A Study of Vocational Trainers Competence Gaps in Schools
Implications for Effective Teacher Training Programmes

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Abstract

The study investigates the perspectives and experiences of vocational educators regarding key competencies, competency gaps, challenges in acquiring required competencies, strategies for addressing these gaps and the implications for teacher training. Results from the administered questionnaire reveal that educators recognise the importance of technical expertise, pedagogical skills, ICT proficiency, employability skills and effective assessment. However, despite this recognition, competency gaps persist in areas such as, pedagogy, ICT, employability skills, assessment, awareness about NSQF, NCrF and NEP-2020. Challenges faced in acquiring these competencies include low status and priority assigned to vocational education, inadequate awareness, comparatively lower salaries and limited access to training opportunities. Respondents unanimously emphasise the critical role of training programmes, networking, and ongoing support to bridge these competency gaps. Specific competencies requiring emphasis include job roles, pedagogy, employability, technology integration, industry partnerships and student support systems. Further analysis of pre-test and post-test results highlights improvements in technical skills, pedagogical skills, learning outcomes, instructional resources, and employability skills following training programmes. Positive shifts are

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observed across various competencies, indicating enhanced understanding and application of NEP-2020, NCrF and NCF. While substantial progress has been made, the study underscores the need for continued professional development and targeted support to ensure vocational trainers are well-equipped for evolving job market demands. This research underscores the critical need for sustained efforts to enhance competencies of vocational educator. Effective training programmes, increased recognition, and support for vocational education, along with addressing financial disparities, can lead to a more competent workforce, benefiting students and the vocational education sector. Continuous professional development and targeted support are vital for further improvement, ensuring that vocational trainers are well-prepared to navigate the evolving job market.

Keywords: *Vocational education, teacher competence, skills gap, teacher training, professional development*

Introduction

In line with India's National Education Policy (NEP) 2020, which emphasises the seamless integration of vocational education into the mainstream system, this study investigates the competence gaps of vocational trainers in schools. NEP-2020 advocates for introducing skill modules from Grade 6 onwards and fostering industry collaboration, aligning with the National Credit Framework (NCrF) and National Curriculum Framework for School Education (NCFSE) 2023's focus on competency-based vocational skills. Understanding these frameworks' emphasis on vocational education is crucial for analysing the skill development needs of vocational trainers and designing effective training programmes to bridge their competence gaps. This study aims to contribute to this critical aspect of NEP-2020's successful implementation.

The study of vocational teacher's competence gaps in schools is an essential topic in the field of education. As the demand for skilled workers continues to rise, vocational education plays a crucial role in preparing students for the workforce. However, the effectiveness of vocational education heavily depends on the competence of the vocational trainers responsible for delivering the instruction.

This study aims to identify and analyse the competence gaps of vocational trainers in schools, examining the implications for teachers training. The study explores the current state of vocational trainer's competencies as well as the challenges that they face in delivering effective instruction. Through a comprehensive review of existing literature and data analysis, the study aims to provide insights into the areas where vocational trainers need support and training.

The implications of this study are significant for policymakers, educators and teacher training institutions as they can use the findings to develop targeted training programmes that address the identified gaps. By improving the competence of vocational trainers, we can enhance the quality of vocational education thus, better preparing students for the workforce and contributing to the economic growth of the country.

Background and Context of Vocational Education

Vocational education is a form of education that aims to provide students with the necessary skills and knowledge to perform specific job roles. It is often associated with various sectors such as, agriculture, automobile, apparel, tourism, hospitality, healthcare, business, information technology, etc.

Vocational education has its roots in the industrial revolution, where the demand for skilled workers led to the creation of technical schools and apprenticeships. In the United States, the Smith-Hughes Act of 1917 established federal funding for vocational education programmes in public schools.

Over time, the focus of vocational education has shifted from providing training for specific trades to preparing students for a broader range of careers. Today, vocational education encompasses a wide range of disciplines and includes both traditional classroom instruction and hands-on learning experiences.

