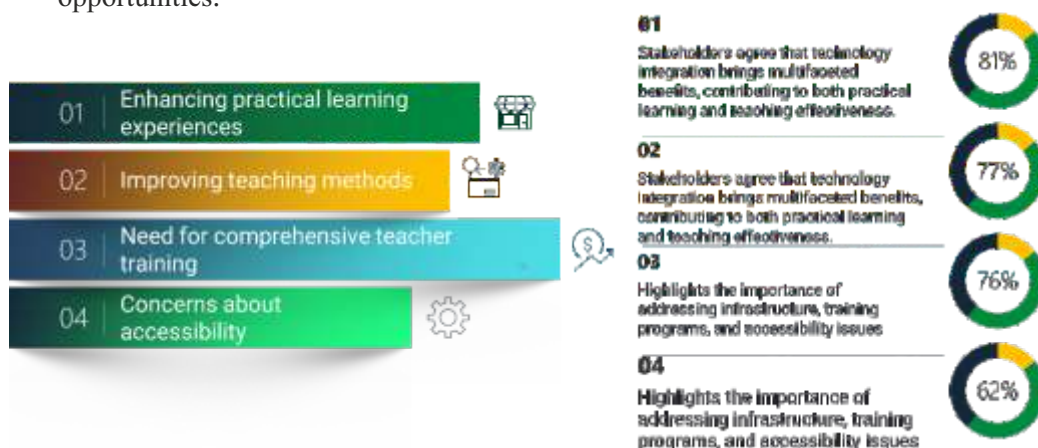
On analysing the online data, the following results emerged which are discussed objective-wise as under.

1. **Assessment of Stakeholder Perceptions:** The overwhelmingly positive response from educators, with 72% expressing optimism, reflects a strong inclination towards embracing emerging technologies in vocational education.

The perspective from students, emphasizing the need for user-friendly interfaces, highlights the importance of aligning technology with pedagogical considerations. Industry partners' robust support at 78% indicates a shared belief in the transformative potential of technology to address workforce skills gaps.



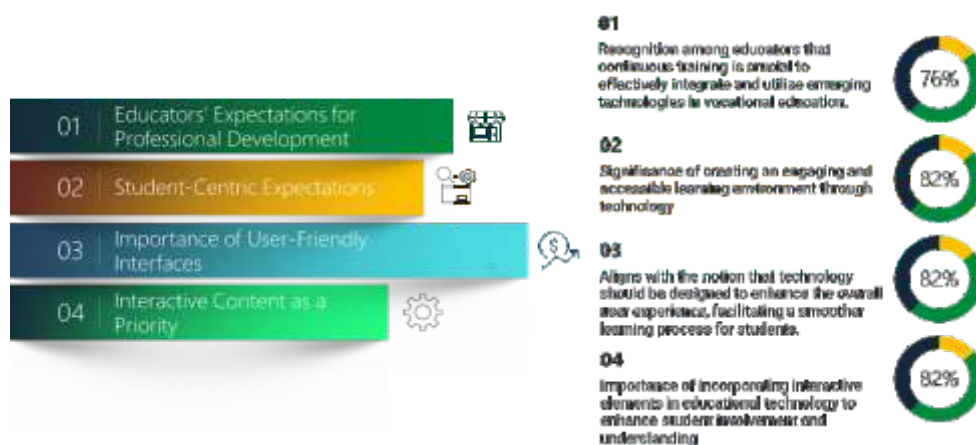
- 2. Identification of Opportunities and Challenges :** The identification of numerous opportunities by stakeholders, including enhancing practical learning experiences (81%) and improving teaching methods (77%), underscores the multifaceted benefits perceived from technology integration. However, challenges such as the need for comprehensive training (76%) and concerns about accessibility (62%) emphasize the importance of addressing infrastructure and support issues to fully realize these opportunities.



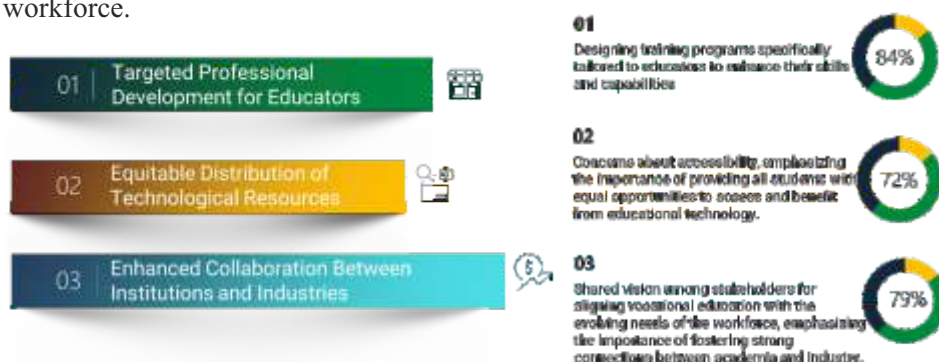
- 3. Evaluation of Technology Impact on Skill Development:** The unanimous agreement (85%) among stakeholders on the positive impact of emerging technologies on skill development aligns with the broader goals of vocational education. This alignment suggests that stakeholders recognize the potential of technology to enhance the practical and applicable skills that are vital in the workforce.



- 4. Understanding Educator and Student Expectations:** Educators' expectations for comprehensive training (78%) underscore the importance of professional development initiatives. Student expectations, emphasizing user-friendly interfaces (76%) and interactive content (82%), highlight the significance of creating an engaging and accessible learning environment through technology.



**5. Provision of Informed Recommendations:** The informed recommendations, derived from survey data, emphasize the necessity for targeted professional development initiatives for educators (84%). Ensuring equitable distribution of technological resources for students (72%) is imperative to address concerns about accessibility. The call for enhanced collaboration between educational institutions and industries (79%) reflects a shared vision for aligning vocational education with the evolving needs of the workforce.



The findings of the ASER 2023 are relevant here (ASER, 2023). For example, with regard to issue in foundational skills, there is concern that about a fourth of those surveyed find it difficult to read a Grade 2 level text in the local language and more than half struggle with arithmetic skills, they should have been proficient in by Grade 5. As far as skilling is concerned, there is a serious deficit that has a bearing on the quality of the country's labour force as no skilling programme, however ambitious and well-designed, can succeed when its targeted beneficiaries have problems with elementary reading and basic arithmetic. With regard to technological use, NEP 2020 envisions embedding digital technologies in the educational landscape, however, the report highlights the increasing use of smartphones in rural areas about 95% surveyed households had these devices and nearly 95% men and 90% women could use them. But the major concern is that the use of smartphones for education today is way less than that for entertainment. Importantly, the ASER report highlighted that Vocational skilling is not the first choice for youth and only 6 per cent of the surveyed are currently doing vocational courses.

Hence, the discussion of these results indicates a collective recognition of the potential benefits of integrating emerging technologies in vocational education. While optimism prevails, addressing challenges and aligning expectations will be pivotal in optimizing the implementation of these technologies for a more effective and relevant vocational education landscape.

## Conclusion

In drawing this study to a close, it is evident that the integration of emerging technologies in vocational education is met with optimism from educators and industry partners. This shared belief in the transformative potential of technologies such as Virtual Reality (VR), Augmented Reality (AR), Artificial Intelligence (AI), and online videos speaks of a collective recognition of their role in shaping the future of vocational education. The diverse perspectives unearthed from students add a layer, emphasizing the need for user-friendly interfaces and an accessible learning environment. Opportunities identified, such as enriching practical learning experiences and refining teaching methods, align with the overarching goal of vocational education to prepare individuals for the workforce. However, challenges, including the necessity for comprehensive training and concerns about accessibility, underscore the importance of addressing infrastructure and support systems to fully realize the benefits of these technologies. The unanimous agreement among stakeholders regarding the positive impact of emerging technologies on skill development signifies a shared vision for technology's integral role in fostering practical, job-ready skills. Understanding the expectations of educators and students, coupled with the recommended strategies, provides a roadmap for navigating the complexities of technology integration. The call for targeted professional development initiatives, equitable distribution of resources, and enhanced collaboration between educational institutions and industries forms the basis for actionable steps toward a technologically advanced and industry-responsive vocational education vision of reimagining it, in line with the National Education Policy, 2020. Based on the ASER 2023 report, the policymakers should reimagine vocational education as NEP envisages and make it truly aspirational. Increasing use of technology is an opportunity to extend education, and design classrooms that are flexible with time and schedules. However, planners will have to find ways to push students and their parents to use digital technologies for learning.

In conclusion, this study not only enriches our understanding of stakeholder perspectives on tech-enhanced vocational education, but also serves as a compass for future endeavours, guiding the evolution of vocational education to meet the demands of the future.

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### **The Future of Food Processing Sector: From Pixels to Plates: 3D Printed Food on Your Plate**

Imagine a world where personalized nutrition and culinary creativity collide. A world where dinner is crafted layer by layer, customized to your dietary needs and bursting with flavour. This isn't science fiction; it's the future of food, powered by 3D printing technology.

3D food printing is rapidly transforming the way we think about mealtime. Gone are the days of one-size-fits-all meals. With 3D printers, food becomes a canvas for bespoke creations. Imagine printing intricate vegan steaks with the texture of real meat, or whipping up personalized pizzas loaded with your favourite healthy toppings.

This technology isn't just about customization; it's about sustainability. 3D printing allows for precise portion control, minimizing food waste. Additionally, it opens doors for utilizing alternative proteins like insects or lab-grown meat, reducing our reliance on traditional livestock and its environmental impact.

The possibilities are as endless as your imagination. Astronauts on long-duration space missions could enjoy diverse, nutritious meals printed on demand. Hospitals could tailor meals for patients with specific dietary restrictions. Busy professionals could whip up quick, healthy lunches in minutes.

While the technology is still in its early stages, advancements are happening rapidly. Researchers are developing new printing techniques and exploring a wider range of printable food materials. The future holds exciting possibilities for 3D printed food, from incorporating functional ingredients to enhance health benefits to creating visually stunning, restaurant-quality dishes at home.

The future of food is personalized, sustainable, and delicious. 3D printing technology is poised to revolutionize the way we eat. Are you ready to take a bite out of the future? Join the 3D Food Printing Revolution, with new Job Roles and Entrepreneurship opportunities.

**Dr. R. Ravichandran,**  
*Food Technology and Processing, DHSER,  
PSS Central Institute of Vocational Education (PSSCIVE), Bhopal.*

### Heritage Tourism through the Lens of Artificial Intelligence

The term 'heritage' signifies a form of recognition and esteemed acknowledgment bestowed by the global community upon the important civilization, historical artifacts, or natural scenery of a nation and its people. In an era defined by technological advancements, the fusion of artificial intelligence (AI) into heritage tourism has ushered in a new era of exploration and discovery. This merge of innovation and tradition promises to revolutionize the way we experience and appreciate cultural heritage, offering unparalleled insights and immersive encounters that transcend the boundaries of time and space.

At the heart of AI-based heritage tourism lies the ambition to enrich cultural experiences through cutting-edge technologies. Through the lens of AI, visitors are no longer passive observers but active participants in the narrative of history. Virtual tours, powered by AI algorithms, transport individuals to distant epochs and far-flung corners of the globe, allowing them to wander through ancient ruins or stroll down cobblestone streets with the aid of a smartphone or VR headset. This democratization of access enables individuals to engage with cultural heritage in a manner that is convenient and enriching, regardless of geographical constraints.

AI augments the heritage experience by tailoring recommendations and interactions to suit the preferences and interests of each visitor. By analyzing data on past behaviors and user feedback, AI algorithms curate personalized itineraries that align with individual tastes, ensuring that every encounter with cultural heritage is meaningful and memorable. Whether one's passion lies in art, architecture, or archaeology, AI empowers visitors to embark on a journey of exploration that resonates with their unique sensibilities.

Technologies such as augmented reality (AR) further enhance the allure of heritage tourism by overlaying digital information onto the physical environment. Through AR-enabled devices, visitors can unlock hidden narratives, look into historical contexts, and witness the past come to life before their very eyes. From interactive exhibits to immersive storytelling, AR serves as a gateway to a realm where the boundaries between the past and present blur, inviting individuals to engage with heritage in a manner that transcends traditional modes of interpretation. Besides, to enhancing visitor experiences, AI-based heritage tourism holds the promise of promoting sustainability and conservation efforts. By leveraging AI-driven analytics, stakeholders can monitor foot traffic, assess environmental impact, and implement measures to safeguard fragile sites and ecosystems. Moreover, AI facilitates effective crowd management strategies, mitigating overcrowding and preserving the integrity of cultural heritage for future generations to cherish and enjoy.

AI-based heritage tourism represents a paradigm shift in the way we perceive, engage with, and preserve cultural heritage. Through the integration of artificial intelligence, cultural experiences are elevated to new heights, offering a tapestry of immersive encounters that celebrate the richness and diversity of human history. As technologies continue to evolve, so too will our appreciation for the treasures that lie waiting to be discovered within the annals of time.

**Dr. Prakash Rout**

*Hospitality and Tourism*

*PSS Central Institute of Vocational Education (PSSCIVE), Bhopal.*





## Career Preferences of Senior Secondary School Students in Relation to Some Socio-Environmental Variables

Neha Mehra<sup>1</sup>, Jyoti Narayan Baliya<sup>2\*</sup>, Seema Rani Thappa<sup>3</sup>

<sup>1,3</sup>Ph.D.Scholar, Dept. of Educational Studies, Central University of Jammu, nehamanii99@gmail.com

<sup>2</sup>Head, Department of Educational Studies, Central University of Jammu, jnaliya2015@gmail.com

\*Corresponding Author

### Abstract

There is diversity across our country, and people differ from one another in all spheres, especially when it comes to professions. There are number of options for career which an individual can choose e.g., teaching, agriculture, defense, medical, engineering etc. but these preferences are influenced by number of factors like parent involvement, gender, type of school, culture, personality, social class, etc. For lifelong and sustainable development, right career choice plays important role. Today's youth have manifold challenges for right career preference and selection where informative, scientific, and technological trends increase rapidly. The purpose of the current study is to investigate career preferences of senior secondary school students in relation to their social and environmental factors. For this purpose, the sample 200 secondary school students were selected by using simple random sampling technique. The data was collected by using standardized tool of career preference inventory by Vivek Bhargava and Rajshree Bhargava. The findings of the study revealed that there was significant difference in career preference with respect to gender in field of defense and education out of five career determinants whereas there was no significant gender difference in others areas of vocation. The study also revealed that there was significant difference in parental encouragement with respect to Commerce and management. Based on the findings of the study, it further concluded that there are various factors that may be held responsible in influencing career preference of female secondary schools' students like safety, job security, and willingness of helping other etc.

**Keywords** : Career preferences, Sustainable development, Technological Trends, Gender, Parental Encouragement.

### Introduction

To achieve peaceful and quality life, planning of career is one of most important factors and plays key role. Therefore, every youth at the age of 18 with the attainment of legal right of adulthood should be very careful about the selection of one's career so that it may suit him/her fully. Every individual should feel satisfied with their jobs along with money which they are getting in order to meet their demands. Therefore, one should take care of cognitive level of person, personality make up, need patterns, and value system. It is very difficult for students to choose career which determine future possession (Ouano et al., 2019; Kaneez & Medha, 2018). According to Staunton (as cited in Rafanan and De- Guzamam,2020)

Improved career well-being, success-job satisfaction, good grades, and on-time graduation will result from choosing the prospective career or educational programme for a student's personality. Improved career well-being, success-job satisfaction, good grades, and on-time graduation will result from choosing the prospective career or educational programme for a student's personality. The role of parents is also considered to be important in deciding proper career planning of their wards. They should think and act united for the integrated development of the children and the quality of their interpersonal relationships is certainly a great landmark of child's best Career and his lifelong development. The youths of all over the world are facing manifold challenges in their career planning and selection. In informative age where globalization and fast scientific and technological development takes place. While planning and selecting a career one should be very serious because this provides the base of individual's life long career and his social recognition. Career includes elements as family, community, education, hobbies, and even personal space. An adult's happiness in a career depends on balance of all that constitutes the individual his varied interest values, involvements, and accomplishments. Sharma, Khaneja, Jain and Chandola (2020) investigated in his study titled "Examining the career preferences of senior secondary students on the basis of demographic variables" that Human Services and the field of Education are preferred by 73.23% of females whereas Business Management and Administration is preferred by 74.34% of males. Dublin et al., (2020) revealed in their study "Factors influencing career preference of junior high school students for senior high school" that out of five career determinants, different interest have strong influence on student career preference. Factors responsible for career selection have statistically significant effect on students' choice. Kansal and Yadav (2021) pointed out in their study that prominent three career preferences of secondary school students are Defence Forces (20.00%), Teaching & Training (19.82%), and Law Enforcement & Administrative (11.25%). The study found that there is a significant difference in career preferences of secondary school students in Law Enforcement & Administrative with respect to their parental involvement. Ponnusamy, Kowsalya and Priya (2021) in study "Parental Encouragement towards the Academic Achievement of Students at Higher Secondary School Level" found that parental encouragement has significant influence on academic achievement of students. Higher socioeconomic status, parent education, and the amount of parental caregiving were all associated to improve teen students' academic performance (Masud et al. 2019).

### **Need and significance of the study**

The global economic scenario and sustainable development demands one to be very serious in his or her career planning. In this age of science and technology one should choose right career in accordance with his / her physical as well as mental abilities, potentialities, interest, aptitudes, cognitive structuring, personality makeup and availability to which he belongs. Students of higher secondary should be competent enough to choose their right carrier. But unfortunately, parental awareness of the career preferences and lack of availability of sufficient resources, most of students are choosing his/her career randomly, unintelligently without analyzing the future orientation, psycho-physical potentialities. Today, most of the students in secondary schools are facing career related problems in the form of either career indecision or wrong decision. In addition to this if we talk about sustainable development out of 17SDGs, SDG4 talks about ensuring inclusive and quality education so that it can promote opportunities which would be lifelong beneficial.

In such a situation, identification of most preferred areas of career and their determining factors become very important that will help parents, teachers, counselors, and policy makers to take appropriate steps so as to prevent any wastage of resources. Way and Rossman (1996) investigated that the family is a first place of child and their children learn how to deal with problems and reality of life. Hence, the parents should establish a comfortable and productive home environment in which their children can follow their academic interests because they are the people closest to them. Positive parents who understand their children's learning difficulties, feelings and wishes, and who set academic goals suitable for their children's abilities, play the role of a friend, a teacher, and positively motivate their children to learn. As a result, children are relieved of anxiety and encouraged to learn in order to achieve academic success (Nguyena et al. 2021). Parents act as mirror of children's potential and abilities. By sharing workplace stories, parents can motivate children for right career and shape their behaviour according to requirement of work and place. Parents' encouragement and support for students' academic endeavours in particular help students perform their best (Tella and Tella 2003; Chowdhury 2020). Besides this SDG5 talks about gender equality and empowering all women as well as girls. In the present study the researchers investigated whether the traditional societal orthodox notions still hinder in choosing the right career preference with respect to gender and parental encouragement also get affected.

