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Assessing the Effectiveness of Technical Institute Curriculum in Skill Development and Employability among Higher Education Students

Dr. Vidhya Kshirsagar[1], Ved Kadam[2] , Yash Dubal[3] , Atharav Pradhan[4]

[1]*Assistant professor, D.Y.Patil Deemed To Be University School Of Humanities & Sciences Navi Mumbai, Maharashtra, India.*

[234]*Student, Department of MCA,* D.Y.Patil *Deemed To Be University School Of Humanities & Sciences Navi Mumbai, Maharashtra, India.*

Abstract - *The technical institute curriculum is effective in developing students' skills and equipping them with employment. This study evaluates student perceptions of the of the curriculum effectiveness in developing skills and employability among students of higher education. A quantitative cross-sectional survey of 20 questions was carried out using a structured questionnaire and 52 valid responses were analysed. Descriptive statistics analysed Curriculum effectiveness, practical learning, internship experience, external learning and perceived job readiness , Pearson correlation and independent-samples t-tests. The results show 92.3% of students agreed that curriculum includes AI/ML or data-related skills and 84.7% agreed that their college offers practical, hands-on learning, which are considered necessary for employability. 94.2% reported that they need additional skills apart from that of college to be job ready and 34.6% identified industry exposure as major area of improvement. Other variables did not show significant differences among groups of students. Statistical analysis indicated significant difference in perceived job readiness between students with and without internship or work experience, supporting H2. Other hypotheses have failed to reach statistical significance. The study overall emphasizes the need for more industry exposure, practical training, placement support and integration of emerging technologies in technical education.*

Keywords: Technical Education, Curriculum Effectiveness, Skill Development, Employability, Job Readiness, Practical Learning, Internship, AI/ML Skills

I. INTRODUCTION

Technical institutes play a major role in preparing higher education students for employment by providing technical knowledge, practical skills, and industry-oriented education. In rapidly changing job market, employers increasingly expect graduates to possess not only theoretical knowledge but also technology-related and practical skills. Therefore, the effectiveness of a technical institute's curriculum has a direct relevance to students' skill development and career preparation. A well-designed curriculum should provide opportunities for hands-on learning, practical training, internships, industry exposure, and learning emerging technologies for students.

There can be gap between what students learn through their formal education and skills they believe are required in workplace. Students may depend on external courses, certifications, online learning platforms, and other resources for develop additional skills. The availability of updated syllabus, practical training, workshops, and industry interaction may influence students' confidence and readiness for employment. Students' awareness of job requirements also affects how they evaluate their own skills and career preparedness. Factors that influence perceived employability are internship experience, academic background, and access to additional learning opportunities . Understanding all these factors is important for evaluating technical institute curriculum support students' professional development. It also considers practical preparation, industry relevance, emerging-technology education, external learning, and students job readiness. These findings help to identify areas where technical institutes need to improve curriculum content, practical learning, industry exposure, and career-oriented training. These improvements contribute for better alignment between higher education and changing requirements of employment market.

II - PROBLEM STATEMENT

The main problem is mismatch between curriculum offered by technical institutes and skills required by students for employment and professional development. Although technical institutes provide technical and theoretical knowledge, students do not receive sufficient practical training, industry exposure, updated technology education, internships, and opportunities to develop job-related skills. It affects confidence, skill development, and readiness for employment of students. Students need to use external courses, certifications, and online learning platforms to develop skills that are not fully covered by their academic curriculum. In addition, differences in internship experience, awareness of job requirements, and access to practical learning

opportunities may influence students' perceptions of their employability. Therefore, this study aims to assess students' perceptions of effectiveness of technical institute curriculum in developing relevant skills and preparing them for employment, while identifying major areas where curriculum, practical training, industry exposure, and career support needs improvement.

III - LITERATURE REVIEW

A. Murari (2026) – "Bridging the Employability Skills Gap in Indian Higher Education: A Comparative Study of Engineering and Management Students in the Post-NEP Era"

Murari (2026) examined the employability skills gap among engineering and management students in Indian higher education. The study used a mixed-method approach involving student surveys and educator feedback. It identified concerns regarding students' preparedness for industry requirements, particularly in problem-solving, creativity, ICT, and career-related skills. The study emphasized the importance of practical learning, industry partnerships, and career support.