One of the primary goals of vocational education is to prepare students for the workforce. In many cases, vocational education can provide students with the skills and certifications that they need to enter the job market immediately after graduation. This can be particularly beneficial for students who may not be interested in pursuing a traditional four-year college degree.

In recent years, there has been a renewed focus on vocational education as a means of addressing skills gaps in the workforce as highlighted in NEP-2020. As technology continues to advance and the nature of work changes, there is an increasing demand for workers with specific technical skills. Vocational education can play a critical role in meeting this demand by providing students with the training and education they need to succeed in today's economy.

Competencies Required for Vocational Trainers

Vocational trainers are essential in preparing students for the workforce by providing practical skills and knowledge in various vocational fields. To be effective, vocational trainers must possess a range of competencies that enable them to deliver high-quality instruction and facilitate student learning. The following are some of the competencies required for vocational trainers:

1. Technical expertise: Vocational trainers must have practical knowledge and experience in the specific vocational field they are teaching, including the latest industry practices and technologies.
2. Pedagogical knowledge: Vocational trainers should understand the principles of teaching and learning, including instructional design, assessment and evaluation and be able to apply them in the vocational context.
3. Communication skills: Vocational trainers must communicate effectively with students, colleagues and industry partners, using various communication modes and technologies.
4. Classroom management: Vocational trainers must be able to create and maintain a safe and engaging learning environment that promotes student participation and learning.
5. Professionalism: Vocational trainers must demonstrate a high level of professionalism, including ethical conduct, commitment to continuous learning, and respect for diversity.
6. Collaboration: Vocational trainers must work collaboratively with colleagues, industry partners, and other stakeholders to enhance the quality of vocational education and ensure that it meets the needs of students and the workforce.
7. Flexibility: Vocational trainers must be adaptable and flexible, able to adjust their instruction to meet the changing needs of students, industry and society.
8. Vocational trainers require a diverse range of competencies that enable them to deliver high-quality instruction, promote student learning and prepare students for the workforce. Continuous professional development and training are essential to ensure that vocational trainers remain competent and effective in their roles.

Review of Literature on Vocational Teacher Competence

The literature on vocational teacher competence highlights the importance of having highly skilled and qualified vocational trainers to meet the demands of the ever-changing labour market. These papers collectively provide insights into the concept of vocational teacher competence in schools. Antera 2021 highlights the need for a clear definition and understanding of professional competence among vocational teachers. Djatmiko 2016 emphasises the importance of professional development and quality assurance in enhancing teachers' effectiveness in vocational secondary schools. Arifin 2018 proposes a competency model for vocational teachers, focusing on teaching competence, professional competence, communication competence and personal competence. Jiong 2009 discusses the significance of competence in vocational education

and suggests that improving students' competence should be a central focus. Xu Da-zhen found the research concerning vocational teacher-competency should be closely integrated with the developing trend of vocational education and instructional approach reform. Ismet Basuki, Joko and Arif Widodo found that academic work competition had no effect on the competence of vocational teachers. Ahyanuardi and Yulia Efronia showed that teachers' learning planning for learning activities was not in accordance with process standards. L. Lahn, H. Nore studied Large scale studies of holistic professional competence in vocational education and training (VET)— The case of Norway and showed the COMET platform may be a viable prototype for the development of diagnostic tools. Antera, S. (2021) identified five key areas of competence that vocational trainers must possess, including technical competence pedagogical competence, social competence, personal competence, and organisational competence.

Technical competence refers to the ability to teach and apply specialised knowledge in their field of expertise. Pedagogical competence involves understanding and applying effective teaching methods and techniques to engage and motivate students. Social competence focuses on the ability to establish positive relationships with students, colleagues and industry partners. Personal competence involves self-reflection and continuous professional development, while organisational competence involves the ability to manage and coordinate teaching activities.

Other studies have emphasised the importance of integrating modern teaching methods and digital technologies into vocational education. For example, Lee 2002 discusses the need for vocational teachers to incorporate technology into their instruction to enhance student learning. Mupinga 2010 explores how information and communication technologies such as, the Internet and Web 2.0 tools can be used to enhance teaching in technical and vocational education.

