

Exploring the Usability and Effectiveness of Technical Vocational and Professional Education at the Senior Secondary Level in relation to the Standard of Higher Education

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Abstract

This study investigates how Technical, Vocational, and Professional Education (TVPE) at the senior secondary level affects students' preparation and how useful and effective it is. While effectiveness is determined by findings like skill acquisition, academic readiness, and employment potential, usability refers to the educational content's accessibility, clarity, and applicability. A structured Likert-scale questionnaire was used to gather data from 450 students enrolled in technical, vocational, and professional streams as part of a quantitative research design. A strong and significant positive correlation between usability and effectiveness was found by statistical analysis using SPSS, which included multiple regression and Pearson's correlation ($r = 0.699$, $p < 0.01$). Furthermore, 63.6% of the variation in students' preparation for college was explained by usability and effectiveness combined ($R^2 = 0.636$). With a standardized beta value of 0.704, usability was found to be the most reliable indicator of readiness. The findings highlight how improving TVPE programs' usability greatly increases their efficacy and better equips students for academic advancement. To increase usability and effectiveness, the study suggests teacher training, digital integration, expanded industry connections, and curriculum modernization. With these enhancements, TVPE can be made a solid basis for both postsecondary education and career preparedness in the competitive marketplace of today.

Keywords

Technical, Vocational, Professional, Usability, Effectiveness, Preparation

Introduction

Technical Education indicates specialized educational programs concentrating on practical and mechanical arts, frequently associated with certain vocational fields. It includes several disciplines, including engineering, architecture, management, and applied sciences. The curriculum is often structured to provide students with the skills and information required for employment in technical positions.

According to (“**Technical Education-Higher Education,” 2024**) Technical education is essential for cultivating qualified individuals, including engineers and technicians, so significantly contributing to economic progress.

Professional education focuses on preparing individuals for specific professions that require advanced knowledge and skills, often involving a formal degree or certification. This type of education is typically associated with fields such as law, medicine, and business administration. Professional education combines theoretical learning with practical experiences, ensuring that graduates possess both the academic background and the practical skills necessary for success in their respective professions (**Chakrasali, 2023**).

Vocational education is designed to provide learners with practical skills and knowledge directly related to specific trades or careers. This form of education often includes hands-on training and apprenticeships that prepare students for immediate employment in various sectors such as construction, culinary arts, and automotive technology. Vocational education emphasizes skill development tailored to meet industry needs, making it a crucial component of workforce readiness (**Cai & Kosaka, 2024**).

The usability of TVPE pertains to the efficacy with which learners can interact with, implement, and get advantages from its curriculum and instructional framework. Optimal usability guarantees that programs are focused on learners, accessible, and pertinent to contemporary labor market requirements, thus enhancing engagement and completion rates (**Maclean & Wilson, 2009**).

The effectiveness of TVPE is often assessed by results like employment, revenue production, entrepreneurial preparedness, and smooth progression to higher education or advanced professional fields. Students receiving high-quality vocational and professional education exhibit enhanced work readiness and flexibility to evolving occupational requirements. Moreover, incorporating usability principles—

such as modular material distribution, competency-based assessment, and flexible learning pathways—into vocational and technical curricula improves their efficacy by fostering lifelong learning and employability (**Duta & Irawan, 2023**).

Secondary education's preparation for higher education, especially Technical, Vocational, and Professional Education, is crucial. Students require critical thinking, communication, and research abilities as well as practical talents to succeed in tough academic situations. Students who are well-prepared can handle academic standards, entrance criteria, and a difficult higher education curriculum. The extent to which TVPE programs promote this readiness is still debated. Vocational education makes students more employable, (**McGrath & Powell, 2016**) argue that it is often ignored and underutilized in postsecondary education planning. This discrepancy highlights the need to assess TVPE frameworks' usefulness and usability in improving students' academic preparation. A well-designed, learner-centered program may fill this gap and provide a more comprehensive education by integrating higher-order learning abilities with practical training.