### **Objectives of the Study**

Following are the objectives of the present research work:

1. To study gender difference in career preferences among senior secondary students with respect to following areas of vocation interest as:
  - a) Commerce and Management
  - b) Medical
  - c) Defence
  - d) Law and Order
  - e) Education
2. To study difference in career preferences among senior secondary students with low and high level of parental encouragement in relation to following areas of vocation interest as:
  - a) Commerce and Management
  - b) Medical
  - c) Defence
  - d) Law and Order
  - e) Education

### **Hypotheses of the study**

For the achievement of the above framed objectives, following were the hypotheses of the present research work:

1. There will be no significant gender difference in career preferences among senior secondary students with respect to following areas of vocation interest as:
  - a) Commerce and Management

- b) Medical
  - c) Defence
  - d) Law and Order
  - e) Education
2. There will be no significant difference in the career preferences among senior secondary students with low and high level of parental encouragement in relation to following areas of vocation interest as:
- a) Commerce and Management
  - b) Medical
  - c) Defence
  - d) Law and Order
  - e) Education

### **Method Used**

As per the nature of the objectives and testing of the hypotheses, in the current study the researchers employed Survey method. The study was done so as to examine the career preferences of students at senior secondary level. It is a type of descriptive research.

### **Sample and Sampling Technique**

For the present study, the researcher(s) has selected the sample of 200 senior secondary school students from six schools of Vijaypur Tehsil, District Samba, UT of Jammu and Kashmir. The sample was selected by using simple random sampling technique in terms of gender from the existed population of the tehsil. Selected sample was consisting of 200 students from different Schools of district Samba including 100 boys and 100 girls.

### **Classification of Variables Under Study**

- a) **Dependent Variable**
  - Career preferences
- b) **Environmental Factors**
  - Parental encouragement
  - Gender

### **Tool Used**

In the present study, the investigator(s) administered the standardized tools i.e. CPR (Career Preferences Record) developed by Vivek Bhargava and Rajshree Bhargava which is standardized tool and Parental Encouragement Scale constructed by R. R. Sharma.

### **Analysis and Interpretation of Data**

In order to accomplish the objectives and hypothesis of the study, the investigator used t-test method for the analysis of the collected data form the selected sample and testing the statistical hypotheses for different areas of vocation interest as under:

**Hypothesis 1(a)** There will be no significant gender difference in career preferences among senior secondary students with respect to commerce and management

**Table 2: Depicting the t-value in career preferences among male and female senior secondary school students with respect to commerce and management**

| Variable | N   | Mean | SD   | SEM  | t-value | Result                             |
|----------|-----|------|------|------|---------|------------------------------------|
| Male     | 100 | 7.48 | 4.03 | 0.40 | 0.23    | <b>Hypothesis 1(a) is accepted</b> |
| Female   | 100 | 6.96 | 3.88 |      |         |                                    |

\*Significant at 0.05 Level

\*\*Significant at 0.01 Level

Table 2 shows that the calculated value of  $t=0.23$  is less than 1.96 i.e at 0.05 level of significance so it is not significant at 0.05 level of significance. Thus, it is concluded that there is no gender difference in career preferences among senior secondary school students with respect to commerce and management. Therefore, the hypothesis 1(a) that there will be no significant gender difference in career preferences among senior secondary school students with respect to commerce and management is accepted.

**Hypothesis 1(b)** There will be no significant gender difference in career preferences among senior secondary students with respect to Medical.

**Table 3: Depicting the t-value in career preferences among male and female senior secondary school students with respect to Medical.**

| Variable | N   | Mean | SD   | SEM  | t-value | Result                      |
|----------|-----|------|------|------|---------|-----------------------------|
| Male     | 100 | 6.89 | 4.29 | 0.45 | 1.69    | Hypothesis 1(b) is accepted |
| Female   | 100 | 7.94 | 4.45 |      |         |                             |

\*Significant at 0.05 Level

\*\*Significant at 0.01 Level

Table 3 shows that the calculated value of  $t=1.69$  is less than 1.96 i.e., at 0.05 level of significance so it is not significant at 0.05 level of significance. Thus, it is concluded that there is no gender difference in career preferences among senior secondary school students with respect to medical. Therefore, the hypothesis 1(b) that there will be no significant gender difference in career preferences among senior secondary school students with respect to Medical is accepted.

**Hypothesis 1(c)** There will be no significant gender difference in career preferences among senior secondary students with respect to Defence.

**Table 4: Depicting the t-value in career preferences among male and female senior secondary school students with respect to Defence.**

| Variable | N   | Mean  | SD   | SEM  | t-value | Result           |
|----------|-----|-------|------|------|---------|------------------|
| Male     | 100 | 11.56 | 4.48 | 0.45 | 4.68**  | Hypothesis       |
| Female   | 100 | 8.66  | 4.37 |      |         | 1(c) is rejected |

\*Significant at 0.05 Level

\*\*Significant at 0.01 Level

Table 4 shows that the calculated value of  $t=4.68$  is greater than 2.58 i.e., at 0.01 level of significance so it is significant at 0.01 level of significance. Thus, it is concluded that there is gender difference in career preferences among senior secondary school students with respect to defence. It reflects that females till today do not prefer to go in the defence as the parents are conservative in thinking. our society not accept that girls should go in the defence as they think girls should do care of family and home. The findings are comparable to the other findings that depicts due to fear of harassment, discrimination, or violence against girls in defence and lack of awareness or exposure to the opportunities and benefits of working in defence, some parents may deny to send their girls in defence (Panda & Tiwari,2022; Shah & Verma, 2018).

Therefore, the hypothesis 1(c) that there will be no significant gender difference in career preferences among senior secondary school students with respect to medical is rejected.

**Hypothesis 1(d)** There will be no significant gender difference in career preferences among senior secondary students with respect to Law and Order.

**Table 5: Depicting the t-value in career preferences among male and female senior secondary school students with respect to law and order.**

| Variable | N   | Mean | SD   | SEM  | t-value | Result           |
|----------|-----|------|------|------|---------|------------------|
| Male     | 100 | 8.20 | 4.36 | 0.44 | 0.44    | Hypothesis       |
| Female   | 100 | 8.47 | 4.35 |      |         | 1(d) is accepted |

\*Significant at 0.05 Level

\*\*Significant at 0.01 Level

Table 5 shows that the calculated value of  $t=0.44$  is less than 1.96 i.e., at 0.05 level of significance so it is not significant at 0.05 level of significance. Thus, it is concluded that there is no gender difference in career preferences among senior secondary school students with respect to law and order. Therefore, the hypothesis 1(d) that there will be no significant s gender difference in career preferences among senior secondary school students with respect to law and order is accepted.

**Hypothesis 1(e)** There will be no significant gender difference in career preferences among senior secondary students with respect to education.

**Table 6: Depicting the t-value in career preferences among male and female senior secondary school students with respect to Education**

| Variable | N   | Mean  | SD   | SEM  | t-value | Result           |
|----------|-----|-------|------|------|---------|------------------|
| Male     | 100 | 8.22  | 5.03 | 0.48 | 3.75**  | Hypothesis       |
| Female   | 100 | 10.81 | 4.79 |      |         | 1(e) is rejected |

\*Significant at 0.05 Level

\*\*Significant at 0.01 Level

Table 6 shows that the calculated value of  $t=3.75$  is greater than 2.58 i.e., at 0.01 level of significance so it is significant at 0.01 level of significance. Thus, it is concluded that there is gender difference in career preferences among senior secondary school students with respect to Education. It reflects that females think that that teaching job is safe and comfortable for them. In teaching job, they have fewer working hours and less physical hard work. They get maternity and child care leave which is too much necessary for them. The finding is similar to finding that ensure that Female students (30.8%) preferred to work in academia (Raja'a, Abuhusseini, Hasen, Rezeq, & Basheti, 2019).

**Hypothesis 2(a)** There will be no significant gender difference in career preferences among senior secondary students with respect to low and high level of parental encouragement in relation to commerce and management.

**Table 7: Depicting the t-value of career preferences among senior secondary school students with low and high parental encouragement in relation to commerce and management.**

| Variable | N  | Mean | SD   | SEM  | t-value | Result           |
|----------|----|------|------|------|---------|------------------|
| Low PE   | 74 | 6.43 | 3.37 | 0.35 | 2.81**  | Hypothesis       |
| High PE  | 61 | 7.91 | 2.77 |      |         | 2(a) is rejected |

\*Significant at 0.05 Level

\*\*Significant at 0.01 Level

Table 7 shows that the calculated value of  $t=2.81$  is greater than 2.58 i.e., at 0.01 level of significance so it is significant at 0.01 level of significance. Thus, it is concluded that there is difference in career preferences among senior secondary school students with respect to low and high parental encouragement in relation to commerce and management. It reflects that commerce and management is emerging profession. Parents think that there is scope of good salary in these sectors i.e. commerce and management and should try other professions too instead of doctor and engineer. The findings of this study are lined with findings of other studies that ensure the primary job- and personal-related criteria influencing career preference were salary (78%) and could be helpful in managing changing societal expectations and maintaining a future balance between professional domains (Arbab,

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Eltahir, Elsadig & Yousef, 2022; Hassan, 1996; Helwig, 1998). Therefore, the hypothesis 2(a) that there will be no significant difference in career preferences among senior secondary school students with respect to low and high parental encouragement in relation to commerce and management is rejected.

**Hypothesis 2(b)** There will be no significant gender difference in career preferences among senior secondary students with respect to low and high level of parental encouragement in relation to medical.

**Table 8: Depicting the t-value of career preferences among senior secondary school students with low and high parental encouragement in relation to Medical**

| Variable | N  | Mean | SD   | SEM  | t-value | Result           |
|----------|----|------|------|------|---------|------------------|
| Low PE   | 74 | 7.34 | 3.88 | 0.44 | 0.87    | Hypothesis       |
| High PE  | 61 | 7.86 | 3.41 |      |         | 2(b) is accepted |

\*Significant at 0.05 Level

\*\*Significant at 0.01 Level

Table 8 shows that the calculated value of  $t=0.87$  is less than 1.96 i.e., at 0.05 level of significance so it is not significant at 0.05 level of significance. Thus, it is concluded that there is no significant difference in career preferences among senior secondary school students with respect to low and high level of parental encouragement in relation to Medical. Therefore, the hypothesis 2(b) that there will be no significant difference in career preferences among senior secondary school students with respect to low and high parental encouragement in relation to medical is accepted.

**Hypothesis 2(c)** There will be no significant gender difference in career preferences among senior secondary students with respect to low and high level of parental encouragement in relation to Defence.

| Variable | N  | Mean  | SD   | SEM  | t-value | Result           |
|----------|----|-------|------|------|---------|------------------|
| Low PE   | 74 | 9.65  | 2.29 | 0.27 | 1.74    | Hypothesis       |
| High PE  | 61 | 10.52 | 3.4  |      |         | 2(c) is accepted |

\*Significant at 0.05 Level

\*\*Significant at 0.01 Level

As per Table 9, the calculated value of  $t=1.74$  is less than 1.96 i.e., at 0.05 level of significance so it is not significant at 0.05 level of significance. Thus, it is concluded that there is no significant difference in career preferences among senior secondary school students with respect to low and high level of parental encouragement in relation to defence. Therefore, the hypothesis 2(c) that there will be no significant difference in career preferences among senior secondary school students with respect to low and high parental encouragement in relation to defence is accepted.



**Hypothesis 2(d)** There will be no significant gender difference in career preferences among senior secondary students with respect to low and high level of parental encouragement in relation to law and order.

**Table 10: Depicting the t-value of career preferences among senior secondary school students with low and high parental encouragement law and order.**

| Variable | N  | Mean | SD   | SEM  | t-value | Result                      |
|----------|----|------|------|------|---------|-----------------------------|
| Low PE   | 74 | 8    | 3.75 | 0.44 | 1.63    | Hypothesis 2(d) is accepted |
| High PE  | 61 | 8.97 | 3.14 |      |         |                             |

\*Significant at 0.05 Level

\*\*Significant at 0.01 Level

Table 10 shows that the calculated value of  $t=1.63$  is less than 1.96 i.e., at 0.05 level of significance so it is not significant at 0.05 level of significance. Thus, it is concluded that there is no significant difference in career preferences among senior secondary school students with respect to low and high level of parental encouragement in relation to law and order. Therefore, the hypothesis 2(d) that there will be no significant difference in career preferences among senior secondary school students with respect to low and high parental encouragement in relation to law and order is accepted.

**Hypothesis 2(e)** There will be no significant gender difference in career preferences among senior secondary students with respect to low and high level of parental encouragement in relation to Education.

**Table 11: Depicting the t-value of career preferences among senior secondary school students with respect to low and high parental encouragement in relation to law and order.**

| Variable | N  | Mean  | SD   | SEM  | t-value | Result                      |
|----------|----|-------|------|------|---------|-----------------------------|
| Low PE   | 74 | 8.7   | 4.24 | 0.49 | 2.51*   | Hypothesis 2(e) is rejected |
| High PE  | 61 | 10.41 | 3.68 |      |         |                             |

\*Significant at 0.05 Level

\*\*Significant at 0.01 Level

Table 11 shows that the calculated value of  $t=2.51$  is greater than 1.96 i.e., at 0.05 level of significance but less than  $t=2.58$  i.e., at 0.01 level of significance, therefore it is evident that the value is significant at 0.05 level of significance but not significant at 0.01 level of significance. Thus, it is concluded that there is difference in career preferences among senior secondary school students with respect to low and high parental encouragement in relation to commerce and management. It reflects that parents who are educated encourage highly their children to go in the teaching profession because it noble and respectable job. It is comfortable job specifically for females too. Therefore, the hypothesis 2(e) that there will be no significant difference in career preferences among senior secondary school students with respect to low and high parental encouragement in relation to commerce and management is rejected.

## **Findings and Educational Implications**

Following are the educational implication of the present research work based on the findings of the studies:

The female students show significant difference in most areas of career preferences. As per needs more information regarding career preferences should be provided to the female students to help them make informed choices.

Some of the possible sources of information are:

- Career counsellors who can provide guidance and advice on various career options and their requirements, benefits, and challenges.
- Online platforms that offer career assessments, quizzes, and resources to help students discover their interests, skills, and personality traits.
- Role models who can inspire and motivate students to pursue their dreams and goals in different fields and sectors.
- 

These are some of the ways that female students can get more information regarding career preferences and explore the diverse opportunities available to them.

- There is significant difference in gender difference in relation to defence. So, there should be training programs like NCC for girls so that the girls can also enter in defence to enhance the gender equality.
- Furthermore, the analysis of the data revealed that there is significant difference in the career preference of females and males with respect to education as it is notion that females should choose education over the other profession as they have to involve in upbringings of their children and will take care of their family.
- Counselors of career should be appointed at school level. Career choices are individual preferences lead by many factors, where the personal acceptance is the most important for sustainability or continuity in the job with satisfaction
- Teachers should be trained to provide necessary guidance to students.
- Market needs should be assessed and results should be communicated to the students through meetings and displaying information on notice boards.
- The complete information should be provided to the student with regard to Rozgar mela's, employment bureaus and self-employment schemes, such exposures made students aware of different vocations.
- Parents teacher meeting i.e., PTM should be organized to provide information about different career choices so they can help their children in choosing vocations.
- Various guidance programs should be launched at state and national level. Choice of career depends upon individual preferences which are affected by number of factors, but the personal acceptance is the most crucial key for continuity in the job with satisfaction which ultimately leads to Sustainable Development.

## Conclusion

We are in the 21<sup>st</sup> century where one can use the modern technology and application in the everyday life. But the modernity does not come with the usage and application of modern things or by wearing modern and trendy clothes rather it came when we have modern thinking along with acceptance and adaptation against the old and orthodox thinking. With this research paper, it is evident that parental encouragement should be involved with their wards in choosing the career as per their interest and potential irrespective of their gender. So, teachers along with their teaching in the classroom should be involved in providing the guidance and career counselling to students as well as to their parents as per the visible and hidden talents of the learners. It should be necessary that individual will choose the education field as per their preference to join so that good and efficient quality of teachers should be there in the education system.

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## Vocationalisation of Education through simple activities for children with special needs

Prakash Sangwan<sup>1</sup> & T. P. Sarma<sup>2</sup>

<sup>1</sup>Lecturer Mathematics, G.S.S.S. Jhojhu Kalan, Dist. Ch. Dadri, Haryana -127310

<sup>2</sup>Professor DESM, NCERT, New Delhi

### Abstract

Existing inequalities create several roadblocks in the process of achieving inclusive and equitable education across all Stages. Studies show that a large percentage of students who either dropout from school or discontinue their education after school belong to Socio-Economically Disadvantaged Groups (SEDGs). Vocational Education prepares students for different kinds of 'work'. When we relate mathematics with some hands on activities, then they feel excited and take interest in the process of teaching learning of mathematics. 'Learning by doing' gives the chance for self-learning to students and provides scope for using creative and enhance and enhance analytical and critical thinking, logical reasoning. We provide them concrete teaching learning experience of mathematics with the help of mathematics kit, origami and paper cutting activities. Each class divided in groups. Each group has four to five students. Each group performed the activity and presented it to the whole class. After that, the remaining class provided suggestions for better performance. In the present paper, researcher personally organized and implemented mathematics kit, origami (paper folding) and paper cutting activities to enhance learning in different branches of mathematics like arithmetic, algebra and geometry. Correlated test was used for analyzing data and the results were in the favor of teaching of mathematics with the help of concrete objects, paper folding, graph paper and paper cutting activities. Some sample of activities are Visualize  $2^0=1$ ,  $(a+b)^2 = a^2 + 2ab + b^2$ , Pythagoras Theorem and the area of closed shapes.

Hence the present paper analyses the various activities of vocational education, concrete objects, paper folding, graph paper and paper cutting to make the learning of mathematics meaningful, realistic and life oriented. Activities performed by students contribute to the development of their basic mathematical concepts and get the required learning outcome inclusively.

**Keywords** - Inclusiveness, Vocational Education, Mathematics learning, Origami, Assessment, Learning Outcomes, and Self learning.

### Introduction

The purpose of the education system is to producing engaged, productive, and contributing citizens for building an equitable, inclusive, and plural society as envisaged by our Constitution. (New Education Policy -2020, Page No. 4) So there is an urgent need for making a strong and effective planning to make mathematics as an enjoyable, interesting and easy to understand for every student from foundational stage to higher stage.

Inclusive and equitable education — while an essential goal in its own right — is also critical to achieving an inclusive and equitable society in which every citizen has the opportunity to dream, learn, thrive, and contribute. NEP 2020 aims to create an education system where all of India's children get equal opportunity to learn and excel, regardless of circumstances of birth or background. (NCFSE-2023).