However, these researches also suggests that there are gaps in vocational teacher competence, particularly in the areas of digital and pedagogical competencies. These gaps can have a significant impact on the quality of vocational education, leading to reduced student engagement and lower employment rates.

The literature highlights the importance of continuous professional development and training for vocational trainers to ensure they have the necessary competencies to deliver high-quality vocational education that meets the needs of the labour market.

Objective of the Study

1. To identify the various essential competencies required for teaching by vocational teachers.

2. To identify various competency gaps among vocational teachers.
3. To suggest recommendations for addressing competence gaps.

Methodology of the Study

The study employed a mixed-methods research design, combining both quantitative and qualitative approaches to comprehensively investigate the competence gaps of vocational trainers in schools. The research methodology consisted of the following key components:

1. Literature Review: A thorough review of existing literature on vocational education, teacher competence and related topics provided a foundation for understanding the current state of knowledge in the field. This review informed the development of the survey instrument and guided the interpretation of results.
2. Questionnaire Development: A structured survey questionnaire was designed to collect quantitative data on the perspectives and experiences of vocational trainers. The questionnaire covered various aspects, including demographics, professional background, perceived competencies, competence gaps, challenges faced, and recommendations. The survey instrument aimed to gather both categorical and scaled responses.
3. Sampling and Participants: The study focused on a purposive sample of 100 vocational trainers from diverse job roles in schools across India. All participants had undergone a specific training programme at the Pandit Sunderlal Sharma Central Institute of Vocational Education (PSSCIVE) in Bhopal during August 7–11, 2023. This targeted sample aimed to capture insights from vocational trainers who had experienced a common training initiative.
4. Data Collection: The survey questionnaire was administered both manually and electronically to ensure a diverse range of responses. Participants were assured of anonymity to encourage honest and unbiased responses. The survey collected data on competencies, competence gaps, challenges and suggestions for improvement.
5. Pre-test and Post-test Analysis: To assess the impact of the training programme, the study employed a pre-test and post-test design. Vocational trainers were administered the survey both before and after undergoing the training programme at PSSCIVE. This approach allowed for a comparative analysis of the competence levels before and after the training, providing insights into the effectiveness of the training initiative.
6. Data Analysis: The study used a combination of descriptive and inferential statistics to analyse the survey data. Descriptive statistics summarised responses, while

inferential statistics identified significant differences in responses based on various factors. Thematic analysis was also employed to interpret qualitative data such as, challenges faced and recommendations provided by the participants.

Results and Findings of the Study

The responses gathered from the questionnaire administered in the 'Study of Vocational Educator's Competence Gaps in Schools: Implications for Effective Teacher Training Programmes' shed light on the perspectives and experiences of vocational educators in relation to identification of key competencies, competency gaps, challenges faced in acquiring the required competencies and strategies for bridging competency gaps.

Recognition of Essential Competencies

Respondents with 1 to 5 years of vocational education experience express a clear understanding of the significance of key competencies for vocational school trainers. These competencies encompass technical expertise in their specific job roles, pedagogical skills, proficiency in information and communication technology (ICT), the ability to impart employability skills and effective assessment capabilities. In the analysis of competency recognition among vocational trainers, it is notable that respondents universally acknowledge the importance of key competencies. Technical expertise, pedagogical skills, ICT proficiency, employability skills and assessment abilities are all recognised by majority (100 per cent) of the surveyed individuals as shown in Fig. 1.