Significance of the study

This study is important for understanding how students' preparation for higher education is impacted by the effectiveness and usability of Technical, Vocational, and Professional Education (TVPE) at the senior secondary level. It becomes crucial to assess whether TVPE gives students the academic, cognitive, and practical skills they need as educational systems work to close the gap between secondary and tertiary learning. The results of this study offer empirical support for the notion that skill-oriented, approachable educational models contribute to students' preparedness for higher education. Since it highlights the necessity of curriculum modernization, industry connections, and improving teaching quality, this has ramifications for curriculum developers, educators, and legislators. Furthermore, by emphasizing vocational education's capacity to promote academic advancement rather than just employment, the study helps to dispel social stigmas associated with it.

Scope and relevance

The usability and efficacy of Technical, Vocational, and Professional Education (TVPE) as well as its impact on students' preparation for postsecondary education are the main topics of this study. Students enrolled in technical, vocational, and professional streams at different institutions are included in the scope, which documents their perspectives, educational experiences, and preparedness for future

academic endeavors. Utilizing statistically validated instruments, the study takes a quantitative approach to assess the connection between preparation, effectiveness, and usability. The study's timely contribution to ongoing educational reforms, particularly in light of the growing demand for skill-based and outcome-oriented education, makes it relevant. It offers guidance to legislators, curriculum designers, and educational establishments who want to improve TVPE's inclusivity, relevance, and fit with industry and higher education demands. This study promotes data-driven enhancements in educational planning and policy implementation by highlighting the shortcomings and advantages of current programs.

Problem statement

Technical, Vocational, and Professional Education (TVPE) has become an important way to learn new skills, get a job, and move up in school in a world economy that is changing quickly. Even though more people are realizing how important TVPE is, many senior secondary TVPE programs are having trouble because their curricula are out of date, they don't work well with the industry, they don't have enough resources, and the quality of instruction is not always good. These usability problems make it harder for students to get the most out of their education and raise doubts about how well these programs prepare students for the challenges of higher education. There isn't much real-world evidence on how the usability and effectiveness of TVPE affect how prepared students are for higher academic standards. If educational institutions don't have a clear understanding of this relationship, they might offer programs that fail to provide students with the skills, knowledge, and confidence they need to make a successful transition to college or a competitive job market. So, it is important to look into how much the usability and effectiveness of TVPE affect how ready students are for school and whether improving these factors can lead to better educational and career outcomes.

Objectives

- To find a relationship between Usability and Effectiveness of Technical Vocational and Professional Education at the Senior Secondary level.
- To evaluate the effect of usability and effectiveness of TVPE at the senior secondary level on the preparation for higher education standards

Hypothesis

H₀: There is no significant relationship between usability and effectiveness of Technical Vocational and Professional Education at Senior Secondary Level.

H₁: There is a significant relationship between usability and effectiveness of Technical Vocational and Professional Education at Senior Secondary Level.

H₀: There is no significant effect of Usability and Effectiveness of TVPE at senior secondary level on the preparation of higher education standards

H₂: There is a significant effect of Usability on Effectiveness of TVPE at senior secondary level on the preparation of higher education standards

Literature Review

(Farran & Nunez, 2024) Educational innovation is essential to prepare students for the dynamic professional landscape. This study examines how double-degree programs integrate vocational education and training (VET) with higher education (HE), highlighting the potential for enhanced collaboration between the two sectors. Authors want to improve students' employability by acknowledging the transformative potential of integrating skills from Vocational Education and Training (VET) with Higher Education (HE) through collaborative curriculum design and unified learning objectives. To address the limitations of the current VET-to-HE transition, we have delineated four prerequisites for successful dual programs: (i) a coherent competence framework; (ii) a standardized methodology; (iii) a distinct identity; and (iv) autonomous signaling. The paper concludes with a case study of an expanding dual VET/HE program in Navarra, Spain, based on the previously outlined criteria.

