Prioritizing Service Quality Factors for Polytechnic Institutions as Per Student’s Perception in the State of Madhya Pradesh, India

Pramod Kinker; Shailesh Vaidya and A. R. Singh
Department of Mechanical Engineering
National Institute of Technology Raipur
Chhattisgarh, India
promod_kinker@rediffmail.com; shailvdy@gmail.com; arsingh.mech@nitrr.ac.in

Rajeev Jain
Department of Mechanical Engineering
Kalaniketan Polytechnic College Jabalpur
Madhya Pradesh, India
jainrajeev.kpc@gmail.com

Abstract

The purpose of this paper is to prioritize service quality factors for polytechnic institutes as per student’s perception in the state of Madhya Pradesh India. A total of ten service quality factors were identified from the exhaustive literature review and the expert opinion of polytechnic institutions. These service quality factors were prioritized using Relative Importance Index technique. The data was collected using convenient sampling technique from the students studying in the polytechnic institutions of Madhya Pradesh, India. The findings of the study suggest that quality infrastructure, well-qualified faculties and supporting staff, better academic performance and placements are the most important service quality factors for improvement of quality in polytechnic institutions. The outcome of this research would be helpful to the administration of polytechnic institutions in determining their optimal strategies and consequently designing their education policy.

Keywords
Education, Madhya Pradesh, Polytechnic Institutes, Relative Importance Index, Service Quality Factors

1. Introduction

Technical Education System has an essential purpose for socio-fiscal expansion in any country. The system not only deals with information growth, skill transfer, and cultural exchange but also make an alliance with industries. The demand and opportunity in this system comprise the exponential increase in a number of technical institutions particularly in the developing countries like India. Also, there exists stiff competition among these institutions to attract meritorious students and fill their sanctioned intakes. The only approach available to these institutions is to increase the quality of education for gaining more market share. Thus institutions start many lucrative things like a collaboration with a foreign university, launching new courses and updating labs with modern facilities-cum technologies, recruiting excellent faculties and developing the existing infrastructure. Through these initiatives, the institutions try to increase their service quality in all aspect and build their brand image. Consequently, various challenges limit the technical institutions to reassess their brand equity and market positioning through sufficient control to follow the quality standards of education (Liberatore and Nydick, 1999).

The quality of education comprises numerous extent associated with system-level factors. The enhancement upon these extents is mandatory if the institution desires to enhance its efficiency and thus the quality of education is an issue of apprehension for technical institutions. It has been studied and recognized quality as a prerequisite and has been suggested as a multiplicity of measures for its enhancement. Further technical education in India is divided in three major streams namely Industrial Training Institute (at high school level), polytechnic education (after high school level or at the intermediate level) and engineering education comprising of graduates and postgraduates (after
Among these, polytechnic education has good importance and often provides the need for a skilled workforce for the country along with Industrial Training Institute.

1.1 Polytechnic Education in India
Polytechnic education creates a pool of skilled manpower linking technicians and engineers. This manpower is used for organized and unorganized service sectors and constitutes a segment of technical education contributing significantly to the physical development. Polytechnic education provides diploma certification in various streams and responsible for supporting skill development initiatives like national vocational education qualification framework (NVEQF) and community development through polytechnics (CDTP).

The diploma courses face the issues of static curricula, poor industry interface, ill-responds to needs, obsolescence of equipment and adequate trainers. Consequently, the diploma course loses the skill components and is perceived as a diluted version of degree education. Quality education in polytechnics is a concern to fulfill the objectives of the government of Madhya Pradesh (India).

Government and other legitimate agencies do take essential remedial steps in this regard. In spite of all these efforts, the quality of technical education has declined in India resulting in loss of interest among student to take up these courses (Sahney et al., 2006). This could be seen from the fact that thousands of seats remain vacant leading to decrease in enrollment ratio (Sahney et al., 2012). One more aspect of declining quality could be an exponential increase in a number of the technical institution in the recent past. Also, students from these institutions are not prepared to fulfill the initial prerequisite standards of industries. Thus, quality enhancement emerges as an efficient tool to deal with such problems. Further to enhance quality there is a need to understand the quality improvement factors in technical institutions. Following this will not solve root problems related to quality since institutions can’t afford to take corrective action to all culprits. Hence a need arise to prioritize these factors and consequently take action in the context of their importance. The successful adaptation of service quality improvement factors in polytechnic education institutes situated in India would enhance education quality. The quality enhancement of polytechnic education may bring the required skills and knowledge in students that help for employment in the current market situation. Thus this paper aims to identify service quality factor responsible for service quality enhancement in polytechnic institutions and consequently prioritize them as per their importance. However, these prioritization has to be as per students perspective as they are the main stakeholder of the education sector (Hill, 1995; Furedi, 2010; Bowden, 2011; Budd, 2017). For this purpose, this work takes account students perspective for prioritizing service quality factors.