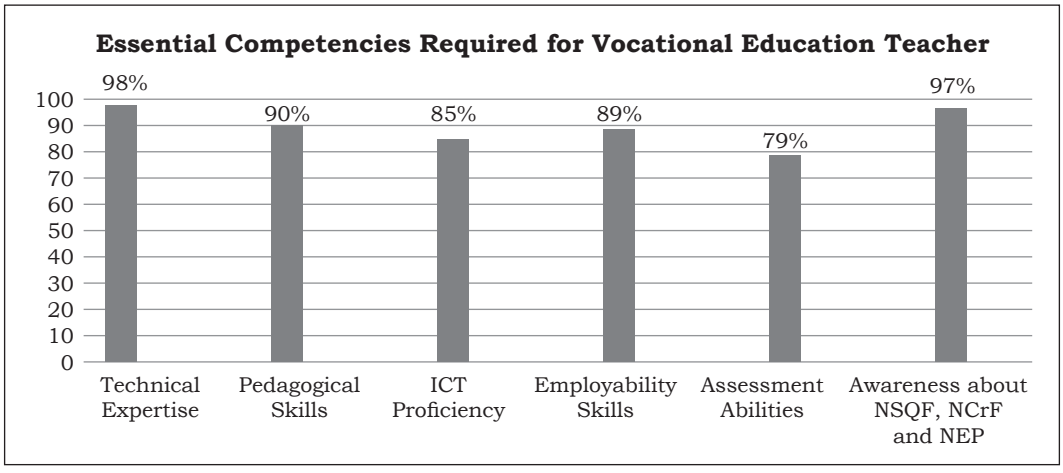

Fig. 1: Essential competencies required for vocational education teacher

Analysis of Competence Gaps Among Vocational Trainers

The data presented in Table 1, presents a comprehensive analysis of competence gaps in vocational trainers in schools, comparing pre-test and post-test results before and after a training programme. The data reveal percentages of respondents categorised by competence levels (Poor, Average, Good, Excellent) across various competencies during pre- and post-training programme. The interpretation below outlines notable trends and changes observed in the vocational trainers' competencies.

In the technical (job role) competency category, there is a noticeable improvement from 19 per cent in the 'good' category in the pre-test to 26 per cent in the post-test, with a corresponding increase in the 'excellent' category, indicating that more trainers have moved from good to excellent in this aspect. This suggests that the training programmes have had a positive impact on enhancing their technical skills.

A significant positive shift is observed in the 'poor' category, with a complete elimination post-training in pedagogical skills. Majority of respondents falling into the 'poor' category in the pre-test shifted to the 'good' and 'excellent' categories in the post-test. This reflects a substantial improvement in teaching methods and strategies among vocational trainers.

Learning outcomes, instructional resources and instructional technology have also shown improvement with more respondents moving towards the 'good' and 'excellent' categories in the post-test. This indicates a positive shift in the ability to create effective learning environments and leverage technology for teaching.

Employability skills and experiential learning have improved, with a notable increase in respondents falling into the 'good' and 'excellent' categories in the post-test. This suggests that trainers are better equipped to prepare students for the job market through enhanced employability skills and practical learning experiences.

Guidance and counseling, co-ordination and management, cultural-inclusivity and classroom or lab management competencies have seen significant improvements in the post-test, with a greater number of trainers falling into the 'good' and 'excellent' categories, indicating growth in their abilities to provide guidance, manage classrooms effectively, and coordinate vocational programmes.

However, it's important to note that some competencies such as, cultural inclusivity and industry trend awareness have shown mixed results with improvements in some categories but still significant room for growth in others.

Positive shifts across competence levels indicated improvement particularly in the 'good' and 'excellent' categories for technological, communication, and interpersonal skills; ICT, entrepreneurial and sustainability aspects. Positive

Table 1: Pre-test and Post-test Results for the Competencies of Vocational Trainers in Schools Before and After the Training Programme