(Oyeniya & Cole, 2019) The purpose of this research was to look at how Nike Art and Gallery Osogbo in Osun State, Southwest Nigeria, grew in connection to vocational training. Using a questionnaire distributed around the Nike Art Gallery, data were collected from 150 people chosen at random. In order to analyze the data, the study used descriptive statistics and regression analysis. Trainees' entrepreneurial spirit grows when they put their vocational skills to use, and the results show that trainees' skill choice affects the extent to which it impacts their entrepreneurial spirit. Additionally, trainees' socioeconomic status significantly impacts the skills they learn. The poll found that students almost universally cited entrepreneurship education as an important factor in determining whether or not an entrepreneur will be successful. The findings and recommendations of this study support the inclusion of entrepreneurship courses as a mandatory curriculum in all types of higher education programs. This means that rather than seeking for traditional jobs, most graduates will have the ability to create their own firms. Colleges and universities could support their teachers' career growth by sending

them to courses on the technical aspects of entrepreneurship. In addition to preparing its students for careers in business, these institutions may serve the local community by providing training programs to their members.

(Jabarullah & Iqbal Hussain, 2019) Investigated here are the results of problem-based learning as it pertains to engineering students enrolled at a Malaysian technical university. Strategic plan, approach, and process: The uniqueness of Universiti Kuala Lumpur's dual engineering curriculum—a more traditional classroom-based curriculum and a more hands-on Higher Technical and Vocational Education and Training (HTVET) program—made it an ideal location to examine PBL. Participating in the study were around 453 third-year students from both of the University Kuala Lumpur's schools. The results of the written and laboratory assessments showed that the PBL lessons benefited the HTVET students. This supports the concept that HTVET's hands-on approach to experiential, student-centered learning works best. The results suggest that PBL may attenuate the association between HTVET student performance and final grades. More investigation is needed on this option. As both degrees are offered at that university, students from there were chosen as the sample. In this study, moderating or mediating factors are not included. Important and innovative contribution: the results support problem-based learning (PBL) in higher education, particularly HTVET-based programs. They also justify revisiting the “minds-on” theoretical approach to engineering education in favor of a more practical, hands-on approach that emphasizes active and experiential learning in class and the curriculum.

(Thakur, 2018) The potential of entrepreneurship to spur innovation, job creation, equity, and societal and economic advancement is a topic of growing interest. Both formal and informal learning opportunities in entrepreneurship are important for the development of entrepreneurial attitudes and behaviors, which in turn fuel the expansion of micro and small enterprises. The area of entrepreneurship education is currently buzzing with activity around how to help students develop the mentality and skills necessary to recognize and capitalize on entrepreneurial possibilities. If they are successful, entrepreneurs may be able to keep a big workforce employed and even increase the number of jobs available. The article's main point is that India has to do a better job of teaching and modeling entrepreneurial skills.

(Farías & Sevilla, 2015) This study examines Chilean students' secondary school academic or vocational route and their predicted achievement in vocational

programs following high school. Although vocational students are less likely to enroll in four-year colleges and universities due to their less difficult curriculum and non-academic environments, it is uncertain how well they do in post-secondary vocational programs. Secondary vocational education graduates with more industry understanding and employment readiness may do better. This research uses propensity score matching to reduce selection bias and establish causal relationships. It does a sensitivity analysis to ensure reliability. Academic students were more accessible and persistent than vocational pupils. Changes in major between high school and college tend to lower academic commitment. The study also found that vocational students attended more evening sessions and received less college financial help. Even after controlling for these two criteria, vocationally-focused students outperformed academically-focused students in high school and college.

(Cattaneo et al., 2015) Almost every Swiss teenager entertains themselves on the go using their mobile phone. Because of this, teachers must make use of the opportunities presented by mobile devices to foster learning in a variety of contexts. Researchers in the field of mobile learning have mostly ignored dual vocational education and training (VET) programs, which commonly involve apprentices alternating between on-the-job training and off-the-job schooling. The study begins by reviewing the fundamentals of mobile learning and how they relate to VET in this article. After that, a project involving the teacher and trainee cooks is detailed. Participants in the project—a trainee, an instructor, and an in-house trainer—met to discuss and illustrate ways vocational education and training (VET) might be incorporated into both the workplace and the classroom. At last, the project's goal was to evaluate the implementation's success based on user happiness, efficiency, and ease of use.