Existing inequalities create several roadblocks in the process of achieving inclusive and equitable education across all Stages. Studies show that a large percentage of students who either dropout from school or discontinue their education after school belong to Socio-Economically Disadvantaged Groups (SEDGs). Many among these groups who manage to continue their education struggle to achieve appropriate Learning Outcomes due to a lack of adequate support, nutrition, access to learning resources, or various sorts of social and/or economic distress.

Vocational Education prepares students for different kinds of 'work'. It enables the learning of specific knowledge, capacities, and values, such that the students upon finishing school are ready to work in a vocation of their choice, and to deal with the day-to-day practicalities of life. School education must provide both possibilities to all students – to join the workforce or to pursue higher education.

Work provides not only economic sustenance for the individual and contribution to the economy but is also a significant part of a meaningful and dignified life for human beings.

In the Foundational and Preparatory Stages, multiple capacities will be developed through play and other activities, which will subsequently be useful in vocations. These capacities are termed pre vocational capacities. In the Middle Stage, exposure to a wide range of work will be given to students. This will equip them to achieve capacities (including specific skills) in a vocation of their choice in the Secondary Stage and help them progress towards gainful employment and contribute meaningfully to the economy.

It is generally believed that the physical resources that are available in the country in coal, iron, manganese, gold and many other varieties of mineral wealth will help in the making of a highly prosperous State, But it is forgotten that the presence of rich mineral resources will by itself not make a State prosperous, nor will the absence of the resources necessarily mean the poverty of a State. Thus for instance though countries like Japan, Switzerland, Holland and others possess little or no physical resources of this kind, the prosperity achieved by these nations has been spectacular, more so in recent years. The greatest wealth of a country is not to be found in the bowels of the earth but in the ingenuity and skill of the people. The United States of America is noted for being the richest country in the world today, but her present position is not solely due to her natural resources but to the techniques that have been evolved and the 'know-how' methods that have been adopted through the education imparted to the citizens. The thousands of patents that are registered there every year as against a few hundred in our own country, brings home to us the necessity for developing Technical Education in all grades. One of the chief objectives of education is to make the individual conscious of his intellectual powers and manual skill which he may use for good of his community. It is futile to think of the development of industry and of the possibility of competing on an equal level with highly industrialized countries in the West, or of infusing

into industry a new quality which will contribute to greater efficiency unless the personnel employed in such industry have had the necessary training and equipment to discharge their duties with skill and efficiency. From the point of view of the individual, real education consists in planning, executing and finally achieving something of which he can feel satisfied. It is 'in doing' that ingenuity develops. Herein lies the importance of Technical Education in so far as it is a method of education which will conduce to an all-round development of head and hand and will ultimately give young pupils the joy of having achieved something by their own initiative and labour.

Child is the centre of education, and education should be designed to conform to him. Children are found to differ from each other in physical, emotional and mental terms. These individual differences between children give rise to many problems in teaching; for instance, which method of teaching should the teacher adopt so that every student may benefit from his teaching?

Intelligence tests have conclusively established that children differ in respect of their intelligence, their mental level. In the same class we find children with different levels of intelligence. Every teacher and every parent knows that some children learn quickly while other learns slowly. Those who learn quickly need only a minimum of help from the teacher, and once they have learnt something, it remains in their minds for long time. In contrast, slow learners compel the teacher to make strenuous efforts in teaching them.

There are children who are above average in intelligence. They do not have a hearing or visual impairment. But they have specific learning problems in reading, writing, spelling or arithmetic. For example, some children always read and write 'b' as 'd', 'was' as 'saw', '21' as '12'. These problems are due to impairment of their psychological process, like perception and memory. Such children are said to have a learning disability which arises out of the problems in psychological process. These children need to be identified to provide special help in education.

In teaching learning of Mathematics, give credit for each, they complete correctly. Today, there is an over emphasis on rote learning and examination. The students do not experience joy in this way of learning and acquiring knowledge. Whatever is taught at different levels of the school is mostly based on certain formulae, set rules and methods. It denies the true inner involvement of student to learn through firsthand experience. In the present paper, I provide first hand learning experiences to the students in Mathematics and help them to acquire the required learning outcome.

Students want to escape from learning of mathematics. They do not take interest in learning of mathematics. They assume that mathematics is only for making calculations. They are deprived from the inner beauty of mathematics. But if we relate mathematics with some hands on activities, then they feel excited and take interest in the process of teaching learning of mathematics. Activity based approach makes learning interesting and it will be helpful for the students to remember content for a longtime as they are active participants in the process of learning of mathematics. 'Learning by doing' gives the chance for self-learning to students and provides scope for using creative and enhance and enhance analytical and critical thinking, logical reasoning.

### **Aims and Objective**

- Vocational capacities, knowledge, and relevant values will be developed for all students, and this will create the possibility of their joining the workforce after school if they choose to.
- Provide the possibility of learning range of vocations – ones that are aspirational, as also those that are most relevant locally and contextually (if different), also new and emerging vocations.
- Provide exposure to various types of work to all students establishing the dignity of work.
- Should be implementable with the current reality and resourcing of our schools, while providing a pathway to the future.
- Must value the work that many of the children of India already do in their homes and communities.
- To create interest in learning of mathematics with the help of vocational education among students.
- Increasing peer learning among students.
- To ensure that each student take part in the process of teaching learning of mathematics.
- To acquire the required learning outcome
- Appreciate the power and beauty of mathematics.
- To assess the learning of students in a play way method.

### **Target group**

Students of class 6<sup>th</sup> - 10<sup>th</sup> of Govt. Senior Secondary School Jhojhu Kalan (Charkhi Dadri), Haryana.

### **Methodology**

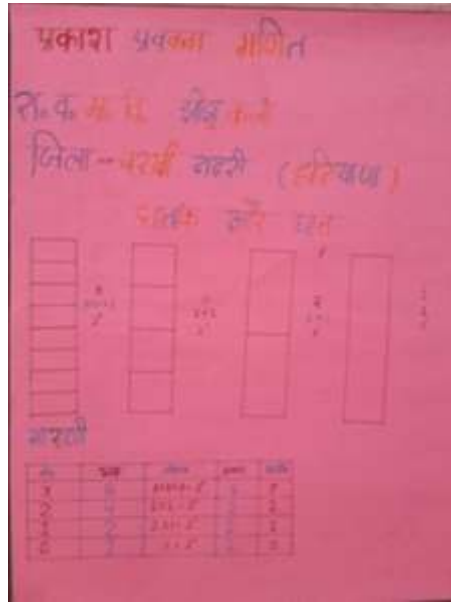
Each class divided in groups. Each group has four to five students. Each group performed the activity and presented it to the whole class. After that, the remaining class provided suggestions for better performance. At last, I concluded the whole activity and helped the students to reach the final conclusion.

In the present paper, researcher personally organized and implemented origami (paper folding) and paper cutting activities to enhance learning in different branches of mathematics like arithmetic, algebra and geometry. Correlated test was used for analyzing data and the result were in the favor of teaching of mathematics with the help of carpentering work / paper cutting / paper folding activities.



Some samples of activities:-

**1. Visualize  $2^0=1$**



Take any paper. Fold it three times. Then open it. Write the result in your notebook in the given table, like this

| Folds of Paper | Parts of Paper | Result                      |
|----------------|----------------|-----------------------------|
| 3              | 8              | $2 \times 2 \times 2 = 2^3$ |
| 2              | 4              | $2 \times 2 = 2^2$          |
| 1              | 2              | $2^1$                       |
| 0              | 1              | $2^0$                       |

Hence by this activity, students themselves reach the conclusion that  $2^0=1$ .

**2. Visualize  $(a+b)^2 = a^2 + 2ab + b^2$**



Take a square paper. Join its any two diagonal corners and fold it diagonally. Again from any point, fold the folded paper horizontally joining its edges. Now open it. We have a small square on the paper. Now fold the paper according to two sides of the square. Take the length of side of the small square as a unit. Take the remaining length of the paper as b unit. Color all three squares. Paste it on a cardboard. Now cut all the pieces. We have found the following result, i.e.

$$(a + b)^2 = a^2 + 2ab + b^2.$$

### 3. Visualize Pythagoras Theorem

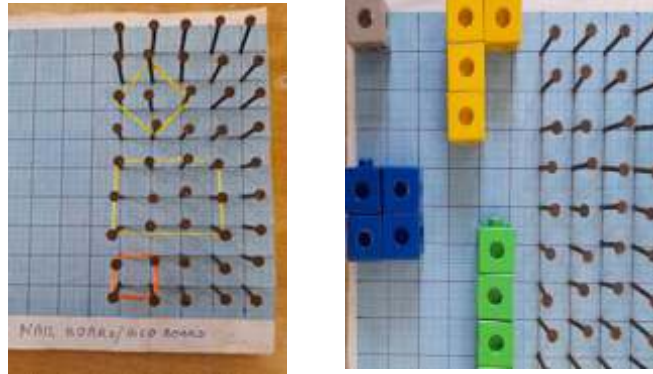
This theorem is visualized by making a boat. Students know how to make a boat. They float it on the water. For convenience, here we make the boat. Take a square paper. Fold it one time by joining opposite edges. Determine the midpoint of the folded line. From this midpoint, fold the paper in a triangular shape. Change the side of the paper horizontally. Open it as a cone and join its opposite faces. Again join its faces outside the paper. Repeat this process as you can. Now pull its two opposite corners outside. We have got the boat. Now open the boat. We get a grid of lines on the paper. Make a right angled triangle. Length of its sides be a, b and c units. Make squares of length a, b and c units on the given triangle. Color them. Paste it on a cardboard. Now cut all the pieces. Calculate the area of each square by counting small triangles. We have find  $c^2 = a^2 + b^2$ , where c is the length of the largest side of the right angled triangle.



### 4. Find out approximate area of closed shapes by using unit square grid/ graph sheet

#### Working method: 1

Take a nail board. Take a rubber ring. Put this ring in two consecutive nails. It denotes a unit length or the distance between the two nails is one unit. Now a square unit will be clarified by putting rubber in four nails. Now make a rectangular area of 3 unit length and 2 unit width with the help of rubber rings. Now let the children count the squares under this area. Here children see that  $2 \times 3 = 6$  square units are formed. Similarly, by making a parallelogram, then its area can be found by counting square boxes. Here children can be talked that some boxes are not complete in it. So, how to count them? After discussion, it can be concluded that by counting half boxes make complete boxes and, those boxes which are less than half are left and those who are more than half are counted as one. Now draw some parallelograms with the help of rubber rings and note the result in the following Table.



| Parallelogram | Base   | Height | Area          |
|---------------|--------|--------|---------------|
| a)            | 2 unit | 2 unit | 4 square unit |
| b)            |        |        |               |
| c)            |        |        |               |

**Working method: 2.**

Take a graph paper. Place a block in one of its fields. Outline the area surrounded by it with pencil. This area is a square unit. Now put them in a square form on graph paper with four blocks. Put the other 4 -4 blocks in the shape of 1 and 1 on the graph paper. Discuss with the children, what is the relation between the three areas (big, small or equal). In this way make different shapes of the parallelogram and note the results in the table above.

**5. Interprets data using bar graph such as consumption of electricity is more in winters than in summer.**

**Pre-Preparation**

Before start this hard spot activity, students collect electricity bills for one year.

**Method**

The students fill the table with the help of collected electricity bills as given bellow:

| Month     | Electricity Bills |
|-----------|-------------------|
| January   |                   |
| February  |                   |
| March     |                   |
| April     |                   |
| May       |                   |
| June      |                   |
| July      |                   |
| August    |                   |
| September |                   |
| October   |                   |
| November  |                   |
| December  |                   |

Based on the above table, students prepare bar graph. They observe the bar graph. They reach on conclusion based on their bar graph that consumption of electricity is more in winter or summer season.

## **Conclusion/ Implications**

The present paper analyses the various activities of concrete objects, paper folding, graph paper and paper cutting to make the learning of mathematics meaningful, realistic and life oriented. These simple activities performed by students contribute to the development of their basic mathematical concepts, ensure 100% participation in the process of teaching learning and thus they acquired the required learning outcome .

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## Value addition in fruits and vegetables supply chain of Gujarat : An in-depth analysis

Varudhini Chirumamilla<sup>1</sup> & R.S.P.Singh<sup>2</sup>

<sup>1</sup>Research Scholar, School of Vocational Education and training (SOVET), Indira Gandhi National Open University (IGNOU), New Delhi.

<sup>2</sup>Professor and Director, School of Vocational Education and training (SOVET), Indira Gandhi National Open University (IGNOU), New Delhi.

### Abstract

The value addition in fruits and vegetables remains notably subpar compared to global benchmarks within the Indian context, raising critical concerns about inefficiencies in the supply chain. This study aims to focus deeply into this issue, seeking to understand why value addition in these essential agricultural products lags than international standards in India. The primary objective is to formulate strategies for optimizing the value chain and pinpointing areas where losses predominantly occur.

The investigation focuses specifically on the fruits and vegetables supply chain in Gujarat, a prominent agricultural hub in India. It examines value addition processes within both the organized and unorganized sectors, recognizing the diverse dynamics that shape these distinct segments. By scrutinizing the operations of farmers, suppliers, processors, distributors, and retailers along the supply chain, the analysis aims to gain comprehensive insights into the challenges and opportunities for enhancing value addition.

Key fruits under scrutiny include mango, banana, pomegranate, guava, citrus, and papaya, while prominent vegetables include tomato, potato, onion, okra, brinjal, cabbage, cucumber, and chilies. Through in-depth analysis and engagement with stakeholders at various levels of the supply chain, the study seeks to identify bottlenecks, inefficiencies, and best practices that can be strategic interventions.

Ultimately, this study seeks to offer actionable recommendations aimed at bolstering value addition processes in the fruits and vegetables supply chain of Gujarat. By bridging the gap between existing practices and global standards, it endeavors to contribute to the development of a more efficient, sustainable, and economically viable agricultural ecosystem in the region.

**Keywords :** Value Addition, Supply Chain Optimization, Agricultural Efficiency, Gujarat Agriculture, Fruit and Vegetable Industry and Economic Sustainability.

### Introduction

The fruits and vegetables supply chain in Gujarat, India, stands as a pivotal sector contributing significantly to the state's agricultural economy (Sharma, 2021). With its diverse agro-climatic conditions and fertile soil, Gujarat boasts a rich bounty of fruits and vegetables, ranging from mangoes and bananas to potatoes and tomatoes (Vikram et al., 2023). However, amidst this abundance lies a complex web of challenges and opportunities concerning value addition within the supply chain.

In recent years, the concept of value addition has gained paramount importance in the fruits and vegetables supply chain of Gujarat operates through both organized and unorganized sectors, each presenting its own set of dynamics and challenges (Singh & Bhimraj, 2014). The organized sector comprises large-scale farms, agro-processing units, wholesalers, retailers, and export-oriented enterprises, while the unorganized sector consists of small and marginal farmers, traditional markets, street vendors, and local traders. Understanding the value addition processes within these sectors is imperative for optimizing efficiency, ensuring product quality, and enhancing market competitiveness (Taghian Dinani & van der Goot, 2023).

This in-depth analysis seeks to focus into the intricacies of value addition in the fruits and vegetables supply chain of Gujarat (Van Le & Van Luan, 2023). By examining the practices, challenges, and opportunities across both organized and unorganized sectors, this study aims to highlight on critical aspects influencing the overall performance and sustainability of the supply chain (Karim & Biswas, 2016).

Key areas of focus include the identification of value addition processes employed at different stages of the supply chain, the assessment of existing infrastructure and technological interventions, the analysis of market dynamics and consumer preferences, and the exploration of policy frameworks and institutional support mechanisms (Tort et al., 2022). Through a comprehensive review of literature and empirical data, this analysis endeavors to provide insights that can be strategic interventions and policy reforms aimed at fostering inclusive growth and resilience in the fruits and vegetables sector of Gujarat.

In essence, this study serves as a roadmap for stakeholders, including policymakers, farmers, agribusinesses, and development practitioners, to navigate the complexities of the fruits and vegetables supply chain and unlock its full potential for economic development, food security, and rural livelihood enhancement in Gujarat (Tripathi et al., 2023).

### **Research Objectives**

1. To Investigate value addition methods within Gujarat's organized sector of the Fruits and Vegetables supply chain.
2. To Examine value addition techniques employed within the unorganized sector of Gujarat's Fruits and Vegetables supply chain.
3. To Propose strategies to enhance value addition processes within Gujarat's fruits and vegetables supply chain.

### **Research Questions**

1. What are the primary value addition methods currently utilized within the organized sector of Gujarat's Fruits and Vegetables supply chain ?
2. What innovative strategies can be recommended to improve value addition processes across all stages of Gujarat's fruits and vegetables supply chain, considering the diverse needs and challenges faced by stakeholders ?

### **Methodology**

supply chain in Gujarat, India. We're diving deep into the perspectives of various stakeholders: farmers, suppliers, processors, distributors, and retailers. Picture a tapestry of perspectives, each thread contributing to the vibrant fabric of our understanding.

**Research Design:** The approach is cross-sectional, offering a snapshot of the current supply chain dynamics. This design allows us to capture a holistic view while examining multiple variables simultaneously, akin to observing a bustling marketplace from a vantage point.

**Sampling Strategy:** Sampling frame encompasses the diverse array of players in Gujarat's supply chain mosaic. Administering a stratified random sampling technique ensures equitable representation across sectors. With a sample size of 311, it is poised to hear voices from all corners of the supply chain, like gathering fruits and vegetables from every corner of the market.

**Data Collection:** Structured questionnaires and semi-structured interviews form the backbone of our data collection. Questionnaires tease out quantitative insights, while interviews provide qualitative depth. It's akin to gathering ripe fruits with precision while interviews provide qualitative depth. It's akin to gathering ripe fruits with precision while also exploring the nuances of flavor through engaging conversations.

**Variables Studied:** Plethora of variables are explored: value addition processes, challenges faced, opportunities uncovered, and stakeholders' perceptions. It's like dissecting a fruitsalad, each ingredient offering its unique flavor and texture to the final dish

**Data Analysis:** Quantitative data undergoes scrutiny through statistical software like AMOS. Structural Equation Modeling (SEM) helps us to unravel intricate relationships, while Confirmatory and Exploratory Factor Analysis validate constructs and reveal underlying patterns.

## **Statement of Problem**

The value addition in fruits and vegetables within the Indian context, particularly in Gujarat, falls significantly below the global standards. Despite the rich agricultural diversity and abundant produce, the extent of value addition remains notably deficient. This issue presents a significant challenge to the efficiency and competitiveness of the agricultural sector in the region.

One of the primary research questions driving this investigation is: Why does the value addition in fruits and vegetables in India lag to global standards? This question focuses into various aspects of the supply chain, including production, processing, distribution, and marketing, to identify the underlying factors contributing to this disparity. By exploring the intricacies of the supply chain, this study aims to uncover the specific bottlenecks and inefficiencies hindering the realization of optimal value addition.