Competence	Pre-test Poor (%)	Post-test Poor (%)	Pre-test Average (%)	Post-test Average (%)	Pre-test Good (%)	Post-test Good (%)	Pre-test Excellent (%)	Post-test Excellent (%)
Technical (Job Role)	0	0	0	0	19	26	74	81
Pedagogical	52	0	37	55	11	39	0	6
Learning Outcome	51	0	34	19	15	58	0	23
Instructional Resources	46	11	37	28	17	34	0	27
Instructional Technology	64	27	22	19	12	23	2	31
Instructional Media and Methods	47	7	30	4	21	52	2	37
Employability Skills	39	4	33	12	12	42	16	42
Experiential Learning	42	19	31	27	23	35	4	19
Skill Assessment and Evaluation	39	13	29	23	26	41	6	23
Guidance and Counseling	11	0	36	21	31	38	22	41
Co-ordination and Management	47	0	33	33	20	38	0	29
Cultural-Inclusivity	51	31	31	14	16	33	2	22
Classroom and Lab Management	62	0	13	9	17	39	8	52
Technological	58	31	15	19	18	31	9	19
Communication	36	27	30	23	29	31	5	19
Interpersonal	39	31	27	25	27	33	7	11
ICT	23	7	38	33	27	41	12	19
Entrepreneurial	42	29	13	14	29	38	16	19
Sustainability	56	0	22	18	14	38	8	44
Industry Trend	61	36	19	19	14	27	6	18
Industry Partnership	51	33	33	37	12	19	4	11
Field Visit	15	0	19	0	56	47	10	53
Vocational Awareness activities	74	22	21	27	5	19	0	32
Guest Lectures	4	0	7	0	65	32	20	68
NEP-2020	77	0	14	38	9	49	0	13
NCrF	95	0	3	29	2	54	0	17
NCF	93	0	4	31	3	55	0	14

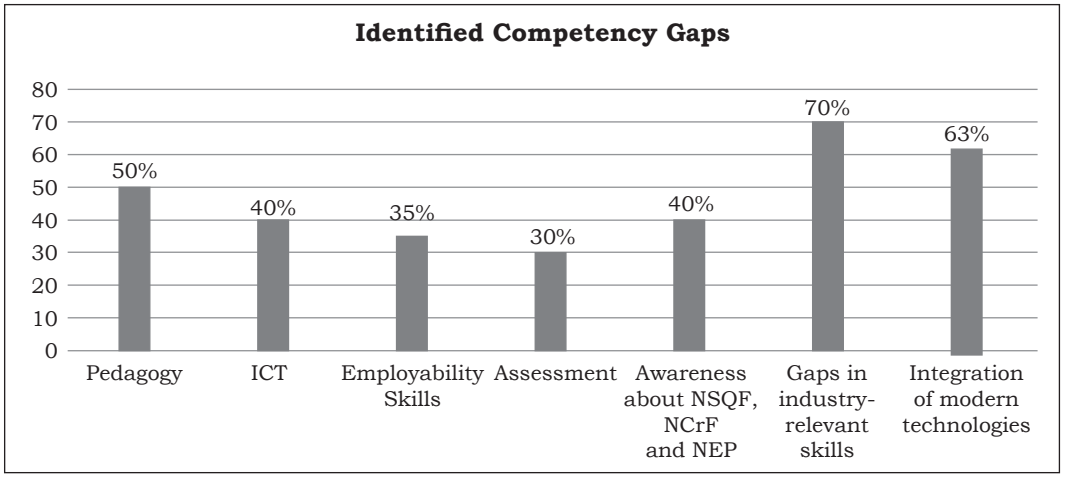

Fig. 2: Identified competency gaps among vocational teachers

shifts in various competence levels suggested enhanced understanding and collaboration with industry trends and partnerships.

Positive trends in the 'Good' and 'Excellent' categories for implementation of field visits, vocational awareness activities, and guest lectures was observed after the training.

Positive shifts in various competence levels for the competence of NEP-2020, NCrF and NCF was evident with a greater number of trainers falling into the 'good' and 'excellent' categories post-training when compared with pre-training. This indicated increased understanding and application of the National Education Policy (NEP) 2020, National Curriculum Framework (NCrF) and National Curriculum Framework (NCF).

Identified Competency Gaps

Despite their recognition of the importance of these competencies, participants identified competency gaps in areas such as, pedagogy, ICT, employability skills, assessment, awareness about NSQF, NCrF and NEP-2020, gaps in industry-relevant skills and integration of modern technologies with percentages 50 per cent, 40 per cent, 35 per cent, 30 per cent, 40 per cent, 70 per cent and 63 per cent respectively as shown in Fig. 2. These gaps, as they opine, stem from issues like lack of awareness, insufficient support and limited opportunities for skill enhancement.