The relevance of this research to the present study is its focus on the gap between higher education and industry expectations. Similarly, the present study examines students' perceptions of curriculum effectiveness, skill development, and job readiness in technical education.

B. Keerthi and Uma Maheswari (2026) – "Integrating Digital Literacy into Higher Education Curriculum: A Need Analysis on the Gap in Digital Literacy Skills Among Engineering Students"

Keerthi and Uma Maheswari (2026) investigated digital-literacy skill gaps among engineering students using a mixed-method approach. The study surveyed 128 engineering students and interviewed six industry professionals. It identified gaps in advanced digital skills, data literacy, software use, communication, and problem-solving. The findings highlighted the need to align higher education curricula more closely with industry requirements.

The relevance of this research to the present study is its focus on digital skills and curriculum improvement. Similarly, the present study investigates whether technical institute curricula adequately develop emerging technology skills and prepare students for employment.

C. Sivaraman et al. (2026) – "Evaluating the Impact of NEP 2020 on Higher Education Reforms and Skill Development in India: A Systematic Literature Review"

Sivaraman et al. (2026) conducted a systematic literature review of 50 peer-reviewed sources published between 2020 and 2025. The study examined the influence of the National Education Policy (NEP) 2020 on higher education reforms and skill development in India. It identified progress in curriculum reforms and vocational education while highlighting challenges such as limited funding, inadequate infrastructure, faculty readiness, and regional disparities.

The relevance of this research to the present study is its examination of curriculum reform and skill development in Indian higher education. The present study complements this work by collecting primary data from students to understand their perceptions of curriculum effectiveness, practical learning, and employability.

D. Alam et al. (2025) – "Does the Digitalised Era Adjust the Mismatch as Match? A Comparison of Graduates from Different Streams to Align HE and Industry in Bangladesh"

Alam et al. (2025) examined the mismatch between higher education and industry requirements in Bangladesh. The study used descriptive statistics, multinomial logistic regression, and interviews to investigate graduate skills and employment-related requirements. It highlighted the growing importance of digital and computer-related skills across different academic disciplines.

The relevance of this research to the present study is its focus on the alignment between educational outcomes and industry expectations. Similarly, the present study examines whether technical institute curricula develop the skills students believe they need for employment.

E. Srivastava et al. (2025) – "Vocational Training and Employability: A Study in Reference to Skill Development Program from Gujarat, India"

Srivastava et al. (2025) evaluated vocational training and employability in Gujarat using a mixed-method approach and the Kirkpatrick training evaluation model. The research involved more than 500 beneficiaries and interviews to examine training outcomes. The study identified potential benefits for skill development and employability while highlighting challenges related to training quality and job retention. It also emphasized the importance of improving training standards and industry connections.

The relevance of this research to the present study is its focus on the relationship between skill development and employment outcomes. While the earlier study focused on vocational training, the present study examines students' perceptions of technical institute curricula, practical learning, and preparation for industry

requirements.

F. Dlamini and Dlamini (2025) – "Transitioning from Academia to the Professional Arena: Evaluating Higher Education Curriculum Strategies—A Review"

Dlamini and Dlamini (2025) reviewed curriculum strategies used to prepare higher education students for professional employment. The study emphasized aligning curriculum content, teaching methods, and assessments with workplace requirements. It also highlighted the importance of practical learning and employability-focused education.

The relevance of this research to the present study is its emphasis on connecting academic learning with workplace expectations. The present study extends this discussion by examining students' perceptions of practical training, curriculum effectiveness, and job readiness.

G. Akhtar et al. (2024) – "The Interdisciplinary Curriculum Alignment to Enhance Graduates' Employability and Universities' Sustainability"

Akhtar et al. (2024) investigated curriculum alignment and graduate employability by examining 38 academic programs and interviewing 16 academics and industry experts. The study emphasized the importance of analytical skills, programming, and big data in preparing students for changing industry requirements. It recommended regularly updating curricula to reflect developments in the workplace.

The relevance of this research to the present study is its focus on industry-oriented curriculum development and technology-related skills. Similarly, the present study investigates students' views on curriculum content, practical learning, and the skills required to improve employability.