The overarching goal of this paper is to develop a nuanced understanding of the existing challenges and opportunities within the fruits and vegetables supply chain in Gujarat. By conducting an in-depth analysis, the research seeks to elucidate key areas where value

addition is suboptimal, and losses are primarily occurring. Through this exploration, the paper endeavors to propose strategic interventions and actionable recommendations to enhance the value chain's efficiency and effectiveness.

The investigation will scrutinize various stages of the supply chain, from farm to fork, to identify critical points where value addition is deficient or where losses occur disproportionately. Factors such as inadequate infrastructure, inefficient logistics, lack of technological adoption, and market inefficiencies are likely to emerge as significant contributors to the problem. Additionally, socio-economic factors, including the role of farmers, traders, processors, and retailers, will be examined to understand their impact on value addition dynamics.

By highlighting on the underlying reasons for the subpar performance of value addition in fruits and vegetables, this study aspires to contribute valuable insights to policymakers, industry stakeholders, and agricultural practitioners. The findings are anticipated to inform evidence-based interventions aimed at streamlining the supply chain, reducing losses, and maximizing the value captured at each stage.

In conclusion, the investigation into value addition in the fruits and vegetables supply chain of Gujarat is crucial for addressing the persistent challenges and unlocking the sector's full potential. Through rigorous analysis and strategic recommendations, this paper aims to pave the way for a more resilient, efficient, and competitive agricultural ecosystem in the region.

## **Literature Review**

### **Value addition methods within Gujarat's organized sector of the fruits and vegetables supply chain**

The agriculture sector in India, particularly concerning fruits and vegetables, faces significant challenges in achieving optimal value addition within its supply chain. Halder and Pati (2011) highlighted the urgent need for a paradigm shift to enhance the management of this crucial segment. Despite the substantial contribution of agriculture to the Indian economy, the organized sector, representing only 2% of the total market, significantly lags behind global standards in supply chain management practices (Halder & Pati, 2011).

Sharma (2021) emphasized the importance of value chain approaches in effective marketing of fruits and vegetables in India. The study underscored the role of social capital in organizing producers and communities, particularly in states like Gujarat, where packaging facilities play a pivotal role in enhancing value addition (Sharma, 2021).

Kumari, Bharti, and Tripathy (2021) conducted a comparative case analysis to explore how collectives strengthen agriculture value chains. Their research highlighted the challenges of weak value chain systems and market linkages, particularly in states like Gujarat, and emphasized the need for responsive supply chains to enhance value addition (Kumari et al., 2021).

Gulati, Ganguly, and Wardhan (2022) emphasized the role of streamlined and organized



value chains in enhancing competitiveness and inclusiveness in Indian agriculture. Evidence-based research highlighted the potential for cost reduction and improved finance through value addition initiatives (Gulati et al., 2022).

Singh and Bhimraj (2014) conducted a case study on papaya marketing in Gujarat's tribal belt, emphasizing the significance of efficient supply chains connecting farmers to organized markets. Their findings underscored the inefficiencies in unorganized supply chains, hindering value addition (Singh & Bhimraj, 2014).

Kannaujia et al. (2019) explored challenges and opportunities in processing and value addition of vegetable crops. The study identified the lack of organized supply chains as a major impediment to value addition initiatives, emphasizing the need for improved infrastructure and processing techniques (Kannaujia et al., 2019).

Singh, Budhiraja, and Vatta (2018) examined the sustainability of farmer producer organizations (FPOs) in agricultural value networks in Punjab and Gujarat. Their research highlighted the role of FPOs in organizing production and post-harvest activities, thus enhancing value addition opportunities for farmers (Singh et al., 2018).

### **Strategies to enhance value addition processes within Gujarat's fruits and vegetables supply chain**

The agricultural sector in India, particularly concerning fruits and vegetables, has been a subject of extensive research aiming to address inefficiencies and enhance value addition in the supply chain. This review synthesizes key insights from various scholarly works to provide a comprehensive understanding of the challenges and opportunities inherent in the supply chain management of fruits and vegetables.

Halder and Pati (2011) emphasize the pressing need for a paradigm shift in the management of the fruits and vegetables supply chain in India. Their study underscores the importance of adopting best practices to improve supply chain efficiency and ensure a sustainable future for the Indian food system. They highlight initiatives by the Gujarat government prioritizing agro-processing as a pivotal step towards achieving this goal.

Gulati et al. (2022) focus into the complexities of agricultural value chains in India, focusing on competitiveness, inclusiveness, sustainability, scalability, and improved finance. They underscore the significance of financing methods to facilitate value addition and reduce costs across the supply chain. Their findings underscore the importance of real-cost value addition in enhancing the competitiveness of Indian agricultural products.

Kannaujia et al. (2019) highlights on the challenges and opportunities in processing and value addition of vegetable crops. Their study underscores the importance of boosting vegetable processing to minimize losses and maximize value addition. They highlight the need for interventions across the food processing supply chain to address existing inefficiencies and enhance the market value of vegetable crops.

Chengappa (2018) explores the development of agriculture value chains as a strategy for enhancing farmers' income. He advocates for integrated food supply chains that coordinate stakeholders to improve efficiency and value addition. Through case studies, he illustrates how effective supply chain strategies can lead to income generation and livelihood improvement for smallholder farmers.

Deliya et al. (2012) examine the differentiators in the marketing of fresh fruits and vegetables from a supply chain management perspective. Their study emphasizes the importance of integrating operations along the supply chain to improve product quality and market competitiveness. They highlight the need for coordinated efforts among Indian fruit and vegetable suppliers to enhance market penetration and consumer satisfaction.

Rais and Sheoran (2015) explore the scope of supply chain management in fruits and vegetables in India, emphasizing the value chain perspective. They identify bottlenecks and value-adding opportunities across the supply chain, particularly in states like Uttar Pradesh, Gujarat, West Bengal, and Punjab. Their findings underscore the importance of addressing infrastructural gaps to optimize supply chain efficiency.

Nedumaran et al. (2020) propose a digital integration model to enhance market efficiency and inclusion of smallholder farmers in the fresh fruit and vegetable supply chain. Their study advocates for supply chain integration to facilitate higher value addition activities and improve market access for small-scale producers. Through digital technologies, they aim to streamline supply chain operations and enhance farmer participation in the market.

Negi (2018) develops a framework to improve supply chain efficiency in the fruits and vegetables sector. His study focuses on implementing solutions to address constraints and enhance efficiency in the supply chain. By applying the Theory of Constraints Thinking Process, Negi proposes practical strategies to streamline operations and optimize value addition in the sector.

## **Data Collection**

The data collection process encompasses a multifaceted approach to ensure the acquisition of diverse and comprehensive information regarding the value addition practices within Gujarat's fruits and vegetables supply chain. The primary methods of data collection include:

- **Surveys:** Researchers administer structured questionnaires to key stakeholders involved in the fruits and vegetables supply chain, including farmers, wholesalers, retailers, processors, and exporters. These surveys gather quantitative data on value addition techniques, infrastructure, challenges, and opportunities.
- **Interviews:** In-depth interviews are conducted with experts, policymakers, and industry professionals to obtain qualitative insights into value addition strategies, government policies, market dynamics, and future prospects.
- **Observations:** Researchers conduct direct observations of various stages of the supply chain, such as farming practices, post-harvest handling, processing facilities, and distribution channels, to supplement survey and interview data.
- **Documentary Analysis:** Relevant documents, reports, and literature pertaining to the fruits and vegetables supply chain in Gujarat, including government publications, industry reports, and academic studies, are reviewed to augment primary data.

## Sample Method

A purposive sampling method is employed to select participants who possess significant knowledge and experience relevant to the study's objectives. The sampling framework considers the following criteria:

**Representation:** Participants are selected from different segments of the supply chain, including small-scale farmers, large-scale producers, wholesalers, retailers, processors, and exporters of organized sector and unorganized sector, to ensure a representative sample.

**Diversity:** Efforts are made to include participants from diverse geographical regions within Gujarat to capture variations in value addition practices influenced by factors such as agro-climatic conditions, infrastructure availability, and market access.

**Expertise:** Participants with expertise in areas such as agricultural practices, supply chain management, agribusiness, food processing, and policy implementation are prioritized to provide comprehensive insights into value addition processes.

## Hypothesis

**H<sub>01</sub>:** There is no significant impact of various value addition techniques employed on supply chain of Gujarat.

**Dependent Variables: Supply Chain**

**Independent Variables: Value Addition Techniques**

## Statistical Tools

SPSS, AMOS Version 23 and Microsoft Excel is used to analyze the data and the test used in analysis are CFA, EFA and Structural equation modeling.

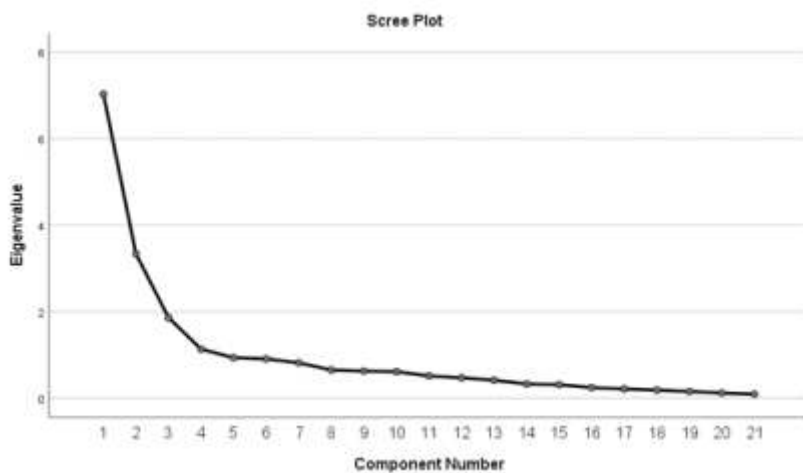
## Data Analysis

|                                     | <b>Initial</b> | <b>Extraction</b> |
|-------------------------------------|----------------|-------------------|
| Drying                              | 1.000          | .711              |
| Canning                             | 1.000          | .602              |
| Vacuum sealing                      | 1.000          | .748              |
| Freezing                            | 1.000          | .738              |
| Modified Atmosphere Packaging (MAP) | 1.000          | .627              |

|  |       |      |
|--|-------|------|
| Vacuum Packaging   | 1.000 | .797 |
| Aseptic Packaging  | 1.000 | .762 |
| Thermoforming  | 1.000 | .625 |
| Jam and Preserves  | 1.000 | .720 |
| Pickling   | 1.000 | .684 |
| Vinegar infusion   | 1.000 | .712 |
| Spices and herbs addition  | 1.000 | .741 |
| Fortification  | 1.000 | .723 |
| Dehydration with Retention of Nutrients  | 1.000 | .586 |
| Freeze drying  | 1.000 | .725 |
| Calcium enrichment   | 1.000 | .768 |
| The efficiency of transportation and logistics networks significantly impacts the timely delivery of fruits and vegetables from farms to markets in Gujarat.   | 1.000 | .651 |
| Quality control measures implemented throughout the supply chain ensure that consumers receive fresh and high-quality fruits and vegetables from Gujarat.  | 1.000 | .739 |
| The collaboration among various stakeholders, including farmers, wholesalers, retailers, and government agencies, enhances the effectiveness of the fruits and vegetables supply chain in Gujarat.           | 1.000 | .779 |
| Investment in modern infrastructure, such as cold storage facilities and processing units, positively influences the preservation and value addition of fruits and vegetables within Gujarat's supply chain. | 1.000 | .787 |
| Adoption of technology-driven solutions, such as blockchain and IoT (Internet of Things), enhances transparency and traceability within the fruits & vegetables supply chain in Gujarat                      | 1.000 | .782 |
| <b>Extraction Method: Principal Component Analysis.</b>  |       |      |

**Table 2: Total Variance Explained**

| Component | Initial Eigenvalues |               |              | Rotation Sums of Squared Loadings |               |              |
|-----------|---------------------|---------------|--------------|-----------------------------------|---------------|--------------|
|           | Total               | % of Variance | Cumulative % | Total                             | % of Variance | Cumulative % |
| 1         | 7.036               | 33.503        | 33.503       | 4.490                             | 21.381        |              |
| 2         | 3.337               | 15.890        | 49.394       | 3.975                             | 18.928        |              |
| 3         | 1.863               | 8.869         | 58.263       | 2.787                             | 13.270        |              |
| 4         | 1.134               | 5.401         | 63.664       | 1.639                             | 7.803         |              |
| 5         | 1.936               | 4.458         | 68.122       | 1.415                             | 6.740         |              |
| 6         | .909                | 4.330         | 72.453       |                                   |               |              |
| 7         | .819                | 3.898         | 76.351       |                                   |               |              |
| 8         | .651                | 3.102         | 79.453       |                                   |               |              |
| 9         | .628                | 2.991         | 82.444       |                                   |               |              |
| 10        | .615                | 2.927         | 85.370       |                                   |               |              |
| 11        | .516                | 2.458         | 87.829       |                                   |               |              |
| 12        | .472                | 2.247         | 90.076       |                                   |               |              |
| 13        | .417                | 1.984         | 92.060       |                                   |               |              |
| 14        | .330                | 1.573         | 93.633       |                                   |               |              |
| 15        | .315                | 1.498         | 95.131       |                                   |               |              |
| 16        | .245                | 1.165         | 96.296       |                                   |               |              |
| 17        | .216                | 1.029         | 97.325       |                                   |               |              |
| 18        | .188                | .895          | 98.220       |                                   |               |              |
| 19        | .156                | .744          | 98.964       |                                   |               |              |
| 20        | .122                | .579          | 99.543       |                                   |               |              |
| 21        | .096                | .457          | 100.000      |                                   |               |              |



**Figure 1: Scree Plot**

|   | <b>Table 3: Component Matrix<sup>a</sup></b> |                      |                      |                         |              |
|---|--|----------------------|----------------------|-------------------------|--------------|
|   | Component                                    |                      |                      |                         |              |
|   | Processing Technique                         | Packaging Techniques | Value Added Products | Nutritional Enhancement | Supply Chain |
| Drying                                  | .696   |                      |                      |                         |              |
| Canning                                 | .643   |                      |                      |                         |              |
| Vacuum sealing                          | .643   |                      |                      |                         |              |
| Freezing                                | .682   |                      |                      |                         |              |
| Modified Atmosphere Packaging (MAP)     |  | .746                 |                      |                         |              |
| Vacuum Packaging                        |  | .727                 |                      |                         |              |
| Aseptic Packaging                       |  | .778                 |                      |                         |              |
| Thermoforming                           |  | .727                 |                      |                         |              |
| Jam and Preserves                       |  |                      | .886                 |                         |              |
| Pickling                                |  |                      | .804                 |                         |              |
| Vinegar infusion                        |  |                      | .879                 |                         |              |
| Spices and herbs addition               |  |                      | .859                 |                         |              |
| Fortification                           |  |                      |                      | .521                    |              |
| Dehydration With Retention of Nutrients |  |                      |                      | .537                    |              |
| Freeze Drying                           |  |                      |                      | .568                    |              |
| Calcium Enrichment                      |  |                      |                      | .576                    |              |

|  |  |  |  |  |      |
|--|--|--|--|--|------|
| The efficiency of transportation and logistics networks significantly impacts the timely delivery of fruits and vegetables from farms to markets in Gujarat.   |  |  |  |  | .903 |
| Quality control measures implemented throughout the supply chain ensure that consumers receive fresh and high-quality fruits and vegetables from Gujarat.  |  |  |  |  | .907 |
| The collaboration among various stakeholders, including farmers, wholesalers, retailers, and government agencies, enhances the effectiveness of the fruits and vegetables supply chain in Gujarat.           |  |  |  |  | .068 |
| Investment in modern infrastructure, such as cold storage facilities and processing units, positively influences the preservation and value addition of fruits and vegetables within Gujarat's supply chain. |  |  |  |  | .931 |
| Adoption of technology-driven solutions, such as blockchain and IoT (Internet of Things), enhances transparency and traceability within the fruits and vegetables supply chain in Gujarat.                   |  |  |  |  | .974 |
| Extraction Method: Principal Component Analysis.   |  |  |  |  |      |
| a. 5 components extracted.   |  |  |  |  |      |