2. Literature Review
It is imperative for an educational institution to maintain the quality of academic services due to competition and quickly changing environment. Higher education institutions are commencing to realize and are contending for students, equally in the national and international market (Paswan and Ganesh, 2009). More careful generalization is required for the case of higher education due to its complex characteristics (Owlia, Aspinwal, 1996).

The purpose of this study is to explore relevant literature available on the quality of education, its factors and the approach in prioritizing service quality. Consequently, there is a need to review the literature concerning the concept of service quality its tools, techniques, and application in the area of technical education. The literature review is based on the approach of service quality factors, tools, and techniques applied by the researchers in the field of education.

Debnath and Ravishankar (2012) have discussed quality of technical education in India context by Interactive Structure Modeling(ISM). Jain et al. (2013) focused on service quality of technical education for the Indian context and used total correlation to understand correlation while Cronbach’s alpha for checking the consistency of used scale for questionnaire purpose. Whereas Sahu et al. (2008) proposed a model for quantification and the effectiveness of technical institutions in India. Shekhar et al. (2012) measured the overall service quality (OSQ) in engineering education through Fuzzy TOPSIS by evaluating distances of each factor between fuzzy positive ideal rating and fuzzy negative ideal rating. Tulsi&Poonia (2015) attempted to highlight strategies in the Indian context to improve quality and strive for excellence in institutes according to the Washington Accord. Satsangi (2016) has assessed the quality teaching in Indian higher education.

Idoro and Bose (2014) have suggested service quality factors and students’ perception using SERVQUAL model with independent t-test and multiple regressions for Nigerian Polytechnics. Chopra et al. (2014) have identified the gap between expectations and perceptions of service quality in higher education by SERVQUAL and t-test. Anwowie et al. (2015) have reported service quality students’ satisfaction of Polytechnic Takoradi, Western Region Ghana by using SERVQUAL model. Akhlaghi et al. (2012) attempted to assess the service quality of educational institute by five-dimensional SERVQUAL model for technical and vocational colleges of Iran. Palli and Mamilla (2012) have discussed the higher education service quality and students’ satisfaction with the application of t-test and ANOVA.

The careful review of the literature suggested that competence, attitude, content, delivery, and reliability are the factors to evaluate service quality and measures performance to enhance educational services (Sahney et al., 2003; Sahney et al., 2008; Sahney, 2011a, b). The quality factors like tangibles, reliability, responsiveness, assurance and empathy have identified the level of service quality in educational institutions measuring students’ expectations and perceptions about the service they acknowledged (Akhlaghi et al., 2012; Palli and Mamilla, 2012; Idoro and Bose, 2014; Chopra et al., 2014; Anwowie et al., 2015). Curriculum, academic facilities, industries exposure, input quality, support facilities, interpersonal relationship, non-academic activities, input resources, instructional processes, research, enablers and barriers to improve and develop the curriculum of technical education seek to improve quality of service and build excellence in engineering education (Debnath and Shankar, 2012; Jain et al., 2013; Tulsi and Poonia; 2015 and Satsangi, 2016).

It has been observed that service quality factors infrastructure, teaching effectiveness, interaction with industry and society, extracurricular activities, research and development, responsiveness, information and skills of staff, training and placement, integrated education, empathy, learning outcomes, physical facilities, personality development, academics and administrative staff influence the performances of services provided to the stakeholders (Khan and Mahapatra, 2008; Sahu et al., 2008, Akdag and Zaim, 2012; Shekhar et al., 2012), Sahney, 2012; Sahu et al., 2013).

2.1 Motivation for the Study

It has been summarized from the literature review the potential of service quality enhancement exists in the area of education, particularly measurement and evaluation of service quality. Further there exist opportunities to model factors affecting service quality in educational institutions by applying suitable techniques for assessment, comparison, and ranking. Also, there exist studies for higher technical and management studies for evaluating their service quality, but no studies exist in the context of polytechnic education which is an important aspect of technical education in India. In this regard, we apply the Relative Importance Index for prioritizing service quality factors of the polytechnic institute in the Indian context.

3. Service Quality Factors in Polytechnic Education

This works aim to prioritize the service quality for quality enhancement in polytechnic institutions of Madhya Pradesh State of India. For this purpose, at first, the service quality factors were identified through an exhaustive literature search and finalization were done based on the opinion of an educational expert. The final selected factors for this study and their interpretation are tabulated in table 1.