IV - RESEARCH GAP

Recent studies have examined curriculum, skill development, digital literacy, and employability, some areas remain insufficiently explored:

- Limited overall evaluation : Recent studies focus on one area, such as digital skills, employability, or vocational training, then overall effectiveness of technical-institute curriculum.
- Less student focused evidence : There is need for more research based directly on student's perceptions of curriculum effectiveness and job readiness.
- Practical learning needs more attention : Practical training, internships, projects, and industry exposure are important, but their combined role is not sufficiently examined.
- Curriculum industry mismatch : A gap exists between what students learn in institutes and skills required by employers.
- Need of integrated analysis : Few studies examine curriculum effectiveness, skill development, practical preparation, and employability .
- Focus of study : This research finds gaps between assessing student's perceptions of technical institute curriculum effectiveness in skill development and employability.

V - RESEARCH QUESTIONS

Based on identified research gaps, the study aims to answer the following research questions:

1. What are students' perceptions of the effectiveness of their technical institute's curriculum in developing relevant skills?
2. What practical and hands-on learning opportunities does the curriculum provide to students?
3. How does the curriculum prepare students for current industry and employment requirements?
4. How does internship or work experience relate to students' perceived job readiness?
5. How do students use external learning platforms to develop skills beyond their college curriculum?
6. Which areas of the technical institute's curriculum do students believe require the most improvement?
7. What relationship exists between students' perceptions of curriculum effectiveness and their perceived employability or job readiness?

VI - RESEARCH OBJECTIVES

The main objective of this research is to assess the effectiveness of technical institute curriculum in developing relevant skills and improving employability among higher education students.

The specific objectives are:

1. To assess students' perceptions of the effectiveness of technical institute curriculum in developing relevant skills.
2. To examine the extent of practical learning and hands-on training provided through the curriculum.
3. To evaluate how well curriculum prepares students for their current industry and employment requirements.

4. To analyse role of internships, external learning platforms and work experience in students' skill development and job readiness.
5. To identify areas of improvements that students need in their curriculum for better employability and development of skill.

VII - HYPOTHESIS

The hypotheses of this study were developed to examine the relationship between technical institute curriculum effectiveness, practical learning, internship or work experience, external learning, and students' perceived job readiness. The hypotheses were tested using the survey responses collected from 52 higher education students.

H1: Curriculum Effectiveness and Job Readiness

- H_{01} (Null Hypothesis): There is no significant relationship between students' perceptions of curriculum effectiveness and their perceived job readiness.
- H_{11} (Alternative Hypothesis): There is a significant positive relationship between students' perceptions of curriculum effectiveness and their perceived job readiness.

H2: Internship or Work Experience and Job Readiness

- H_{02} (Null Hypothesis): There is no significant difference in perceived job readiness between students with internship or work experience and students without such experience.
- H_{12} (Alternative Hypothesis): Students with internship or work experience have significantly higher perceived job readiness than students without such experience.

H3: External Learning and Job Readiness

- H_{03} (Null Hypothesis): There is no significant difference in perceived confidence and job readiness between students who participate in external learning and those who do not.
- H_{13} (Alternative Hypothesis): There is a significant difference in perceived confidence and job readiness between students who participate in external learning and those who do not.

H4: Practical Learning and Employability

- H_{04} (Null Hypothesis): There is no significant relationship between students' perceptions of practical, hands-on learning and their perceived job readiness.
- H_{14} (Alternative Hypothesis): There is a significant positive relationship between students' perceptions of practical, hands-on learning and their perceived job readiness.

The hypotheses were evaluated at a 5% significance level (\(\alpha = 0.05\)). A p-value below 0.05 was considered statistically significant.

VIII - RESEARCH METHODOLOGY

This study uses quantitative, cross-sectional survey design to assess student's perceptions of effectiveness for technical institute curriculum in skill development and employability.

A. Samples and Dataset:

The study uses 52 valid responses collected from higher education students studying in technical institutes. The dataset consists of responses to a structured 20-question questionnaire (Q1–Q20).