(Mamta, 2015) Vocational education programs aim to train students for a specific career at institutions that provide them. Its focus on scientific technique, skill, and technology immediately enhances mastery of the art in all its aspects. Participation in the apprenticeship system is open to students enrolled in secondary, postsecondary, further, and university programs. The foundation of vocational education is training, or internships as they are known in academic circles. The purpose of this research is to determine if students have an understanding of and are open to the vocational education system as it stands or with proposed changes. The results shed light on a web of interrelated problems, such as people's general ignorance of vocational education, distrust, the importance of internships in student education, and many more.

(Baraki & Kemenade, 2013) This study analyzes TVET teaching methods, course materials, and assessment standards in low-income countries. Ethiopia's TVET system follows worldwide best practices. The 2008 TVET plan improved the evaluation and certification system's identification of formal TVET graduates as competent. This recognition rose from 17.42% in 2009/2010 to 40.23% in 2011/2012. Conversely, regional variation exists. This may be done by increasing awareness, coordination, integration, flexibility, involvement, empowerment, responsibility, and quality culture. This study is limited by the lack of longitudinal competence test data. More research is needed on TQM and the factors that affect TVET institutions' internal effectiveness. Our Ethiopian reform process description may help policymakers and practitioners in other African technical and vocational education and training (TVET) countries based on global best practices. Importance/uniqueness – This study may be required to realistically evaluate TVET programs and define the methods, notably TQM-based ones, that affect their effectiveness.

Research Methodology

This study used a quantitative research methodology to examine the efficacy and effectiveness of Technical, Vocational, and Professional Education (TVPE) in senior high schools. The study employed systematic methodologies and statistical techniques to collect and evaluate data, ensuring that our results are dependable, impartial, and relevant across many contexts.

Variable:

Independent variable: Usability and Effectiveness

Dependent variable: Preparation

Research Design

The researcher examined the relationship between three variables—usability, effectiveness and preparation utilizing a descriptive and correlational research approach, which supports the study. The design incorporates elements of causal-comparative research to determine whether usability substantially predicts effectiveness. This approach effectively assesses the statistical significance of the relationship between variables and evaluates hypotheses.

Methods & tools

The population consists of students engaged in technical, vocational, and professional programs. A total of 450 respondents were selected using stratified random sampling to provide a balanced representation of educational backgrounds.

The primary data collection instrument was a structured questionnaire. The study assessed respondents' views on usability, efficacy and preparation using a 5-point Likert scale, ranging from “Strongly Disagree” to “Strongly Agree.”

Statistical analysis

The Statistical Package for the Social Sciences (SPSS) was used to evaluate the collected data, draw relevant interpretations, and test the hypotheses.

Results

This section provides an analysis and interpretation of the data gathered to investigate the correlation between the usability and efficacy of Technical, Vocational, and Professional Education (TVPE) at the senior secondary level.

Table 4.1: Age-wise distribution of respondents

Age		
	Frequency	Percent
Below 18 years	32	7.1
18 to 25 years	404	89.8
26 to 30 years	10	2.2
Above 30 years	4	.9
Total	450	100.0

Age-wise distribution is discussed in the table above. Below 18 years, frequency is 32 and percentage is 7.1%. In 18 to 25 years, the frequency is 404 and the percentage is 89.8%. In 26 to 30 years, the frequency is 10 the percentage is 10 and the percentage is 2.2%. In the above 30 years, frequency is 4 and percentage is 0.9%.