Challenges Faced in Acquiring the Required Competencies

Fig. 3 displays various challenges in acquiring the required competencies highlighted by the vocational teachers

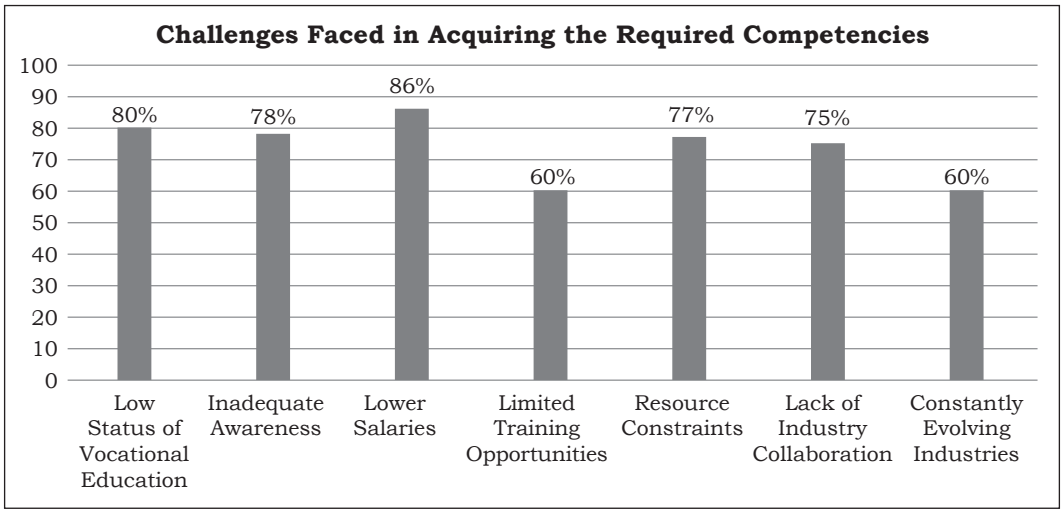

Fig. 3: Challenges faced in acquiring the required competencies by vocational teachers

in their responses. These includes low status and least priority assigned to vocational education, inadequate awareness about its significance among students and teachers, relatively lower salaries compared to other teaching positions and limited access to training opportunities. These challenges contribute to the identified competency gaps.

Inferential Statistics: T-Test Results

Table 1 presents t-test results for the specified parameters comparing pre-test and post-test mean scores. All parameters, including Pedagogical, Learning Outcome, Employability Skills, Experiential Learning, Skill Assessment and Evaluation, ICT, Entrepreneurial, Sustainability, NEP-2020, NCrF, and NCF, exhibit statistically significant improvements post-training, as indicated by the p-values less than 0.001. The negative t-values across all parameters suggest that, on average, vocational trainers demonstrated significant enhancements in these competencies after participating in the training programme. The highly significant p-values provide strong evidence against the null hypothesis, supporting the conclusion that the training programme positively impacted these competencies.

Strategies for Bridging the Identified Competency Gaps

To effectively address these competency gaps, all respondents (100 per cent) emphasised the

Table 2: Inferential Statistics: T-test results

Variable	Pre-Test Mean	Post-Test Mean	t(198)	p-value
Pedagogical	49.7	72.4	−7.81	< 0.001
Learning Outcome	36.2	53.8	−5.32	< 0.001
Employability Skills	41.5	68.7	−9.12	< 0.001
Experiential Learning	45.8	63.2	−6.64	< 0.001
Skill Assessment and Eval.	38.6	56.3	−5.95	< 0.001
ICT	34.1	59.8	−11.24	< 0.001
Entrepreneurial	40.2	65.7	−8.73	< 0.001
Sustainability	37.5	60.9	−10.12	< 0.001
NEP 2020	52.3	74.6	−6.98	< 0.001
NCrF	10.2	45.6	−18.32	< 0.001
NCFSE	11.8	49.1	−17.46	< 0.001

critical role of training programmes, networking and ongoing support. They proposed regular, annual training initiatives specifically designed for content enrichment, professional development and capacity building. The respondents emphasise specific competencies requiring emphasis, including job roles (90 per cent), pedagogy (80 per cent), employability (70 per cent), technology integration (70 per cent), industry partnerships (60 per cent) and student support systems (50 per cent).