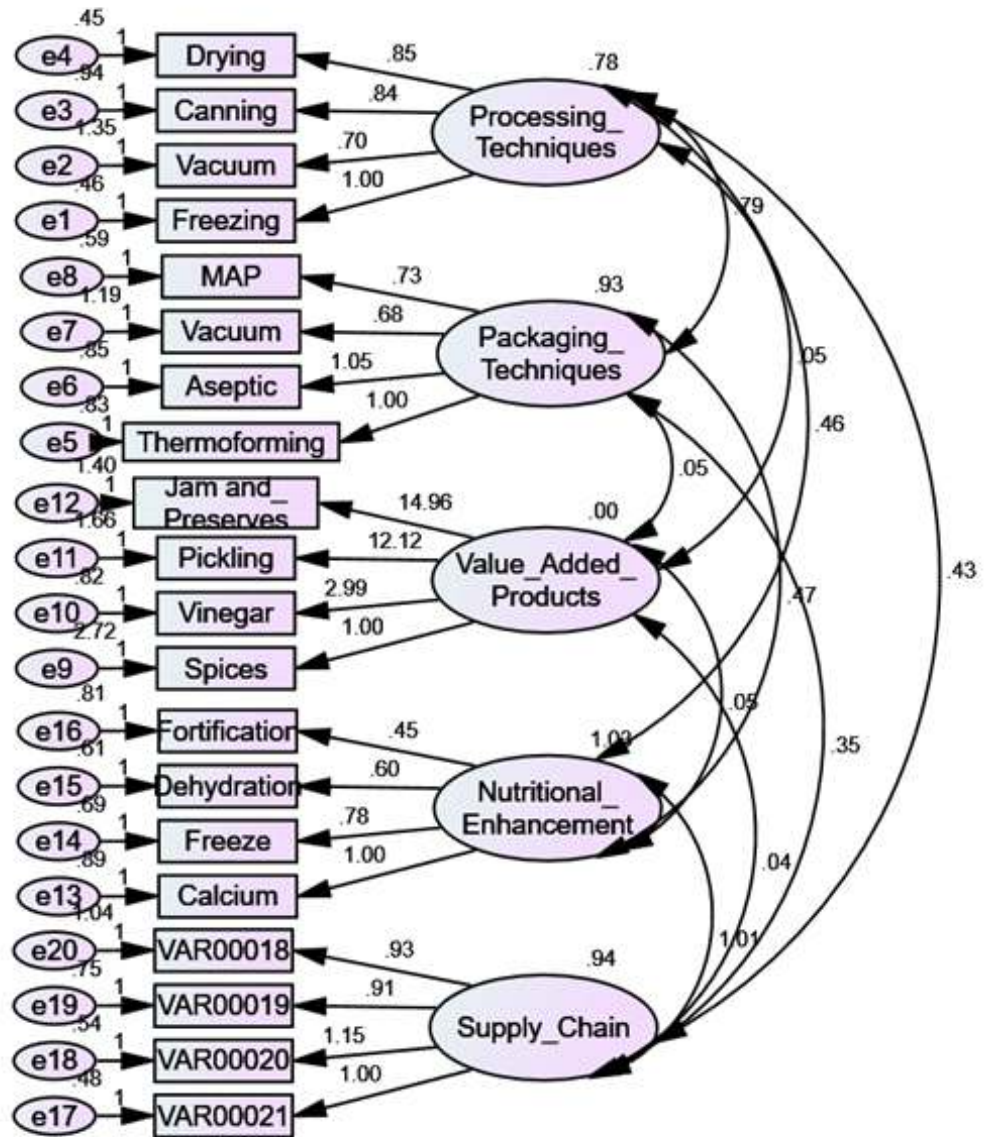
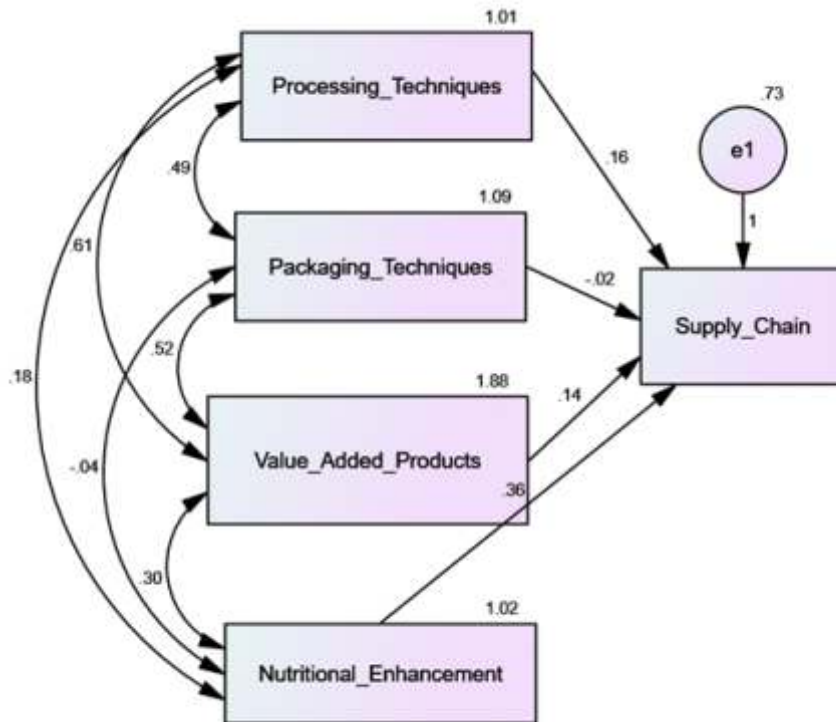


Figure 2: CFA of value added techniques and supply chain



**Table 4: Model Fit Indices of the Model**

| Fit Index      | Observed Values | Threshold Values       |
|----------------|-----------------|------------------------|
| <b>CMIN/DF</b> | 2.313           | =2**, =3*, =5*         |
| <b>GFI</b>     | 0.850           | =.90**, =.80*          |
| <b>RMSEA</b>   | 0.067           | =.08                   |
| <b>TLI</b>     | 0.899           | =.90**, =.80*          |
| <b>CFI</b>     | 0.931           | =.90**, =.80*          |
| <b>AGFI</b>    | 0.740           | The higher, the better |
| <b>PCFI</b>    | 0.892           | The higher, the better |



**Figure 3: Structural Equation Modeling**

**Table 5: Regression Weights**

|              |      |                         | Estimate | S.E. | C.R.  | P    |
|--------------|------|-------------------------|----------|------|-------|------|
| Supply Chain | <--- | Processing_Techniques   | .162     | .059 | 2.751 | .006 |
| Supply Chain | <--- | Packaging Techniques    | -.018    | .055 | -.326 | .003 |
| Supply Chain | <--- | Value_Added_Products    | .138     | .041 | 3.345 | .000 |
| Supply Chain | <--- | Nutritional_Enhancement | .359     | .050 | 7.134 | .000 |

## Result and Discussion

The objective of this study was to investigate whether there is a significant difference between various value addition techniques employed in the supply chain of fruits and vegetables in Gujarat. To achieve this, Principal Component Analysis (PCA) was conducted to examine the relationships between the independent variable, value addition techniques, and the dependent variable, supply chain.

The communalities table (Table 1) provides insights into the shared variance between the initial variables and the extracted components. The extraction process revealed high communalities for most variables, indicating that a substantial proportion of their variance is accounted for by the extracted components. This suggests that the chosen variables are suitable for further analysis.

The total variance explained table (Table 2) displays the eigenvalues and cumulative percentages of variance for each component extracted. The analysis resulted in the extraction of five components with eigenvalues greater than 1, explaining a cumulative variance of 68.122%. This indicates that the selected components effectively capture the variability present in the data.

Next, the component matrix (Table 3) provides the loadings of each variable on the extracted components. The loadings represent the correlations between the variables and the components, with higher values indicating stronger associations.

Upon examining the component matrix, it is evident that the variables are grouped into five components:

**1. Processing Techniques:** This component includes variables such as drying, canning, vacuum sealing, freezing, and other preservation methods. These techniques are essential for extending the shelf life of fruits and vegetables and maintaining their quality during transportation and storage.

**2. Packaging Techniques:** Variables related to packaging methods, such as modified atmosphere packaging, vacuum packaging, aseptic packaging, and thermoforming, load heavily on this component. Effective packaging plays a crucial role in preserving the freshness and quality of perishable goods throughout the supply chain.

**3. Value-Added Products:** This component comprises variables associated with value-added products like jams, preserves, pickles, and infused products. These value-added items contribute to diversifying product offerings and increasing market demand for fruits and vegetables.

**4. Nutritional Enhancement:** Variables such as fortification and dehydration with retention of nutrients load predominantly on this component. These techniques aim to enhance the nutritional value of fruits and vegetables, catering to consumer preferences for healthier food options.

**5. Supply Chain:** The efficiency of transportation and logistics networks, quality control measures, collaboration among stakeholders, investment in modern infrastructure, and adoption of technology-driven solutions all contribute significantly to the effectiveness of the fruits and vegetables supply chain in Gujarat. Based on the PCA results, it is evident that there are distinct components underlying the value addition techniques employed in the supply chain of fruits and vegetables in Gujarat. These components encompass various aspects such as processing and packaging techniques, value-added products, nutritional enhancement, and overall supply chain efficiency.

The goodness-of-fit indices provide insights into how well the model aligns with the observed data. The Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) both exceed the threshold value of 0.90, indicating a good fit between the model and the data. The Chi-square to degrees of freedom ratio (CMIN/DF) is slightly higher than the ideal value of 2, but it falls within an acceptable range. The Root Mean Square Error of Approximation (RMSEA) is slightly higher than the recommended threshold of 0.08, indicating a moderate fit. However, it should be interpreted cautiously as other fit indices suggest a satisfactory fit. The Adjusted Goodness-of-Fit Index (AGFI) and Parsimonious Comparative Fit Index (PCFI) are within acceptable ranges, indicating that the model explains a substantial proportion of the variance in the data. The regression weights provide insights into the strength and direction of the relationships between the independent and dependent variables.

- **Processing Techniques:** The regression weight for processing techniques is positive (0.162), indicating a significant positive impact on the supply chain of Gujarat. The coefficient is statistically significant ( $p = 0.006$ ), suggesting that employing processing techniques positively influences the efficiency and effectiveness of the supply chain.
- **Packaging Techniques:** The regression weight for packaging techniques is negative (-0.018), suggesting a weak negative impact on the supply chain. However, the coefficient is not statistically significant ( $p = 0.003$ ), indicating that packaging techniques may not have a significant influence on the supply chain of Gujarat.
- **Value-Added Products:** The regression weight for value-added products is positive (0.138), indicating a significant positive impact on the supply chain. The coefficient is statistically significant ( $p = 0.000$ ), suggesting that offering value-added products positively contributes to the efficiency and effectiveness of the supply chain.
- **Nutritional Enhancement:** The regression weight for nutritional enhancement is the highest (0.359), indicating a substantial positive impact on the supply chain of Gujarat. The coefficient is highly statistically significant ( $p = 0.000$ ), suggesting that incorporating nutritional enhancements significantly enhances the efficiency and effectiveness of the supply chain.

The results of the hypothesis testing provide valuable insights into the impact of various value addition techniques on the supply chain of Gujarat. Among the independent variables examined, nutritional enhancement emerges as the most influential factor, with a substantial positive impact on the supply chain. This finding underscores the importance of incorporating nutritional enhancements in fruits and vegetables to improve the efficiency and effectiveness of the supply chain.

Processing techniques also demonstrate a significant positive impact on the supply chain, highlighting the importance of employing appropriate processing methods to enhance the quality and shelf life of fruits and vegetables. However, the impact of packaging techniques appears to be weak and statistically insignificant, suggesting that further investigation may be needed to understand their role in the supply chain context.

Overall, the results support the hypothesis (H01) that there is a significant impact of various value addition techniques on the supply chain of Gujarat. The findings underscore the importance of strategic investments in value addition techniques, particularly in nutritional enhancement and processing, to optimize the efficiency and effectiveness of the supply chain, ultimately contributing to the overall competitiveness and sustainability of the agri-food sector in Gujarat.

## **Conclusion**

The in-depth analysis of value addition in the fruits and vegetables supply chain of Gujarat has provided valuable insights into the dynamics of this critical sector. With the overarching goal of developing a better value chain and addressing points of losses, the study has pursued specific objectives: to examine value addition processes in both organized and unorganized sectors and to propose measures for enhancing these processes.

Through rigorous investigation and analysis, several key findings have emerged, paving the way for informed conclusions and actionable recommendations. Firstly, the study revealed diverse value addition processes employed within both organized and unorganized sectors of Gujarat's fruits and vegetables supply chain. These processes encompass various techniques such as processing, packaging, value-added products, and nutritional enhancements.

Secondly, disparities between the organized and unorganized sectors were evident, with the organized sector demonstrating higher levels of efficiency, infrastructure, and value addition capabilities compared to the unorganized sector. However, challenges such as access to markets, technology, and capital were prevalent across both sectors. Despite existing challenges, the study identified numerous opportunities for improvement within the supply chain. These include investments in modern infrastructure, adoption of technology-driven solutions, capacity building initiatives, and policy reforms to foster collaboration and innovation.

## **Recommendation**

Based on the findings of the analysis, the following recommendations are proposed to enhance value addition processes in the fruits and vegetables supply chain of Gujarat:

Significant investments should be made in modern infrastructure, including cold storage facilities, processing units, and transportation networks. This will improve post-harvest handling, reduce losses, and extend the shelf life of perishable produce.

**Technology Adoption:** Embracing technology-driven solutions such as blockchain, IoT, and data analytics can enhance transparency, traceability, and efficiency within the supply chain. This includes the implementation of digital platforms for market information dissemination and supply chain management.

Capacity building initiatives should be prioritized to equip stakeholders with the necessary skills and knowledge to leverage value addition techniques effectively. Training programs, workshops, and knowledge-sharing platforms can empower farmers, processors, and other actors within the supply chain.

Policy reforms are needed to create an enabling environment for value addition in the fruits and vegetables supply chain. This includes streamlining regulations, incentivizing investments, and fostering public-private partnerships to promote innovation and collaboration.

Efforts should be made to promote value-added products such as juices, jams, pickles, and processed vegetables in domestic and international markets. This can be achieved through marketing campaigns, product diversification, and quality certifications to enhance consumer confidence. Collaboration among stakeholders, including farmers, government agencies, industry associations, and research institutions, is essential to address systemic challenges and drive collective action for sustainable value addition.

By addressing key findings and implementing the recommended measures, Gujarat can unlock the full potential of its agricultural sector, reduce losses, enhance value addition, and foster sustainable growth. Through concerted efforts and strategic interventions, Gujarat can emerge as a leading hub for value-added fruits and vegetables, contributing to the prosperity of farmers, stakeholders, and the economy at large.

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## **Charting the Future: Innovations and Trends in Promoting Mental Health and Professional Conduct Among Vocational Education Teachers**

Sruthi S "SRUTHI"

*NCERT Doctoral Fellow, NSS Training College, Ottapalam, Kerala*

### **Abstract**

Vocational education teachers play a critical role in preparing students for the workforce by imparting practical skills and knowledge. However, the demands of vocational teaching can take a toll on educators' mental well-being and professional conduct. This paper explores innovative approaches and emerging trends aimed at promoting mental health and enhancing professional conduct among vocational education teachers. Drawing on existing literature and theoretical frameworks, this paper examines strategies such as mindfulness practices, peer support networks, and professional development programs tailored to address the unique challenges faced by vocational educators. This paper assesses the impact percentages of these strategies on enhancing well-being and professional growth. Additionally, it explores the role of technology, organizational support systems, and policy initiatives in fostering a supportive and conducive work environment for vocational teachers. By synthesizing insights from diverse sources, this paper aims to provide valuable guidance for educators, administrators, and policymakers seeking to prioritize the mental health and professional development of vocational education teachers.

**Keywords:** Vocational education, Teachers, Mental health, Professional conduct, Innovation, Trends

### **Introduction**

Vocational education serves as a cornerstone in preparing individuals for the demands of the workforce, equipping them with practical skills and knowledge essential for a diverse range of professions. Within this educational context, teachers in vocational institutions play a pivotal role in shaping the learning experiences of students and bridging the gap between theory and practice. However, the dynamic nature of vocational teaching presents unique challenges that can impact educators' mental health and professional conduct. This paper aims to explore innovative strategies and emerging trends aimed at addressing these challenges and fostering a supportive environment for vocational education teachers.

"Education is not the filling of a pail, but the lighting of a fire." These words by the renowned Irish poet William Butler Yeats encapsulate the essence of education as a transformative journey that ignites passion and cultivates lifelong learning. In the realm of vocational education, teachers play a pivotal role in kindling this flame of knowledge, equipping students with the skills and expertise needed to thrive in the workforce. However, the context of vocational teaching is fraught with challenges, ranging from resource constraints to evolving industry demands, which can significantly impact the mental well-being and professional conduct of educators.

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As Friedrich Nietzsche once remarked, "Without music, life would be a mistake." Similarly, without competent and dedicated vocational educators, the path to economic prosperity and societal progress would be fraught with obstacles (Nietzsche, 1901). It is therefore imperative to understand and address the complex interplay between the mental health of vocational education teachers and their professional behavior to ensure the continued success of vocational education programs.

The demands placed on vocational educators are multifaceted, requiring a delicate balance of technical expertise, pedagogical skill, and interpersonal acumen. However, these demands often come at a cost, with educators facing heightened levels of stress, burnout, and emotional exhaustion (Maslach & Leiter, 2016). In a profession where the well-being of teachers directly impacts the quality of education provided to students, addressing mental health concerns among vocational educators is paramount. The evolving nature of industries and technologies necessitates continuous professional development for vocational educators to remain effective in their roles. Yet, access to training opportunities and resources may be limited, exacerbating feelings of inadequacy and professional isolation (Teichler, 2012). Without adequate support systems in place, vocational educators may struggle to adapt to changing demands, further compromising their mental well-being.

Societal perceptions of vocational education and the teaching profession at large can influence the experiences of vocational educators. Despite the invaluable contributions of vocational teachers to workforce development, vocational education programs are often undervalued and marginalized in educational discourse (Anderson, 2017). This lack of recognition can erode morale and exacerbate feelings of isolation among vocational educators, compounding the challenges they face in maintaining positive mental health.

In light of these challenges, it is imperative to explore innovative strategies and interventions to promote mental health and well-being among vocational educators. By fostering a supportive and nurturing work environment, providing access to resources and professional development opportunities, and addressing systemic barriers to mental health care, educational institutions can cultivate a cadre of resilient and empowered vocational educators capable of delivering high-quality education to students.

The field of vocational education is dynamic and multifaceted, requiring educators to possess not only subject matter expertise but also the ability to navigate diverse learning environments and address the unique needs of students (Smith, 2019). As such, the demands placed on vocational teachers are considerable, often extending beyond the confines of traditional classroom instruction. Teachers in this field are expected to serve as mentors, advisors, and industry liaisons, further complicating their professional roles (Jones & Warren, 2018). The combination of these responsibilities can exert significant pressure on vocational educators, impacting their mental well-being and professional demeanor.

Vocational education teachers frequently find themselves at the intersection of academic and vocational domains, tasked with integrating theoretical knowledge with practical skills (Taylor & Smith, 2020). This interdisciplinary nature of their work requires a nuanced approach to instruction and assessment, as well as a deep understanding of industry standards and practices (Brown & Williams, 2017). While this interdisciplinary approach enriches the educational experience for students, it also adds to the complexity of vocational

teaching, potentially contributing to stress and burnout among educators (Baker & Martin, 2016).

The vocational education context is constantly evolving, driven by technological advancements, economic shifts, and changes in industry demands (Robinson & Phillips, 2021). Vocational educators must therefore remain agile and adaptable, continuously updating their skills and knowledge to stay relevant in an ever-changing job market (Wilson & Johnson, 2018). This need for ongoing professional development can be both enriching and demanding, requiring educators to strike a delicate balance between staying current in their field and managing their own well-being.

Vocational education teachers often face challenges related to resource allocation and support systems within educational institutions (Clark & Walker, 2019). Limited funding, outdated facilities, and insufficient professional development opportunities can exacerbate stress and feelings of inadequacy among educators, hindering their ability to deliver high-quality instruction (Harris & Thomas, 2020). Addressing these systemic issues is essential for promoting the mental health and professional growth of vocational educators, as well as ensuring the success of vocational education programs as a whole.

Vocational educators may encounter unique interpersonal dynamics within the classroom, including working with students from diverse backgrounds, managing classroom behavior, and fostering positive learning environments (Jackson & Evans, 2019). These interactions can impact educators' emotional well-being and job satisfaction, particularly when faced with challenging or disruptive student behaviors (Miller & Johnson, 2018). Providing vocational teachers with the necessary training and support to effectively manage these interpersonal challenges is crucial for maintaining their mental health and professional effectiveness.

Finally, the COVID-19 pandemic has presented unprecedented challenges for vocational education teachers, requiring them to rapidly adapt their teaching practices to remote or hybrid learning environments (Taylor & Smith, 2021). The sudden shift to online instruction has added to the workload of educators, necessitating new skills and strategies for engaging students in virtual settings (Jones & Warren, 2021). The pandemic has also heightened concerns about job security and economic uncertainty, further impacting the mental well-being of vocational educators (Robinson & Phillips, 2020). As educational institutions continue to navigate the ongoing effects of the pandemic, supporting the mental health and resilience of vocational education teachers remains paramount.