Graph 4.1: Graphical representation of age-wise distribution of respondents

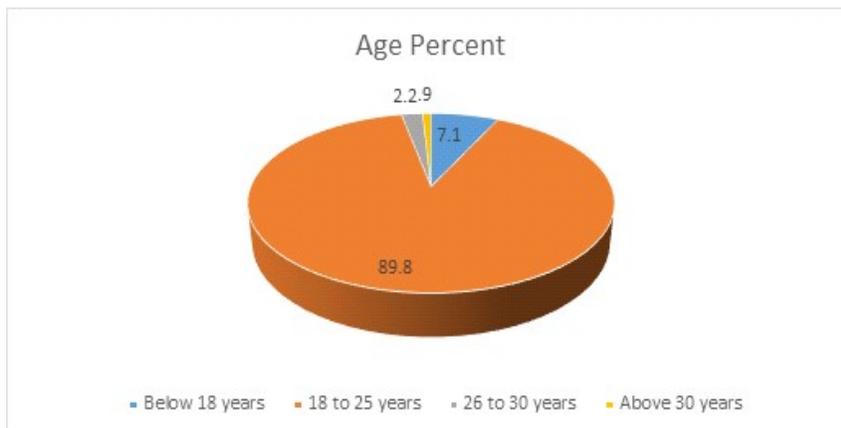


Table 4.2: Gender wise distribution of respondent

Gender		
	Frequency	Percent
Male	183	40.7
Female	267	59.3
Total	450	100.0

Gender wise distribution is discussed in the table above. There are 183 males and 267 females participating in this study, whose percentage is 40.7% and 59.3% respectively.

Graph 4.2: Graphical representation of gender wise distribution of respondents

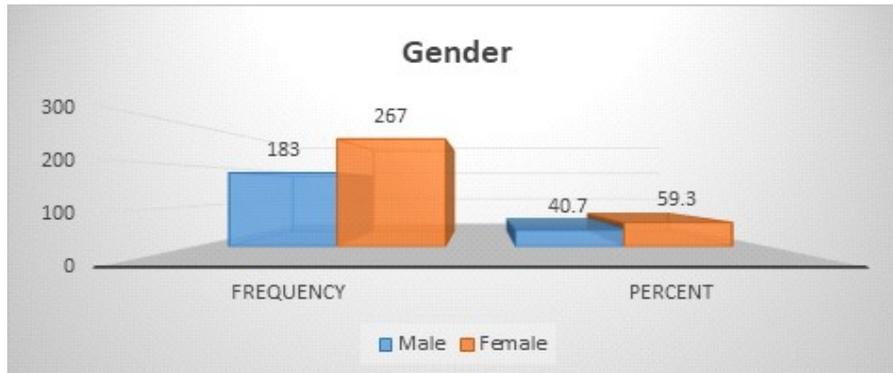
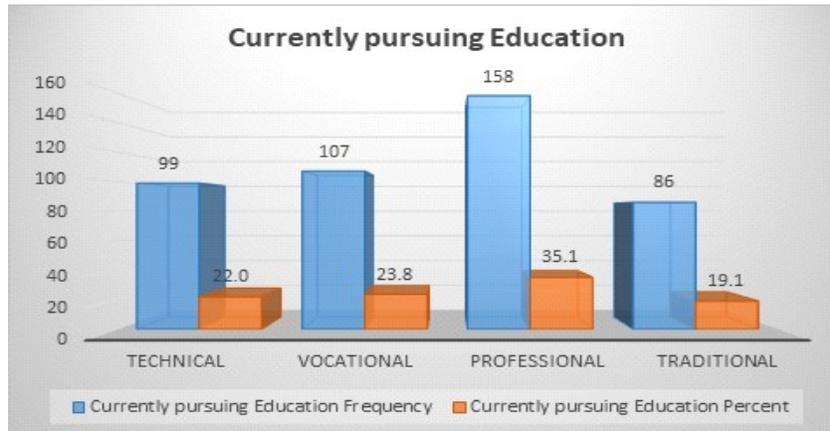


Table 4.3: Education-wise distribution of respondents

Currently pursuing Education		
	Frequency	Percent
Technical	99	22.0
Vocational	107	23.8
Professional	158	35.1
Traditional	86	19.1
Total	450	100.0

Education-wise distribution is discussed in the table above. In technical terms, frequency is 99 and percentage is 22%. In vocational, frequency is 107 and percentage is 23.8%. In Professional, frequency is 158 and percentage is 35.1%. In Traditional, frequency is 86 and percentage is 19.1%.