In addition to the aforementioned strategies, respondents provided valuable suggestions and recommendations to address competency gaps among vocational school trainers. These include advocating for permanent positions for vocational educators, aligning their salaries with those of their counterparts in traditional education, providing financial assistance to support their professional growth, and ensuring regular, accessible training opportunities. Specifically, 80 per cent of the respondents advocated for the provision of permanent positions for vocational educators, 85 per cent suggested an increase in salaries, 75 per cent recommended providing financial assistance for the vocational education and training of teachers, and a notable 90 per cent emphasised the importance of ensuring regular training opportunities for vocational teachers.

The questionnaire responses underlined the critical need for

comprehensive and sustained efforts to enhance the competencies of vocational school trainers. Effective training programmes, improved recognition and support for vocational education, along with addressing financial disparities can collectively contribute to a more competent and motivated vocational educator workforce. Such efforts are anticipated to yield positive outcomes not only for educators but also for students and the broader vocational education sector.

Implications and Recommendations

The study's findings have several implications for the enhancement of vocational teacher competence in schools and the success of vocational education programmes. First and foremost, the recognition of competence gaps in areas such as, pedagogy, ICT, employability skills and awareness about educational frameworks underscores the urgent need for targeted training programmes. The identified challenges, including low status and priority for vocational education, inadequate awareness and limited access to training opportunities highlight the systemic issues that must be addressed to create a conducive environment for vocational trainers. The positive shifts observed in competencies post-training indicate the potential effectiveness of ongoing professional development initiatives. These implications suggest that a comprehensive and sustained effort is required to improve vocational teacher competencies.

Building upon the implications, the following recommendations emerge:

Develop Targeted Training Programmes: Policymakers and teacher training institutions should collaborate to design and implement training programmes that specifically target the identified competence gaps. These programmes should focus on practical applications of technology, workplace knowledge, and pedagogical skills aligning with industry demands.

Enhance Collaboration: Foster collaboration between vocational trainers and industry experts to bridge the gap between theoretical knowledge and real-world applications. Guest lectures, workshops, and on-the-job training can enrich vocational trainers' understanding and enhance their teaching practices.

Incorporate Technology: Integrate technology training into vocational teacher programmes to ensure that educators are proficient in leveraging digital tools for effective instruction. This includes incorporating modern teaching methods and staying updated on emerging technologies relevant to vocational fields.

Provide Ongoing Support: Establish mentorship and coaching programmes to offer continuous support to vocational trainers. This support can include guidance on

classroom management, assessment strategies, and staying current with industry trends, contributing to sustained professional development.

Evaluate Programme Effectiveness: Regularly assess the effectiveness of training programmes through feedback mechanisms, student performance assessments, and monitoring of programme outcomes. This evaluation will ensure that the programmes are addressing the identified gaps and delivering tangible improvements in vocational teacher competencies.

The study underscores the critical need for comprehensive and targeted efforts to enhance the competencies of vocational trainers in schools. By implementing these recommendations, stakeholders can contribute to the development of a skilled and competent vocational education workforce, ultimately benefiting students and advancing the vocational education sector.

Conclusion

Addressing the identified competence gaps in vocational teacher training is imperative for enhancing the effectiveness of vocational education. The study underscores the significance of targeted training programmes to equip vocational trainers with essential skills and knowledge in technology utilisation, workplace practices, pedagogical strategies, and industry-specific expertise. Policymakers, educators and teacher training institutions must collaborate to develop and implement these programmes, ensuring a practical focus on technology application, experiential learning and fostering cultural sensitivity in teacher-student relationships. By prioritising these initiatives, we can contribute to the improvement of vocational education, ultimately empowering students and better preparing them for success in their chosen careers.

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