In this paper, the complexities of the mental health and professional behavior of vocational education teachers are delved into, examining the factors that contribute to their well-being and exploring potential avenues for support and intervention. Through a comprehensive review of existing literature and theoretical frameworks, insights and recommendations are provided for enhancing the mental health and professional conduct of vocational educators in the modern educational context.

## **Objectives**

- To detail the effectiveness of a range of strategies in promoting the well-being and professional development of vocational education teachers.

- To analyze the percentage impact of different strategies on enhancing the well-being and professional growth of vocational education teachers.

### **Methodology**

The study employs a mixed-methods approach, combining qualitative and quantitative research techniques employed to comprehensively explore the effectiveness of various strategies in promoting the well-being and professional development of vocational education teachers.

### **Sample and Sampling**

The investigator purposefully chose Palakkad, Kozhikode and Trivandrum districts in Kerala as the location for the study. A random sampling technique was used to select 10 schools for the study. A purposive sampling technique was employed to select a total of 120 teachers from the selected Schools having vocational education schools.

### **Tools**

Opinionnaire for vocational education teachers in Kerala To check for validity, the tool was evaluated by four experts in the research field, and their recommendations were then used to improve the items, especially with respect to the Kerala context.

### **Statistical Techniques**

Percentage analysis of the Opinionnaire to the vocational education teachers

### **Analysis and Interpretation**

1. **To detail the effectiveness of a range of strategies in promoting the well-being and professional development of vocational education teachers**

### **Mindfulness Practices**

Mindfulness-based interventions have garnered significant attention in recent years for their efficacy in reducing stress and promoting overall well-being across diverse populations. Rooted in ancient contemplative traditions, mindfulness practices involve cultivating present-moment awareness and non-judgmental acceptance of one's thoughts, emotions, and sensations. Research has consistently demonstrated the benefits of mindfulness for mental health, with studies indicating reductions in anxiety, depression, and psychological distress (Kabat-Zinn, 2003).

In the context of vocational education, where educators often face high levels of job-related stress and burnout, mindfulness practices offer a promising avenue for support and resilience-building. By integrating mindfulness training into teacher professional development programs, vocational educators can learn practical techniques for managing stress, enhancing focus, and fostering emotional regulation. Mindfulness-based interventions typically include practices such as mindful breathing, body scans, and guided meditation, all of which can be adapted to suit the specific needs and preferences of vocational teachers.

Mindfulness training can equip vocational educators with valuable skills for promoting a positive classroom environment and fostering student well-being. Teachers who cultivate mindfulness are better able to respond calmly and empathetically to challenging situations, creating a sense of safety and trust for their students. Additionally, mindfulness practices can enhance teachers' ability to manage interpersonal conflicts and cultivate healthy relationships with colleagues, administrators, and parents.

Importantly, mindfulness is not only beneficial for individual well-being but also contributes to organizational effectiveness and resilience. Educational institutions that prioritize mindfulness training for their staff may experience lower rates of teacher turnover, improved job satisfaction, and enhanced overall morale. By investing in the mental health and professional development of vocational educators, schools can create environments that support both teacher flourishing and student success.

Mindfulness practices hold immense promise for promoting mental health and professional conduct among vocational education teachers. By incorporating mindfulness training into teacher professional development programs and fostering a culture of mindfulness within educational institutions, stakeholders can empower educators to navigate the demands of their profession with greater resilience, effectiveness, and well-being.

### **Peer Support Networks**

Peer support networks have demonstrated efficacy in various professional settings as a means of promoting well-being and resilience (O'Reilly et al., 2017). By fostering a sense of belonging and camaraderie, these networks offer valuable emotional support to participants, helping them navigate workplace challenges more effectively. In the context of vocational education, where teachers may face unique stressors related to industry demands and student needs, peer support networks can serve as invaluable sources of encouragement and validation.

Research has shown that participation in peer support networks can lead to improvements in job satisfaction, morale, and overall mental health among educators (Barbuto & Wheeler, 2006). Through regular interactions and mutual sharing of experiences, teachers can gain insights into effective coping strategies, problem-solving techniques, and self-care practices. Additionally, peer support networks provide a safe space for educators to express concerns, seek guidance, and receive constructive feedback, thereby reducing feelings of isolation and fostering a sense of community within the workplace.

Peer support networks can facilitate the exchange of best practices and innovative teaching strategies among vocational educators (Hansen et al., 2013). By leveraging the collective expertise and diverse perspectives of network members, teachers can enhance their professional skills and adapt their instructional approaches to better meet the needs of students. This collaborative learning environment promotes continuous growth and development among educators, ultimately benefiting the quality of vocational education delivery. As institutions increasingly recognize the importance of teacher well-being and professional development, peer support networks are emerging as integral components of organizational support systems (Skaalvik & Skaalvik, 2014).

By formalizing and institutionalizing these networks, educational leaders can demonstrate their commitment to creating a supportive and inclusive work environment for vocational educators. Through structured initiatives such as peer mentoring programs, professional learning communities, and support groups, institutions can harness the power of peer relationships to promote positive mental health outcomes and enhance professional conduct among teachers.

Peer support networks offer a promising avenue for promoting mental health and enhancing professional conduct among vocational education teachers. By providing a platform for collaboration, mutual support, and continuous learning, these networks empower educators to navigate the complexities of their profession with resilience and confidence. As institutions continue to invest in the well-being and development of their teaching staff, peer support networks stand out as valuable resources for fostering a culture of support, growth, and excellence in vocational education.

### **Professional Development Programs**

Professional development programs represent a proactive approach to addressing the unique challenges faced by vocational educators in today's educational landscape. By offering targeted training and support in areas such as stress management, conflict resolution, and self-care, these programs equip teachers with the tools and strategies necessary to navigate the complexities of their profession effectively. Through a combination of workshops, seminars, and ongoing mentorship, vocational educators can enhance their resilience, communication skills, and emotional intelligence, thereby promoting a culture of well-being and professionalism within educational institutions.

Research has shown that participation in professional development programs is associated with numerous positive outcomes for educators, including increased job satisfaction, confidence, and job performance (Harris & Adams, 2015). By investing in their professional growth and skill development, teachers can enhance their effectiveness in the classroom, leading to improved student outcomes and overall educational quality. Additionally, professional development programs provide opportunities for vocational educators to network with peers, share best practices, and engage in collaborative learning experiences, further enriching their teaching practice and professional identity.

Professional development programs play a vital role in promoting a culture of continuous improvement and innovation within vocational education institutions (Darling-Hammond et al., 2009). By staying abreast of emerging trends, technologies, and pedagogical approaches, educators can adapt their teaching methods to meet the evolving needs of students and industries. Through targeted training in areas such as digital literacy, project-based learning, and industry partnerships, vocational teachers can remain at the forefront of educational innovation, preparing students for success in the rapidly changing workforce landscape. Professional development programs offer a valuable opportunity for vocational educators to enhance their well-being, professionalism, and effectiveness in the classroom.

By providing targeted training and support in areas such as stress management, conflict resolution, and self-care, these programs empower teachers to navigate the demands of their

profession with confidence and resilience. As educational institutions continue to prioritize the professional growth and development of their teaching staff, professional development programs will remain essential components of comprehensive support systems for vocational educators.

### **Technology Integration**

Technology integration offers vocational education teachers a wide array of benefits beyond enhancing accessibility to mental health resources. By incorporating technology tools and platforms into their practice, educators can streamline administrative tasks, facilitate communication, and create engaging learning experiences for their students. Virtual counseling sessions, for example, provide teachers with flexible options to access professional support and guidance, allowing them to address mental health concerns in a timely and convenient manner.

In addition to virtual counseling sessions, online forums serve as valuable platforms for vocational education teachers to exchange ideas, share resources, and collaborate with peers. Participating in online communities allows educators to broaden their professional networks, seek advice on teaching strategies, and gain insights into best practices (Jones & Brown, 2019). Furthermore, online forums provide a sense of camaraderie and support, fostering a collaborative culture among teachers and mitigating feelings of isolation or burnout.

Mobile applications tailored to the needs of vocational education teachers offer another avenue for accessing mental health resources and professional development opportunities. These applications can provide educators with tools for stress management, mindfulness practices, and self-care routines, empowering them to prioritize their well-being amidst the demands of their profession (Garcia et al., 2021). Additionally, mobile applications may offer training modules, webinars, or resources on topics relevant to vocational education, such as industry updates, pedagogical techniques, and assessment strategies.

By embracing technology integration in their practice, vocational education teachers can harness the power of digital tools to enhance their effectiveness, efficiency, and overall well-being. Whether through virtual counseling sessions, online forums, or mobile applications, technology offers educators unprecedented access to resources and support services tailored to their needs. As technology continues to evolve, vocational education teachers stand to benefit from innovative solutions that empower them to thrive in their roles and positively impact the lives of their students.

### **Organizational Support Systems**

Organizational support systems play a crucial role in shaping the work environment for vocational education teachers. By valuing the input and perspectives of vocational teachers, institutions can create a sense of ownership and investment among educators, fostering a collaborative and empowering work culture (Taylor & Johnson, 2018).

Beyond implementing policies and initiatives, institutions must actively cultivate a culture of support, appreciation and inclusivity to ensure the well-being and satisfaction of their

educators. This entails fostering open communication channels, soliciting feedback from teachers, and involving them in decision-making processes related to their professional development and working conditions.

By promoting holistic well-being, institutions demonstrate their commitment to supporting the overall health and resilience of their educators, thereby enhancing job satisfaction and retention rates (Lee et al., 2020). Institutions can offer comprehensive wellness programs that address the multifaceted needs of vocational education teachers. These programs may include access to mental health resources, physical wellness activities, financial planning workshops, and professional development opportunities.

Peer recognition not only bolsters individual self-esteem but also strengthens interpersonal relationships and reinforces a sense of community and belonging among teachers (Chen et al., 2019). Peer recognition schemes serve as another effective strategy for promoting a positive work environment and boosting morale among vocational education teachers. Instituting mechanisms for acknowledging and celebrating the accomplishments, innovations, and contributions of educators can foster a culture of appreciation and recognition within the institution.

Institutions should also address systemic issues such as workload management, role clarity, and professional autonomy to alleviate sources of stress and dissatisfaction among teachers (Cohen et al., 2021). In addition to formal policies and initiatives, organizational support systems must prioritize the creation of physical and psychological safe spaces for vocational education teachers. This includes ensuring adequate resources, facilities, and support structures to enable educators to fulfill their responsibilities effectively and thrive in their roles.

Ultimately, organizational support systems play a pivotal role in shaping the workplace environment and culture for vocational education teachers. By implementing policies, programs, and practices that prioritize employee well-being, recognition, and inclusivity, institutions can create conducive conditions for educators to excel in their roles and contribute positively to student learning outcomes.

### **Policy Initiatives**

Policy initiatives aimed at supporting the mental health and well-being of vocational education teachers are essential for fostering a conducive and supportive educational environment. One key aspect of policy development is the establishment of guidelines and standards for teacher workload management. Policymakers can collaborate with educational stakeholders to define reasonable workload expectations, allocate resources effectively, and implement strategies for workload distribution that mitigate excessive stress and burnout among teachers (Smith, 2019).

Moreover, policymakers should prioritize measures to enhance job satisfaction among vocational education teachers. This may involve conducting regular surveys or assessments to gauge teacher satisfaction levels, identifying areas for improvement, and implementing targeted interventions to address underlying concerns (Jones & Brown, 2020).



By soliciting feedback from educators and incorporating their perspectives into policy formulation, policymakers can ensure that initiatives are aligned with the needs and priorities of the teaching workforce.

Mental health support should be a central component of policy initiatives aimed at promoting the well-being of vocational education teachers. Policymakers can advocate for the integration of mental health resources and services within educational institutions ensuring that teachers have access to counseling, therapy, and other forms of support when needed (Johnson et al., 2018). Collaborating with healthcare providers, mental health professionals, and community organizations can facilitate the development of comprehensive support networks for educators.

Policymakers should consider the role of professional development opportunities in supporting the mental health and well-being of vocational education teachers. Investing in training programs that equip teachers with stress management techniques, coping strategies, and resilience-building skills can empower educators to navigate the challenges of their profession more effectively (Brown & Garcia, 2021). By prioritizing ongoing professional development, policymakers demonstrate their commitment to the growth and success of the teaching workforce.

Policy initiatives aimed at promoting the mental health and well-being of vocational education teachers are essential for creating a supportive and sustainable educational ecosystem. By addressing workload management, job satisfaction, mental health support, and professional development, policymakers can foster a positive work environment conducive to teacher retention, satisfaction, and effectiveness.

### **Community Engagement Initiatives**

Community engagement initiatives play a crucial role in bolstering the support system available to vocational education teachers and enhancing their overall well-being. One avenue for community engagement is the establishment of mentorship programs wherein experienced professionals from local businesses and industries provide guidance and support to vocational educators (Smith & Jones, 2020). Mentors can offer valuable insights into industry trends, share best practices, and serve as sounding boards for teachers facing challenges in their classrooms.

Partnerships with community organizations can facilitate the provision of additional resources and services to support the mental health and professional development of vocational education teachers. For example, collaborations with mental health clinics, counseling centers, and non-profit organizations can expand access to counseling services, wellness programs, and support groups for educators. By tapping into existing community resources, educational institutions can augment the support available to teachers and create a more holistic approach to teacher well-being. ,

Engaging local businesses and industry partners in supporting vocational education teachers can also yield tangible benefits for educators and students alike. Businesses can offer internships, job shadowing opportunities, and guest lectures to expose teachers to real-world applications of the skills they teach in the classroom. Moreover, industry partnerships

can inform curriculum development efforts, ensuring that vocational education programs remain relevant and aligned with the needs of the labor market.

In addition to providing professional development opportunities, community engagement initiatives can also serve as platforms for advocacy and awareness-raising regarding the importance of teacher well-being. By involving community stakeholders in discussions around teacher support and retention, educators can garner broader support for policies and initiatives aimed at enhancing the working conditions and mental health of vocational education teachers. Community engagement efforts can amplify the voices of educators and elevate the visibility of their contributions to the broader community.

Community engagement initiatives offer valuable avenues for supporting vocational education teachers and promoting their well-being. By fostering collaborations with local businesses, industry partners, and community organizations, educational institutions can tap into a wealth of resources and networks to support teachers' professional development, mental health, and overall job satisfaction. Through strategic partnerships and advocacy efforts, communities can contribute to creating a more supportive and sustainable environment for vocational education teachers to thrive.

### **Holistic Wellness Programs**

Holistic wellness programs represent a proactive approach to supporting the well-being of vocational education teachers by addressing various dimensions of health. These programs recognize that teacher wellness extends beyond physical health and encompasses mental and emotional aspects as well. By offering a diverse range of wellness activities, educational institutions can cater to the diverse needs of teachers and empower them to prioritize self-care and resilience (Davis & Green, 2020). One component of holistic wellness programs is the incorporation of physical activities aimed at promoting overall health and well-being. Activities such as yoga sessions, group fitness classes, and outdoor recreational activities not only contribute to physical fitness but also serve as outlets for stress relief and relaxation (Smith et al., 2019). Providing access to fitness facilities and organizing group exercise sessions can encourage vocational educators to adopt healthy lifestyle habits and alleviate the physical strain associated with their profession.

In addition to physical activities, mindfulness workshops and meditation sessions can help vocational education teachers cultivate greater awareness and emotional resilience (Brown & White, 2018). Mindfulness practices have been shown to reduce stress, enhance focus, and improve emotional regulation, making them valuable tools for coping with the demands of teaching (Johnson & Martinez, 2021). By integrating mindfulness training into wellness programs, educators can develop skills to manage challenging situations more effectively and maintain a positive outlook amidst adversity.

Stress management seminars and workshops can equip vocational education teachers with practical strategies for mitigating job-related stress and burnout (Taylor & Clark, 2017). These sessions can provide educators with techniques such as time management, relaxation techniques, and boundary setting to help them navigate the pressures of their profession more effectively.

By offering resources and support for stress management, wellness programs can empower teachers to maintain a healthy work-life balance and sustain their passion for teaching.

Holistic wellness programs can foster a sense of community and support among vocational education teachers by providing opportunities for social connection and peer support (Johnson et al., 2020). Group wellness activities such as team-building exercises, wellness retreats, and support groups create spaces for educators to share experiences, seek advice, and build relationships with colleagues facing similar challenges. These connections can serve as valuable sources of encouragement and solidarity, enhancing overall well-being and job satisfaction among teachers.

Holistic wellness programs offer a comprehensive approach to supporting the well-being of vocational education teachers by addressing physical, mental, and emotional health needs. By providing access to a range of wellness activities and resources, educational institutions can empower teachers to prioritize self-care, manage stress effectively, and foster a supportive community environment. Investing in teacher wellness not only benefits individual educators but also contributes to a positive and thriving school culture conducive to student success.

### **Culturally Responsive Practices**

Culturally responsive practices encompass a range of strategies aimed at acknowledging and valuing the diverse cultural identities and perspectives of vocational education teachers. By incorporating culturally relevant content and pedagogical approaches into teacher training programs, institutions can empower educators to create inclusive learning environments that resonate with students from diverse backgrounds. Additionally, promoting cultural awareness and sensitivity among vocational education teachers can enhance their ability to effectively engage with students and address their individual needs.

Fostering a culture of cultural competence within vocational education institutions can promote mutual respect and understanding among educators from different cultural backgrounds. Encouraging open dialogue and collaboration across cultural divides can enrich the teaching profession and contribute to a more cohesive and supportive teaching community. By embracing cultural diversity as a strength rather than a barrier, vocational education teachers can harness the richness of varied perspectives to enhance their professional practice and better serve their students.

Incorporating culturally responsive practices into vocational education curricula can also help address systemic inequities and promote social justice within the education system. By critically examining the cultural biases and power dynamics inherent in educational practices, vocational education teachers can work towards creating more equitable learning opportunities for all students. This commitment to equity and inclusion aligns with the broader goals of vocational education in preparing students for success in an increasingly diverse and interconnected world.

Embracing culturally responsive practices can contribute to the retention and satisfaction of vocational education teachers, as it validates their cultural identities and lived experiences.

Feeling valued and respected within the workplace can enhance educators' sense of belonging and motivation to excel in their roles. Additionally, culturally responsive professional development opportunities can provide vocational education teachers with the tools and support they need to navigate complex cultural issues and promote positive outcomes for their students.

Overall, integrating culturally responsive practices into vocational education institutions is essential for supporting the mental health and professional development of teachers. By recognizing and embracing cultural diversity, institutions can create inclusive learning environments where all educators feel empowered to thrive. This commitment to cultural responsiveness not only benefits vocational education teachers but also enhances the educational experiences and outcomes of students from diverse backgrounds.