Graph 4.3: Graphical representation of education-wise distribution of respondents



Hypothesis testing

Hypothesis 1: There is no significant relationship between usability and effectiveness of Technical vocational and Professional education at Senior Secondary level.

Correlations			
		Effectiveness	Usability
Effectiveness	Pearson Correlation	1	.699**
	Sig. (2-tailed)		.000
	N	450	450
Usability	Pearson Correlation	.699**	1
	Sig. (2-tailed)	.000	
	N	450	450
**. Correlation is significant at the 0.01 level (2-tailed).			

The correlation analysis indicates a statistically significant and strong positive association between the usability and efficacy of Technical, Vocational, and Professional Education (TVPE) at the senior secondary level. The Pearson correlation value is 0.699, signifying a strong relationship between the two variables. The p-value for this relationship is 0.000, which is below the conventional significance threshold of 0.01, so validating that the observed relationship is statistically significant.

Discussion: Therefore “Null hypothesis H_0 : there is no significant relationship between usability and effectiveness of Technical vocational and Professional education at Senior Secondary level” has been rejected. Hence it is proved that there is a significant relationship between usability and effectiveness of Technical vocational and Professional education at Senior Secondary level.

Hypothesis 2: There is no significant effect of Usability and Effectiveness of TVPE at the senior secondary level on the preparation of higher education standards.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.798 ^a	.636	.634	1.84343
a. Predictors: (Constant), Effectiveness, Usability				

ANOVA ^a						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	2655.248	2	1327.624	390.681	.000 ^b
	Residual	1519.010	447	3.398		
	Total	4174.258	449			
a. Dependent Variable: Preparation						
b. Predictors: (Constant), Effectiveness, Usability						

Coefficients ^a						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.672	.609		6.030	.000
	Usability	.485	.027	.704	17.644	.000
	Effectiveness	.110	.035	.127	3.182	.002
a. Dependent Variable: Preparation						

The multiple linear regression analysis's findings show that effectiveness and usability have a major impact on students' preparation for the standards of higher education. Usability and effectiveness together account for 63.6% of the variance in preparation, according to the model's strong correlation ($R = 0.798$) and R Square value of 0.636. With an F-value of 390.681 and a p-value of 0.000, the ANOVA table validates the model's overall significance and shows that the predictors have a significant effect on the dependent variable. With a standardized beta coefficient of 0.704 ($t = 17.644$, $p < 0.001$), usability has the greatest influence among the predictors. Effectiveness also has a positive contribution, albeit a smaller one, with a beta of 0.127 ($t = 3.182$, $p = 0.002$). These findings show that students' perceptions of their preparedness for college are greatly influenced by both usability and effectiveness, with usability having a greater impact. The results highlight the value of educational programs that are easy to use and goal-oriented in order to improve students' academic preparedness after secondary school.

Discussion: Therefore, the null hypothesis—which holds that “There is no significant effect of Usability and Effectiveness of TVPE at senior secondary level on the preparation of higher education standards” —is rejected.

Hence it is proved that “There is no significant effect of Usability and Effectiveness of TVPE at senior secondary level on the preparation of higher education standards”.

Conclusion

The study shows that, in the context of Technical, Vocational, and Professional Education (TVPE), usability and effectiveness have a major impact on students' preparation for the standards of higher education. The results of both regression and correlation analyses show a strong and statistically significant relationship between these variables, emphasizing that TVPE programs become more effective as their usability improves, improving students' academic readiness and readiness for pathways to higher education. The strongest predictor of effectiveness and preparation outcomes was usability, which is defined by the delivery of a curriculum that is accessible, pertinent, and learner-centric. Even though it has a little less of an impact, effectiveness is still very important in determining how prepared students are for higher education or the workforce. A strong empirical basis for curriculum and policy reform was established by the regression model, which revealed that usability and effectiveness together explain more than 63% of the variation in

students' preparation. TVPE programs must therefore incorporate contemporary teaching techniques, guarantee alignment with industry demands, and assist students using adaptable and pertinent pedagogical models. Prioritizing these aspects is essential for educational institutions, curriculum developers, and legislators to enhance overall learning outcomes and maintain the caliber of higher education, particularly in a time when employability, skills, and flexibility are critical for socioeconomic advancement.