B. Research Instrument:

A structured questionnaire was used as primary research instrument. The questionnaire was divided into four sections :

- Section A : Student background information such as course, year, gender, and internship , work experience.
- Section B : Learning habits, job awareness, barriers to skill development, and areas requiring curriculum improvement.
- Section C: Students perceptions of curriculum effectiveness, including practical learning, industry relevance, workshops, and syllabus updates.
- Section D : Students awareness, confidence, job readiness, and perceptions of employability and additional requirements of skills.

Questions in Sections C and D mainly used five-point Likert scale ranging from Strongly Agree to Strongly Disagree.

Research Procedure:

The questionnaire responses were collected and checked for validity and completeness. The valid responses were organized and coded for statistical analysis. The relevant questionnaire variables were used to examine the relationships and group differences stated in research hypotheses.

Data Analysis Methods

The data collected through the structured questionnaire were analyzed using quantitative statistical methods. A total of 52 valid responses were included in the analysis. Descriptive statistics and inferential statistical tests were used to summarize students' responses and examine the proposed hypotheses.

1. Descriptive Statistics

Frequencies and percentages were calculated for demographic information, learning experiences, and students' opinions about curriculum effectiveness. These statistics helped identify common responses and areas where students believe technical institute curricula require improvement.

The percentage was calculated using:

$$\text{Percentage} = \frac{f}{N} \times 100$$

where f represents the number of responses in a category and N represents the total number of valid responses.

2. Likert-Scale Coding

Responses to the four-point agreement scale were converted into numerical values for statistical analysis.

Response	Score
Strongly Disagree	1
Disagree	2
Agree	3
Strongly Agree	4

For selected multi-item measures, average scores were calculated to represent students' perceptions of curriculum effectiveness and job readiness. Higher scores indicated more positive perceptions. Negatively worded items were reverse-coded where appropriate before calculating composite scores.

3. Pearson Correlation Analysis

Pearson's correlation coefficient was used to examine the direction and strength of the relationship between curriculum effectiveness and perceived job readiness (H1).

It was also used to examine the relationship between practical learning and perceived job readiness (H4).

The Pearson correlation coefficient was calculated as:

$$r = \frac{\sum(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum(x_i - \bar{x})^2 \sum(y_i - \bar{y})^2}}$$

where x_i and y_i represent the observed scores, and □ and □ represent their respective means. The coefficient r ranges from −1 to +1. A positive value indicates a positive relationship, while a negative value indicates an inverse relationship.

4. Independent-Samples t-Test

Welch's independent-samples t-test was used to compare the mean perceived job-readiness scores of students with and without internship or work experience (H2). It was also used to compare confidence and readiness scores between students who participated in external learning and those who did not (H3).

The test statistic was calculated using:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s^2}{n_1} \frac{s^2}{n_2}}}$$

where $\bar{x}1$ and $\bar{x}2$ are the group means $s2$and $s2$ are the group variances, and n_1 and n_2 are the group sample sizes. Welch's test was selected because it does not require the two groups to have equal variances.

5. Significance Testing and Hypothesis Evaluation

All hypothesis tests were evaluated at a significance level of 0.05. The p-value was used to determine whether the observed result was statistically significant.

- If $p < 0.05$, the null hypothesis was rejected.
- If p 0.05 , the null hypothesis was not rejected.

The analysis indicated a statistically significant difference in perceived job readiness between students with and without internship or work experience. The relationships tested under H1 and H4, and the group difference tested under H3, were not statistically significant. These results describe associations and differences in the surveyed sample; they do not establish causal relationships.

Hypothesis	Statistical Test	Result	Decision
H1: Curriculum effectiveness is positively related to job readiness	Pearson correlation	r = 0.046 , p = 0.748	Rejected
H2: Students with internship or work experience have higher perceived job readiness than students without such experience.	Independent samples t-test	t = 2.435, p =0.019	Accepted
H3: Students who participate in external learning activities differ significantly in their perceived confidence and job readiness from students who do not participate.	Independent samples t-test	t = -0.167, p = 0.869	Rejected
H4: Practical learning is related to perceived employability	Pearson correlation	r = 0.093, p=0.513	Rejected

IX - RESULTS AND ANALYSIS

The results are based on 52 valid questionnaire responses. The collected data were analyzed using frequency, percentage, descriptive statistics, Pearson correlation, and independent-samples t-tests.