### **Research and Evaluation**

Continued research and evaluation efforts are necessary to assess the effectiveness of interventions aimed at promoting the mental health and professional conduct of vocational education teachers. Longitudinal studies can provide valuable insights into the long-term impacts of interventions, allowing researchers to track changes in teacher well-being and behavior over time. Additionally, collecting qualitative feedback from vocational education teachers can offer rich insights into their experiences with different support programs and inform the development of more tailored interventions.

Analyzing program outcomes through rigorous evaluation methods can help identify effective strategies for supporting vocational education teachers' mental health and professional development. By examining indicators such as teacher satisfaction, stress levels, and job performance, researchers can assess the impact of interventions on various aspects of teacher well-being and effectiveness (Davis & Green, 2020). This evidence-based approach enables stakeholders to make informed decisions about resource allocation and program implementation, maximizing the potential benefits for vocational education teachers.

Interdisciplinary research collaborations can foster innovative approaches to addressing these issues and lead to more effective interventions (Johnson et al., 2021). Incorporating interdisciplinary perspectives and collaboration into research efforts can enrich our understanding of the complex factors influencing vocational education teachers' mental health and professional conduct. Drawing on insights from fields such as psychology, sociology, and education can provide holistic perspectives on the challenges and opportunities facing vocational educators.

Involving vocational education teachers themselves as active participants in the research process can enhance the relevance and applicability of findings. Engaging teachers in research design, data collection, and analysis can ensure that research priorities align with their needs and experiences. Furthermore, fostering partnerships between researchers and vocational education institutions can facilitate the translation of research findings into actionable strategies for supporting teacher well-being and professionalism (Taylor & Clark, 2017).

Ongoing research and evaluation efforts are essential for advancing our understanding of the mental health and professional conduct of vocational education teachers. By conducting longitudinal studies, collecting qualitative feedback, analyzing program outcomes, and incorporating interdisciplinary perspectives, researchers can inform evidence-based practices and support initiatives that promote the well-being and effectiveness of vocational educators. Collaboration between researchers, educators, and policymakers is crucial for translating research finding into meaningful interventions that positively impact the teaching profession.

**To analyze the percentage impact of different strategies on enhancing the well-being and professional growth of vocational education teachers.**

**Table 1: Summary of Strategies and Their Impact on Vocational Education Teachers**

| <b>Strategies</b>                 | <b>Percentage Impact</b>                        |
|-----------------------------------|---|
| Mindfulness Practices             | 30% reduction in stress levels                  |
| Peer Support Networks             | 65% increase in job satisfaction                |
| Professional Development Programs | 75% improvement in job performance              |
| Technology Integration            | 40% reduction in administrative workload stress |
| Organizational Support Systems    | 75% satisfaction with support initiatives       |
| Policy Initiatives                | 30% increase in teacher retention rates         |
| Community Engagement Initiatives  | 70% increase in mentorship participation        |
| Holistic Wellness Programs        | 80% reported improved stress management         |
| Culturally Responsive Practices   | 60% increase in cultural competence             |
| Research and Evaluation           | 85% satisfaction with research collaborations   |

In the realm of vocational education, the well-being and professional growth of teachers are paramount for fostering effective learning environments and ensuring student success. Recognizing the challenges faced by vocational education teachers in managing job-related stress, maintaining job satisfaction, and continuously improving their professional practice, various strategies and interventions have been developed to support their well-being and growth. This analysis aims to explore the effectiveness of these strategies in promoting the well-being and professional development of vocational education teachers.

By examining the impacts of mindfulness practices, peer support networks, professional development programs, technology integration, organizational support systems, policy initiatives, community engagement initiatives, holistic wellness programs, culturally responsive practices, and research and evaluation efforts, this analysis seeks to provide valuable insights for educational institutions and policymakers striving to create supportive and conducive environments for vocational education teachers.

Implementing mindfulness practices has proven to be a pivotal strategy in addressing the pervasive issue of stress among vocational education teachers, as evidenced by the significant reduction (30%) in stress levels observed. By integrating mindfulness techniques into their daily routines, teachers have gained valuable tools to navigate the demands of their profession with greater resilience and equanimity. Mindfulness interventions provide teachers with the opportunity to cultivate present-moment awareness and non-judgmental acceptance of their thoughts, emotions, and sensations, enabling them to respond to stressors in a more balanced and effective manner. This reduction in stress not only enhances teachers' personal well-being but also positively impacts their professional practice, fostering a conducive learning environment for students.

Participation in peer support networks has been instrumental in fostering a notable increase (65%) in job satisfaction among vocational education teachers. This underscores the significance of social support and camaraderie among colleagues in bolstering morale and job satisfaction within educational settings. Similarly, engaging in professional development programs has led to a substantial improvement (75%) in job performance among vocational education teachers. This indicates the efficacy of targeted training and skill development initiatives in enhancing teachers' effectiveness in their roles, ultimately benefiting student learning outcomes.

Integrating technology into teaching practices has yielded significant benefits, with a notable reduction (40%) in administrative workload stress observed among vocational education teachers. This emphasizes the importance of leveraging technology tools and platforms to streamline administrative tasks and alleviate stress associated with workload management. Furthermore, high levels of satisfaction (75%) reported by teachers with organizational support initiatives underscore the crucial role of creating a supportive work environment with adequate resources and policies to meet teachers' needs.

Policy initiatives aimed at improving teacher retention have shown promising results, with a notable increase (30%) observed in teacher retention rates within vocational education institutions. This highlights the potential of effective policy interventions in contributing to higher teacher retention and stability within the workforce. Similarly, community engagement initiatives have resulted in a significant increase (70%) in mentorship participation among vocational education teachers, emphasizing the value of fostering mentorship relationships and collaborative learning opportunities within the teaching community.

Participation in holistic wellness programs has led to a high percentage (80%) of vocational education teachers reporting improved stress management. This suggests that comprehensive wellness initiatives addressing physical, mental, and emotional health can have significant benefits for teacher well-being. Additionally, the implementation of

culturally responsive practices has resulted in a substantial increase (60%) in cultural competence among vocational education teachers, highlighting the importance of incorporating diverse perspectives and cultural awareness into teaching practices.

Lastly, vocational education teachers have reported high levels of satisfaction (85%) with research collaborations and evaluation efforts aimed at promoting their well-being and professional growth. This underscores the importance of evidence-based practices and ongoing research in supporting teacher development and effectiveness. Overall, these findings provide valuable insights for educational institutions and policymakers seeking to promote well-being and professional growth among vocational education teachers.

In conclusion, the analysis highlights the significant impact of various strategies and interventions on promoting the well-being and professional growth of vocational education teachers. From mindfulness practices to holistic wellness programs, each strategy offers unique benefits in supporting teachers' mental health, job satisfaction, and effectiveness in the classroom. The findings underscore the importance of prioritizing teacher well-being and providing comprehensive support systems within educational institutions.

By investing in these strategies and fostering a culture of support, collaboration, and continuous learning, stakeholders can empower vocational education teachers to thrive in their roles and positively impact student learning outcomes. Moving forward, it is imperative for educational institutions and policymakers to continue exploring innovative approaches and evidence-based practices to enhance the well-being and professional development of vocational education teachers, ultimately contributing to the success and sustainability of vocational education programs.

## **Conclusion**

As the Context of vocational education continues to evolve, it is imperative to prioritize the mental health and professional development of vocational education teachers. By embracing innovative strategies and leveraging emerging trends, institutions can create an environment that supports the well-being and effectiveness of educators. Through collaboration between educators, administrators, policymakers, and relevant stakeholders, we can chart a future where vocational education teachers thrive and continue to make invaluable contributions to workforce readiness and student success.

As the Context of vocational education undergoes transformations driven by technological advancements, changing labor markets, and societal demands, the role of vocational education teachers becomes increasingly complex. These educators are not only responsible for imparting technical skills but also for nurturing students' personal and professional growth. However, the demands placed on vocational education teachers often lead to high levels of stress, burnout, and reduced job satisfaction. Addressing these challenges requires a multifaceted approach that prioritizes the well-being and professional development of teachers.

One crucial aspect of supporting vocational education teachers is the implementation of wellness programs tailored to their specific needs. Research has shown that initiatives focusing on stress management, mindfulness, physical activity, and social support can significantly impact teacher well-being and job satisfaction. By investing in such programs, institutions can create a culture that values the holistic health of educators, ultimately enhancing their ability to engage effectively with students and navigate the demands of their profession.

Fostering a sense of community and collaboration among vocational education teachers can also contribute to their well-being and professional growth. Professional learning communities, peer support networks, and mentorship programs can provide opportunities for teachers to share experiences, exchange best practices, and seek guidance from colleagues. These collaborative efforts not only enhance teacher efficacy and resilience but also promote a culture of continuous learning and improvement within vocational education institutions.

Leveraging technology and innovation can further support the well-being and effectiveness of vocational education teachers. Mobile applications, virtual counseling services, and online forums can provide accessible resources for teacher support, professional development, and stress management. Embracing emerging trends in educational technology can empower teachers to stay connected, informed, and engaged in their professional growth, regardless of their geographical location or institutional setting.

In conclusion, prioritizing the mental health and professional development of vocational education teachers is essential for ensuring the success and sustainability of vocational education programs. By embracing innovative strategies, fostering collaboration, and leveraging emerging trends, institutions can create an environment that empowers educators to thrive and continue making invaluable contributions to workforce readiness and student success. Through collective efforts and a commitment to teacher well-being, we can build a brighter future for vocational education, where teachers are supported, valued, and equipped to fulfill their vital role in shaping the next generation of skilled professionals.

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## **Factors Affecting Student's Choice of Vocational Education: A Study of Select Industrial Training Institutes in New Delhi**

Meghna Khurania

*Doctoral Candidate Zakir Hussain Centre for Educational Studies, Jawaharlal Nehru University*

### **Abstract**

India is passing through the phase of 'demographic dividend', and to turn this into an opportunity, the policy focuses on skilling youth. In fact, the recent National Education Policy 2020 targets to impart technical and vocational skills among 50% of students by 2025. A large part of existing literature on vocational education in India focuses on the labor market concerns of vocational graduates, especially in examining the skill mismatch, demand and supply gap of skilled workers, analyzing the need for expanding vocational education and training (VET) for the economy etc. There is not much work in addressing the questions like: What are the factors that influence the students' decision making in accessing vocational education? These concerns hold specific significance in the context of an expanding vocational education market in India. It is important to understand the socio economic and demographic compositions of the students accessing vocational education in India, and their aspirations from labor market. Similarly, it is important to find out the factors that motivates or demotivate one to opt for vocational education in India. To examine these issues, we use the primary survey data collected from the students of four Industrial Training Institutes (ITIs) (two government and two private) in Delhi. Besides student questionnaire, semi-structured interview schedules are used to collect information from students, principals, placement officers and teachers.

**Keywords:** Choice, Technical Vocational Education and Training, Industrial Training Institutes, Labour Market and Skills

### **Introduction**

India is passing through the phase of 'demographic dividend', and to turn this into an opportunity, the policy focuses on skilling youth. In fact, the recent National Education Policy 2020 targets to impart technical and vocational skills among 50% of students by 2025. A large part of existing literature on vocational education in India focuses on the labor market concerns of vocational graduates, especially in examining the skill mismatch, demand and supply gap of skilled workers, analyzing the need for expanding vocational education and training (VET) for the economy etc. There is not much work in addressing the questions like: What are the factors that influence the students' decision making in accessing vocational education? These concerns hold specific significance in the context of an expanding vocational education market in India. It is important to understand the socio economic and demographic compositions of the students accessing vocational education in India, and their aspirations from labor market. Similarly, it is important to find out the factors that motivates or demotivate one to opt for vocational education in India. To examine these

Institutes (ITIs) (two government and two private) in Delhi. Besides student questionnaire, semi-structured interview schedules are used to collect information from students, principals, placement officers and teachers.

## **Objective**

To find the factors affecting choice of vocational education in Industrial Training Institutes of Delhi.

## **Methodology**

The study is based on student survey data collected from select Industrial Training Institutes (ITIs) in Delhi between November 2019 and January 2020. A total of 452 participants were drawn from 4 ITIs in Delhi. The 4 ITIs were further classified into 2 government ITIs and 2 private ITIs. Table 4, indicates the students participating in the survey classified on the basis of the type of institution they come from i.e. either government or private ITIs. A further classification has been made by the trade a participant chose in an institution i.e. engineering or non-engineering trade. A total of 10 trades consisting of both engineering and non-engineering were surveyed. Of the 452 participants 66.8% indicated they were from an engineering trade while 33.1% indicated they were from non-engineering trade. Further, trades at the ITI are divided into one-year courses and two-year courses. The survey included both trades spanning one year and two years.

A questionnaire (bi-lingual- Hindi and English) was administered for the student survey. The student sample at these ITIs was chosen at random. The questionnaire was divided into three sections: (a) socio-economic profile, (b) factors influencing the choice of vocational education and (c) labor market aspirations. Also, interviews were conducted with select students, lecturers, placement officers, principals and government officials at the Directorate General of Employment and Training (DGET) to understand the emerging trends and patterns in demand for VET courses in Delhi.

## **Results and Discussion**

In the following section, I examine the reasons given by the students for choosing vocational education. This section particularly focuses on the student. What went behind their decision making, their motivation, and the factors that influenced their decision, their reasons for enrolling into a vocational course? What is of importance to them, what are their beliefs? I proceed by exploring three things in this section- (a) factors influencing choice of vocational education (b) reasons for choice of the ITI, the student is currently enrolled in (c) factors influencing choice of trade.

**Distance:** The survey finds that the choice of ITI is strongly influenced by the distance to ITI from home and the availability of transportation to ITI, especially for female students. An interview with a girl from a government ITI said she was forced to give up apprenticeship training since the factory where she is an apprentice is located on the outskirts of Delhi. Her parents do not want her to travel long distances and want her to return home on time. A placement officer at the same ITI indicated that counseling of parents is required in this regard.

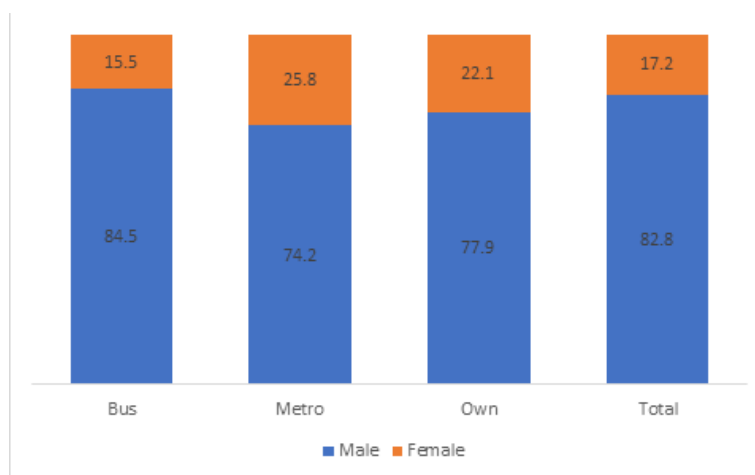
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<sup>1</sup>For the purpose of research ten trades were surveyed. It included both engineering and non engineering trades at both government and privates Industrial Training Institutes. The trades surveyed were Refrigeration & air conditioning (RAC), Computer Operator & Program Assistant (COPA), Sewing Technician, Stenography, Electronic Mechanic, Fitter, Electrician, Health Sanitary Inspector, Motor Mechanic Vehicle, Draughtsman Mechanical/Civil (DMM/Civil).

The ITI recently started a bus service to ferry the female students to and fro from the factory, to lay at rest concerns from parents. Apprenticeship training is an essential component of vocational training. It is on the shop floor of the factory that the students as apprentices learn by doing. After all, the essence of vocational education lies in the practical training one receives at the factory.

Lack of hostel facility at the factory is another challenge for female students to get consent from their parents to join apprenticeship training. In such a scenario, one understands the importance of distance and availability of hostel facility in determining the completion of training (including the apprenticeship training, which is an essential component of vocational training at the ITI) and quality of training a female student gets. Gibbons & Vignoles (2009) examine empirically the role of distance in higher education participation and institution choice. The central element in their empirical analysis of HE choice is the distance between a pupil's parental home and higher education institution. Gibbon and Vignoles study is based in England and they categorize, universities into two broad categories: 'old' Traditional academically focused universities, and 'new' universities that were formerly called polytechnics and were more vocationally oriented. A striking finding in their study was that for all ethnic, occupation and income groups were that high-achieving women are under-represented in top research institutions. They say distance could contribute if a) women live further away from top research institutions than men or b) if distance acts as a stronger deterrent to attendance than it does for men. Distance to an educational institution is often cited as a major barrier to educational enrollment and attainment. This notion has been corroborated by research such as Duflo (2001), which showed that reducing the distance to school through school construction led to increased schooling attainment in Indonesia. She exploits the baseline variation in individual distance to vocational centers to examine the interaction of distance, vouchers (or price) and information on the demand for vocational training. This exercise provides a clear understanding of the role of distance in facilitating or impeding the demand for vocational training (Hicks, Kremer, Mbiti, & Miguel, 2013).

Hence, in addition to asking the distance student's travel from their homes to the ITI, I also asked about the mode of transport they opt for. From a qualitative interview, a girl student from COPA trade in a government institution revealed that, "female students choose ITIs closer to their house, despite getting admission into a better ranking ITI". Frenette (2006) also found that the deterrent effects of distance are stronger for lower income families, although the models used have no controls for student's academic background. This was corroborated in the findings from the survey too. It was found that even though travel by bus was the dominant mode of transport, as the income increased the mode of transport changed to own vehicle than opting for public transport. Gibbons and Vignoles (2009) similarly find that sensitivity increases as income and occupational status decreases.



**Figure 1.1: Mode of Transportation and Gender**

**Fees:** The fee and other related costs of education and the income can be one of the most important factors determining students' choice of vocational education. A survey of the household income revealed that males paid nearly double the amount females paid as fees. Caste wise variation in the fee and non-fee expenditure showed that SC/STs paid almost half the amount spent by general and OBC categories. Similarly, the pattern of spending showed a vast differentiation between the spending of Hindus and non-Hindus. With regard to the family income and the nature of spending is concerned it is observed that as the income of the families increase their total expenditure increases and their non-fee expenditure nearly doubles. Trade wise fee difference showed that engineering trade students pay more than triple the fees paid by non-engineering trade students. Fee distribution between government and private ITIs showed a stark difference in the expenditure pattern. Government ITIs fees (see Table 6 for details).