Suggestions

- To improve usability and relevance, align TVPE content with industry standards and future skill requirements.
- Incorporate real-world projects, apprenticeships, and internships to enhance employability and hands-on learning.
- To increase accessibility and student engagement, make use of mobile apps, e-learning platforms, and modular learning.
- Give educators ongoing professional development so they can embrace contemporary, learner-centered teaching strategies.
- Provide courses on entrepreneurship and academic readiness to accommodate a range of post-secondary career paths.

References

1. Cai, J., & Kosaka, M. (2024). Conceptualizing Technical and Vocational Education and Training as a Service Through Service-Dominant Logic. *Sage Open*, 14(2). <https://doi.org/10.1177/21582440241240847>
2. Cattaneo, A. A. P., Motta, E., & Gurtner, J. L. (2015). Evaluating a mobile and online system for apprentices' learning documentation in vocational education: Usability, effectiveness and satisfaction. *International Journal of Mobile and Blended Learning*. <https://doi.org/10.4018/IJMBL.2015070103>
3. Chakrasali, R. L. (2023). Contextual Curricula and Industry Institute Interaction for Technical Education. *INDIAN JOURNAL OF TECHNICAL EDUCATION*, 46(2).
4. Farías, M., & Sevilla, M. P. (2015). Effectiveness of Vocational High Schools in Students' Access to and Persistence in Postsecondary Vocational Education. *Research in Higher Education*. <https://doi.org/10.1007/s11162-015-9370-2>

5. Farran, I., & Nunez, I. (2024). Converging pathways: new approaches to integrate vocational education training and higher education. *Journal of Vocational Education & Training*, 1–19. <https://doi.org/10.1080/13636820.2024.2428769>
6. Hagos Baraki, A., & van Kemenade, E. (2013). Effectiveness of Technical and Vocational Education and Training (TVET). *The TQM Journal*. <https://doi.org/10.1108/tqm-11-2012-0099>
7. Jabarullah, N. H., & Iqbal Hussain, H. (2019). The effectiveness of problem-based learning in technical and vocational education in Malaysia. *Education and Training*. <https://doi.org/10.1108/ET-06-2018-0129>
8. Maclean, Rupert & Wilson, D. (2009). *International Handbook of Education for the Changing World of Work: Bridging Academic and Vocational Learning*. <https://doi.org/10.1007/978-1-4020-5281-1>
9. Mamta, A. A. A. (2015). IMPORTANCE OF VOCATIONAL EDUCATION IN HIGHER EDUCATION. *Tactful Management Research Journal*, 7.
10. McGrath, S., & Powell, L. (2016). Skills for sustainable development: Transforming vocational education and training beyond 2015. *International Journal of Educational Development*. <https://doi.org/10.1016/j.ijedudev.2016.05.006>
11. Mustajab, Duta & Irawan, A. (2023). *The Effectiveness of Vocational Training Programs on Employment Outcomes*. <https://doi.org/10.60079/acsr.v1i2.344>
12. Oyeniya, A. A., & Cole, K. (2019). The Role of Vocational Training on Entrepreneurship Development. *The Pacific Journal of Science and Technology*.
13. Technical Education-Higher Education Notes. (2024). *Test Book*. <https://testbook.com/>
14. Thakur, M. Agrawal and K. S. (2018). Entrepreneurship Education and Training in India: Dimensions for Success. *International Journal of Research in Management & Social Science*, 6(2). <https://doi.org/10.13140/RG.2.2.36686.20807>