Descriptive Results

The descriptive analysis shows that students generally have a positive perception of their curriculum. A large proportion of students agreed curriculum includes AI ML or data-related skills (92.3%) and provides practical, hands-on learning (84.7%). Similarly, 80.7% agreed teachers connect lessons with current industry requirements. 51.9% students agreed college provides workshops or certifications on emerging technologies. This indicates need of current technologies exposure through workshops, certifications, and practical activities.

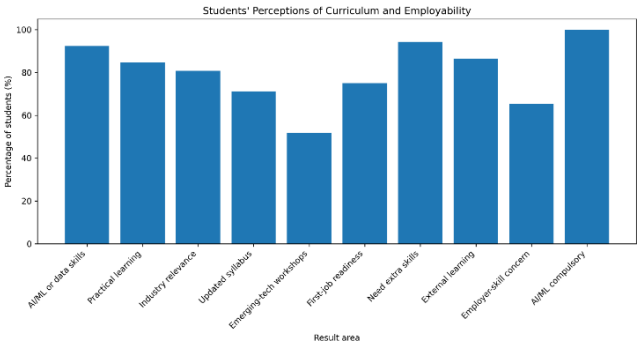


Figure 1: Bar Graph of Major Survey Findings

The bar graph shows that the highest percentage was recorded for the statement that AI/ML skills should be compulsory in the curriculum (100%). This was followed by the belief that students need additional skills outside college (94.2%) and that the curriculum includes AI/ML or data skills (92.3%). The lowest value was for emerging-technology workshops and certifications (51.9%).

Distribution of Curriculum Effectiveness

An overall curriculum-effectiveness score was calculated from Q9–Q13 by converting the Likert responses into numerical values from 1 to 4.

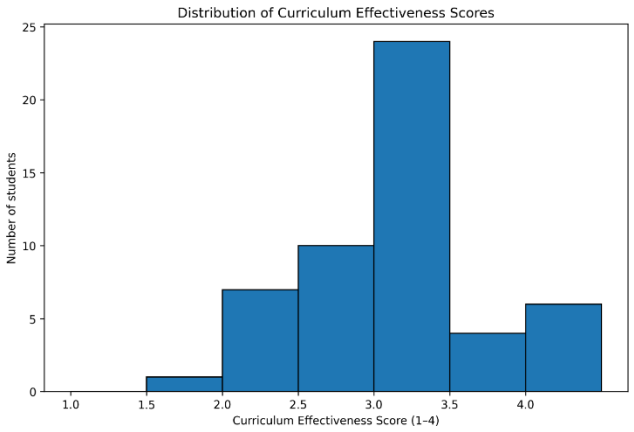


Figure 2: Histogram of Curriculum Effectiveness Scores

The histogram shows students curriculum effectiveness scores are concentrated around 3.0 to 3.5 range, indicates positive perceptions of curriculum effectiveness. Only smaller number of students recorded lower scores, while some students reported very high effectiveness scores.

Internship and Work Experience

Overall, 52 respondents, 24 students (46.2%) reported having internship or part-time work experience, and 28 students (53.8%) reported having no such experience.

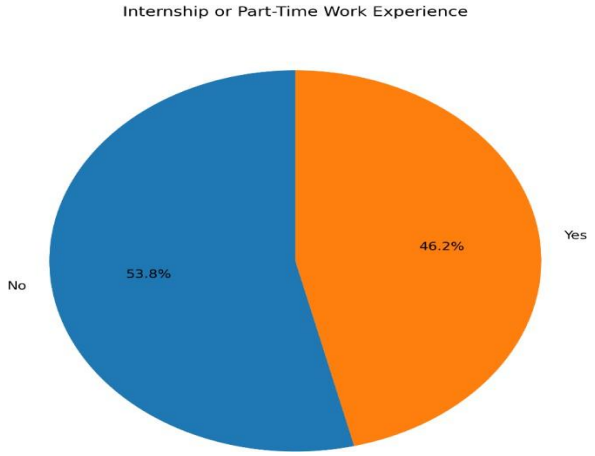


Figure 3: Pie Chart of Internship or Part-Time Work Experience

The pie chart shows that slightly more than half of the respondents had not yet gained internship or part-time work experience. Students with internship/work experience also recorded a higher average perceived job-readiness score than students without such experience.