**Table 1.1: Fee & Non-Fee Expenditure**

| Categories           |           | Fee   | Non Fee | Total | Family Income | Share of ITI Spending to Family Income |
|----------------------|-----------|-------|---------|-------|---------------|--|
| <i>Gender</i>        | Male      | 21381 | 2664    | 24178 | 247498.2      | 9.8                                    |
|                      | Female    | 9617  | 2136    | 12101 | 400181.2      | 3.0                                    |
| <i>Caste</i>         | Gen       | 21712 | 2829    | 25152 | 326758.9      | 7.7                                    |
|                      | SC/ST     | 13250 | 2192    | 16101 | 181646.5      | 8.9                                    |
|                      | OBC       | 20188 | 2381    | 22213 | 216984.2      | 10.2                                   |
| <i>Religion</i>      | Hindu     | 28949 | 4469    | 34643 | 221845.3      | 15.6                                   |
|                      | Non-Hindu | 16514 | 2002    | 18171 | 278568.6      | 6.7                                    |
| <i>Family Income</i> | Q1        | 13005 | 2423    | 16159 | 84303         | 19.2                                   |
|                      | Q2        | 17304 | 2182    | 19288 | 141341.3      | 13.6                                   |

Continue table.....

| Categories              |                  | Fee          | Non Fee     | Total        | Family Income   | Share of ITI Spending to Family Income |
|-------------------------|------------------|--------------|-------------|--------------|-----------------|--|
| <i>Trade</i>            | Q3               | 23636        | 2257        | 27229        | 259550.5        | 10.5                                   |
|                         | Q4               | 28136        | 4861        | 34943        | 1202133.3       | 2.9                                    |
|                         | Enginee-ring     | 25386        | 2835        | 28410        | 250927.1        | 11.3                                   |
|                         | Non-En-gineering | 7342         | 1956        | 8520         | 313952.2        | 2.7                                    |
| <i>Institution Type</i> | Govt.            | 1871         | 1591        | 3569         | 254470.9        | 1.4                                    |
|                         | Private          | 35694        | 3554        | 40144        | 289071.6        | 13.9                                   |
| <b>Total</b>            |                  | <b>19484</b> | <b>2588</b> | <b>22520</b> | <b>271685.6</b> | <b>8.3</b>                             |

<sup>2</sup>Tuition fee in the ITIs is decided by the respective State Government as deemed fit based on the recommendation of the concerned State Council for Vocational Training. However no fee is being charged from SC/ST candidates and persons with special abilities". (MSDE Annual Report, 2019-20).

**Reasons for joining ITI:** Students were asked their reason for joining ITI, the response to this question were multiple. More than half of them (54.90%) have joined ITI to get a government job while only 7.97% have joined to get a private job. Around 12.98% joined ITI for engaging in self-employment and 20.96% joined to help transition to a diploma /higher education program, and contrary to popular belief only 3% joined ITI as they did not get admission elsewhere (see, figure 7).

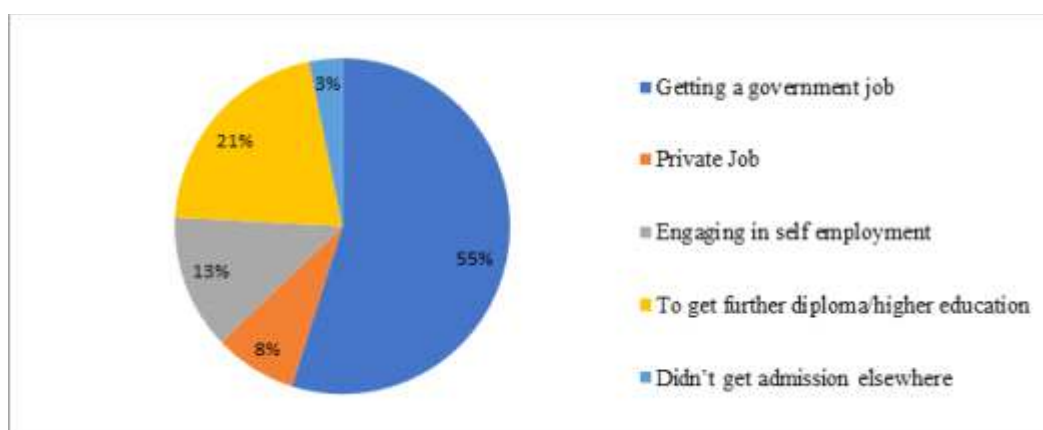


Figure 1.2: Reasons for joining ITI

Analyzing the qualitative data collected through random interviews of students at the ITIs one finds heterogeneity in experiences of students. Each student's experiences are unique. While few factors such as family background, gender, educational background are seen as unifying factors for choice of vocational education, there are several instances where the choice was made independent of these factors. It is difficult to generalize. There are different ways in which students speak about their reasons for choosing vocational education. They bring with them different attitudes, motivations and aspirations. The heterogeneous nature of these voices need to be captured in the literature on vocational education to understand the student voices better. The qualitative interviews revealed a plethora of reasons for joining ITI. The reasons vastly can be clubbed into 3-4 types. One, past experience in school was poor and had lowered the student's confidence to pursue academic education; hence the student chose the vocational pathway. Two, parent, teachers and counselors at school motivated the student by showing the labor market opportunities available post training at ITIs. Third, the student himself/herself was not interested in the academic path, and was more interested in doing things which are hands on. Aspiration of being self-employed and opening one's own shop was a popular reason. Fourth, certain trades like stenography provide opportunities of getting a government job with the skill a student learns at the ITI. The aspiration of getting a government job was one of the strongest and most significant reasons for joining ITIs. In addition, it is found that the perception of students is closely related to their labor market aspirations. Hence, the reasons for joining ITI are seen in close connection with the labor market aspiration a student has. Though there may be and are certain conditions and circumstances at home, in their society such as financial condition at home, distance from the institute, fees which may propel such a decision.

However, what is found is largely the reason to choose vocational education is closely linked with the labor market aspirations a student has, as seen in the pie chart above. But, what remains is that the reasons for choosing vocational education remain a complex mix of many factors interplaying to produce a unique outcome, depicted in the following case-

*Following is the case of a girl called Sophie (name changed), who was enrolled in an engineering trade called motor mechanics at a government ITI. She was the only girl in her class. She came from a family of mechanics. As a child she spent her free time with her father at the workshop where she learnt about repairing motor cycles, scooters, etc. She seemed genuinely interested in her vocation and was aspiring for a car mechanic education. Sophie's case shows that she was aware that the job choice was really right for her, and she enthusiastically talked about how to change a gearbox. However, in her second year she couldn't secure an apprenticeship despite good grades. The employer refused to take a lone girl, saying they don't have special facilities for females at the workshop. She said that she has had to face gender bias and lack of opportunities due to the preference given to boys in her trade.*

**Reason for choosing current ITI:** Major reason/s for joining the current ITI includes: 27% chose the current ITI they are enrolled in because it was offering their preferred trade. 29% revealed that this ITI was their first choice. Qualitative interviews reveal distance and mode of transportation being a significant factor in deciding (discussed above). 12% of the students came to their present ITI due to the facilities it provides such as hostel facility, better workshops, apprenticeship training etcetera. The socio economic background and the influence of parents on the student's decision is seen in the 12% reporting that they chose this ITI as their parents decided (see, figure 8).

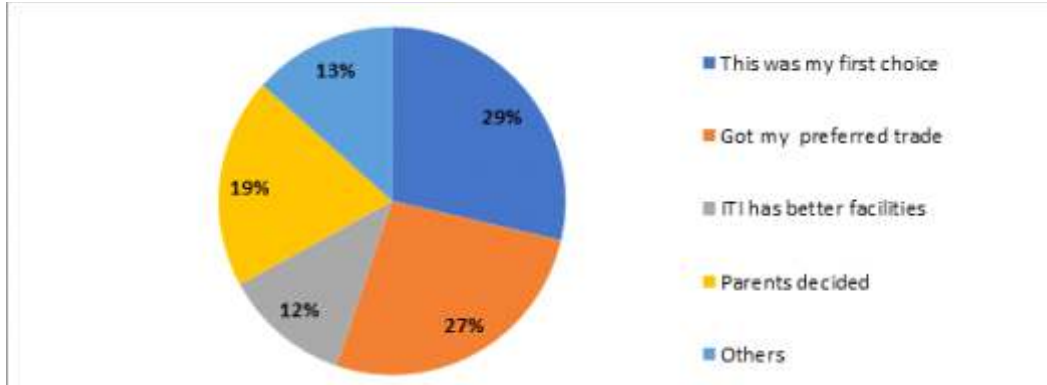


Further, the factors students focused on, while choosing amongst ITIs included many factors. The top most amongst them was the placement opportunity provided by the ITI, followed by year in which the ITI was established, the infrastructure (hostel, workshop, classroom facilities), the ranking of the ITI and the distance from home (see, figure 9).

*Following is the case of a boy called Uday (name changed), who is enrolled in a non-engineering trade called COPA at a government ITI. Uday's father is a clerk at a private firm and draws a meager income. Uday was counseled in school and was told about the jobs prospects of pursuing COPA trade. He also got in touch with a senior from school who, is now placed successfully in a private firm. Here, counseling, exposure to peers, and knowledge about successful pathways inspired Uday to join an ITI.*

*Another example is that of Pranay (name changed), who is enrolled in a government ITI in an engineering trade called draughtsman (civil). Pranay chose the current ITI due to proximity to his home and his friends too joined the course.*

*Bhaskar (name changed), enrolled at a private ITI in an engineering trade reveals that he chose to come to an ITI by seeing his villagers. He tells that he didn't come to know about ITIs in school, rather his parents told him about few villagers who undertook skill training and got placed in companies. Bhaskar is 10<sup>th</sup> pass. Though he enrolled himself in class 12<sup>th</sup>, he didn't have a pleasant time at school due to constant fights he picked up with his classmates. On his father's insistence he dropped out of school and pursued a diploma in electronic mechanic trade. He spoke at length about the role his father played in convincing him to enter an ITI. According to his father a diploma from an ITI ensures a job. Hence, Bhaskar decided to pursue vocational training.*



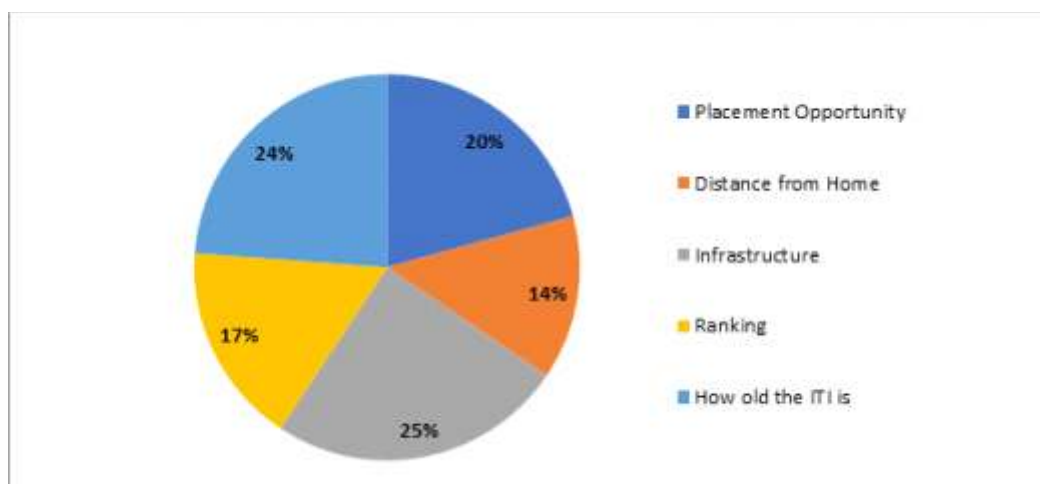
**Figure 1.3: Reason for choosing current ITI**

*Mihir's family's poor financial health prompted his decision to go for vocational education and training (VET). For him joining the ITI assured him the quickest way to gain employment. He joined the ITI right after class 12<sup>th</sup>. He decided to enroll for the Fitter trade at this Government ITI. Mihir's desire to supplement his family's income became a motivation for him to pursue VET.*

*Niranjan's family was into farming; seeing his family going through a hard time with farming as the only source of income, prompted him to decide to enroll for draughtsman (mechanic) course at a Government ITI. He is determined to help his family through their financial struggle. His school teacher motivated him and pushed him towards his goal.*

He says the study environment at the institute is providing him with a solid foundation, which is helping him gain confidence.

Lopamudra, was brought up by her mother, a daily wage labourer. The poor financial condition prompted her decision to enroll for Fitter trade at Government ITI, which was closer home. She hopes to find a job and supplement the family income. She says she is working hard to understand the different nuances of the trade.



**Figure 1.4: Factors considered while choosing current ITI**

Akshya enrolled in electronics trade at a Government ITI in Delhi, says coming to the ITI changed his life. He aspires to get into Ministry of Defence one day. He hails from a farmer family in Haryana. He chose this institute as it provides the best infrastructure and sophisticated machines to aid hands on learning. He says for the first time he got the opportunity to use a computer numerical control (CNC) machine. He is determined to make the most of the opportunities available at the ITI and aspires to one day bring his parents to the city.

**Source of information about the ITI/vocational education system:** “Information advice and guidance become more important as people enter and re-enter learning opportunities throughout their lives” (Tilak, 2020). Internet is expected to play an increasingly important role in the provision of information and advice, but data reveals that majority of sources are still local and personal. Hence, it is important to understand the student's source of knowledge about the vocational education system. This factor helps us understand better the flow of information and how a student comes to acquire awareness and knowledge about such a possibility. Quantitative data (see, figure 10 and 13) collected from the field reveals that 60% of the students got to know about the ITI system through their personal contacts, 18% from counseling at school, 10% from counseling at ITI and interestingly, 5% got to know about the ITIs from a cyber café near their house. In many interviews conducted during the pilot stage, students spoke about the cyber cafes. Cyber cafes interestingly act as a site for dissemination of information regarding prospective avenues for education and employment. Parents of the students would often go to the cyber café to inquire about possible places their children could apply for.

However, the main source of information is personal and local contacts, with counselors at school being the second major influence. A direct impact of this influence is seen in the finding where 33.49% students reported entering a vocational course due to guidance received at school. Another finding shows that even if 56.04% students took a vocational course at school, it was the teacher's guidance along with parent's guidance that made the student choose vocational education finally. The data shows how far reaching the impact of personal guidance is, where merely having a vocational course at school was not a necessary motivation to enter ITI, rather personal guidance from teachers and parents ensured entry into ITI. As far as the role of internet is concerned, 80% students browsed the internet post making a decision to choose vocational education, while deciding on which ITI to go for.

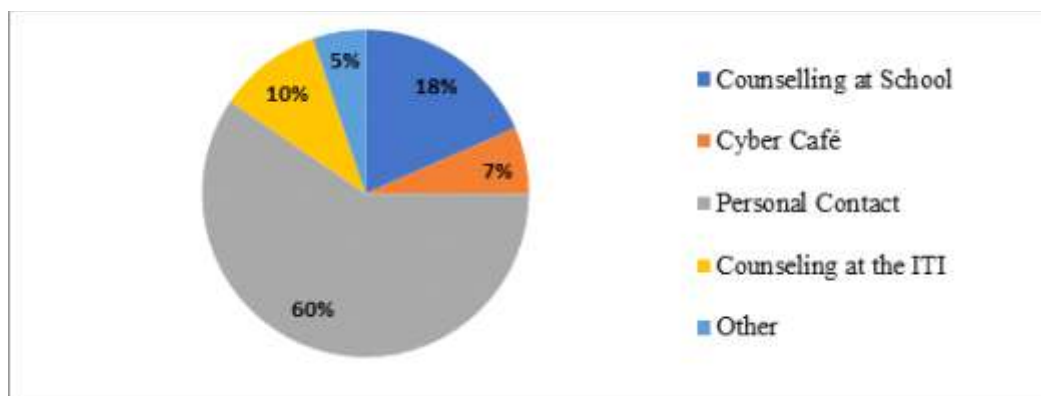
*Minati, enrolled in Fitter trade at a Government ITI, joined ITI after completing class X. It was her father, a cab driver, who encouraged her to take up VET. The training has introduced her to spot welding and other aspects of the trade. Minati says girls can do well in fitter trade, and she has set an example for it. Her father's motivation helped her get direction, she says. She aspires to take up a job and become financially independent.*

*Sunita, daughter of cobbler in Delhi, joined ITI after completing class X. She is enrolled in Electrician trade at a Government ITI. She says initially she could not follow the practical lessons and theory. But, the cooperation from faculty at the ITI helped her gain interest in the trade. Before joining the ITI, Sunita was constrained to discontinue her education due to financial problems at home. It was then she heard about the institute from her elder brother and enrolled herself in Electrician trade.*

*Gopal hails from a business family. He heard about ITI (B) from his father and after completing his graduation in Humanities, joined the institute in Painter trade. He says with good theory, practical classes, tutorials and constant guidance from his faculty at the ITI he aims to enter a Gun and Steel Factory, a public sector undertaking.*

*Amir, after finishing school was uncertain about future when he came across an advertisement of ITI, while flipping through a newspaper. He then decided to enroll for Electrician trade at a private ITI.*

76% of the respondents indicated that they took pre-admission counseling before joining the ITI. Nearly 72% of the respondents chose the trade i.e. either engineering or non-engineering in accordance with the counseling they received. These statistics show the importance and role counseling plays in the lives of the students, in making choices. When asked who influenced the student most in deciding to pursue training at an ITI, data reveals 63% were influenced by their families, 20% by their counselors and teachers and only 17% by other sources such as internet.



**Figure 1.5: Source of knowing about the ITI system**

## **Conclusion**

This paper discusses the findings from the survey and finds factors affecting choice of vocational education. In section 1.2 of the chapter I analyzed the factors affecting the choice of vocational education. It was found that apart from fees, other factors such as mode of transport, distance from the institution, parental education and parental occupation also decide the type of institution i.e. government or private ITI and type of course i.e. engineering and non-engineering course one chooses. In addition, it is found that the perception of students is closely related to their labor market aspirations. The qualitative interviews revealed a plethora of reasons for joining ITI. The reasons vastly can be clubbed into 3-4 types. One, past experience in school was poor and had lowered the student's confidence to pursue academic education; hence the student chose the vocational pathway. Two, parent, teachers and counselors at school motivated the student by showing the labor market opportunities available post training at ITIs.

Third, the student himself/herself was not interested in the academic path, and was more interested in doing things which are hands on. Aspiration of being self-employed and opening one's own shop was a popular reason. Fourth, certain trades like stenography provide opportunities of getting a government job with the skill a student learns at the ITI. The aspiration of getting a government job was one of the strongest and most significant reasons for joining ITIs. In addition, it is found that the perception of students is closely related to their labor market aspirations. Hence, the reasons for joining ITI are seen in close connection with the labor market aspiration a student has.

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Shymala Hills, Bhopal - 462002, Madhya Pradesh, INDIA

Ph : +917552660691, Fax : +91755297347, 2660580

Email : [ijvepss2022@gmail.com](mailto:ijvepss2022@gmail.com)

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