Students' Job Readiness and External Learning

The results show that 75.0% of students agreed that they feel ready for the skills required in their first job. At the same time, 94.2% agreed that they need to learn additional skills outside college to become job-ready. In addition, 86.5% of students reported participating in external learning activities such as online courses and other learning platforms. These findings suggest students' importance of continuous learning beyond formal college curriculum.

Areas Requiring Improvement

The selected area for improvement was industry exposure (34.6%), then placement support (28.8%) and practical hands-on training (23.1%). This shows that students expect technical institutes to provide stronger connections between academic learning and real workplace requirements.

Overall Result

Overall students view technical institute curriculum positively in areas such as practical learning, AI ML content, and industry relevance. Findings also reveal needs of improvement in industry exposure, placement support, emerging technology workshops, and practical preparation. Strong dependence on external learning and significant relationship between internship, work experience and job readiness indicates employability development requires both classroom learning and real-world exposure.

X. MAJOR FINDINGS

The major findings of this study are based on the analysis of 52 valid questionnaire responses collected from higher education students studying in technical institutes.

1) Curriculum and technical skills : A large majority of students agreed that curriculum includes AI/ML or data-related skills (92.3%) and their colleges provides practical, hands-on learning (84.7%).
2) Industry relevance : Most students (80.7%) agreed teachers connect lessons to current industry needs, while 71.2% agreed syllabus is updated regularly according to industry changes.
3) Emerging-technology exposure : Only 51.9% of students agreed college provides workshops , certifications on emerging technologies, indicating area that requires improvement.
4) Job readiness: 75.0% of students agreed that they feel ready for skills needed in their first job. 94.2% also agreed that they need to learn additional skills outside college to become job-ready.
5) External learning: 86.5% of students reported taking courses or learning skills outside college, showing strong dependence on external learning opportunities.
6) Industry and career preparation: Industry exposure identified the most important area for improvement by 34.6% of students, followed by placement support (28.8%) and practical , hands-on training (23.1%).
7) Employability concerns: 65.4% of students agreed they worry about lacking skills expected by employers, while 59.6% disagreed that degree alone is enough to obtain good job.
8) Internship experience: 46.2% of students had completed an internship or part-time job, while 53.8% had not. Students with internship/work experience showed higher average perceived job-readiness scores than those without experience.
9) Hypothesis testing : Statistical analysis found major differences in job readiness between students with and without internship, work experience ($p < 0.05$), supporting H2. Analyses for H1, H3, and H4 did not show statistically significant relationships or differences at 5% significance level.
10) AI/ML curriculum : Students (100%) agreed that skills like AI ML should be compulsory in their college curriculum, increasing strong demand of emerging technologies.

XI. CONCLUSION

The study finds effectiveness of technical institutes curriculum in developing skills and employability in

higher education students. Analysis of 52 responses shows students have positive perception of their curriculum. Students appreciated AI ML , practical learning, and connecting industry requirements and identified industry exposure, placement support, practical training, and emerging technology workshops as areas that needs improvement.

(94.2%) students agreed need additional skills outside college for job-readiness. 86.5% students reported that participating in external learning activities. All (100%) agreed that AI ML skills should be a compulsory part of their curriculum. Statistical analysis shows students with internship or work experience had significantly higher perceived job readiness. Therefore, H2 was supported, while H1, H3, and H4 were not statistically significant. The research objectives and research questions were addressed through the questionnaire analysis. Overall study highlights importance of practical experience and continuous curriculum improvement. Stronger industry exposure, practical training, placement support, and emerging technology integration can further improve students job readiness and employability.

XII. LIMITATIONS

1. Limited sample size: The study was based on only 52 valid responses, which may limit the generalizability of the findings to the wider population of higher education students.
2. Limited study population: The respondents were students from technical institutes, so the findings may not fully represent students from other types of higher education institutions.

XII. FUTURE SCOPE OF RESEARCH

1. Larger dataset: Future studies can use a larger number of respondents from different technical institutes to improve the reliability and generalizability of the findings.
2. Longitudinal research: Future research can track students over several semesters or years to examine how curriculum, internships, and skill development influence job readiness over time.

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