Table 1. Identified Service Quality factors and their interpretations

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Service Quality Factors</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Academic performances</td>
<td>Institution results compared with university results and whether results perform the provisions to appear in placement activities.</td>
</tr>
</tbody>
</table>
2. Appropriate physical facilities | Facilities like a hostel, parking area, garden, common room, cafeteria, stationary, sports facilities, auditorium, and studio.
3. Curriculum structure | The program of study motivated by preferred education outcomes defined in the university's strategic plan.
4. Faculty and supporting staff | For the implementation of the latest updated changes in the field of academics and administration.
5. Feedback from students | The student’s opinions are considered by policy developers.
6. MOU with industry | For strengthening institute-industry interface and entrepreneurship development in the institute.
7. Office automation system | For better record keeping and rendering services.
8. Placement and career counseling | Provision for good opportunities for campus placement and providing career counseling seminar, workshop as well as inculcating ethical values among students.
9. Quality infrastructure (classrooms and laboratories) | Well-equipped modern facilities in classroom, laboratories, and provision of good offline/online library services.
10. State of Art Technology | For the implementation of the latest technology through appropriate means.

4. Methodology
Relative Importance Index (RII) has been used to determine the relative importance of the delay causes (Kometa et al. (1994). The same method is used in this study is to prioritize the identified service quality factors for the polytechnic institute of Madhya Pradesh. RII is a method to rank the quality factors according to stakeholder perception. The RII makes uses of perception through the questionnaire by asking the respondent to rate their perception about the asked factors. The value of RII had a range between ‘0’ to ‘1’, the ‘0’ value means “not inclusive”. The higher value of RII shows more importance. The RII method provides prioritize factors in fewer steps compared to other ranking MCDM methods and provides accurate ranking based on customer response. The validation of responses can be checked by any approach for better result. This study used Cronbach alpha to validate the data. The RRI score is calculated using equation 1.

$$RRI = \frac{\sum W}{AN} = \frac{5n_5 + 4n_4 + 3n_3 + 2n_2 + 1n_1}{5N}$$

Where $n_1$ stand for the minimum rating given by the respondent and $n_5$ stand for the higher rating given by the respondent on given scale.

‘W’ stands for weighting has been given to each variable by respondents (in 1 to 5 ranges)
‘A’ stand for the highest weight (5 for this case)
‘N’ stands for the total number of responses.

For our case, we used a Likert Scale as follows
1. Most Important; 2. Important; 3. Neutral; 4. Not Important; 5. Not at all Important

The format of the questionnaire is given at the end of this paper in the form of an appendix.

4.1 Data collection
A questionnaire survey technique has been using to analyze the comparative impact of quality factors in polytechnic institutions. Structured questionnaire survey based on identified issues in technical education is shared with boys and girls studying in polytechnic institutions of Madhya Pradesh India. The structured questionnaire asked the demographic profile of the respondents like Name, Age, Institutions, etc. in the first part while they were asked to rate the questions on the Likert scale of 1-5 given against each question in the second part.

The random sampling technique was used to collect the data from the respondents which were distributed online to 250 students studying in different polytechnic institutions of Madhya Pradesh, India. A total of 122 responses were received which was further screened and few responses were omitted either due to incomplete form or vague response. Finally, 104 valid responses were selected for final analysis purpose which makes 41.6% which is fair enough for carrying out further investigation. The detailed profile for distribution of the survey is shown in Table 2. The data collected were analyzed using MS-Excel and SPSS 20.0. Relative Importance Index (RII). RII has been applied to priorities the impact of the quality factors.

| Table 2. Distribution of Respondents Profile |  |
| Respondents Distributed | Received | Valid Responses |
| 1643 | | |
4.2 Reliability analysis
In the case of a questionnaire survey, the reliability test is necessary to check the consistency of scale and ensure dimensionality. For this purpose, Cronbach's alpha is a suitable measure. In the case of our study, the value of Cronbach’s alpha was calculated as 0.825 which is well under the specification limit which is 0.7 (Sao et al., 2017).

5. Results and Discussions
The data were analyzed and Relative Importance Index (RII) was calculated for each construct using equation 1 and mentioned in Table 3. The details in the form graph are shown in figure 1. It was found that quality infrastructure, faculty and supporting staff and academic performance were top three important service quality factor in students perception followed by placement and career counseling, appropriate physical facilities, curriculum structure and MOU with Industry. While the State of Art Technology, Office automation system, and Feedback from students were least three important service quality factors in students perception.

Quality infrastructure was a top priority for students since it could be believed that students often are attracted by good vibrant classrooms and laboratories. Also, students are very much influenced by good faculty, supporting staff and academic performance while appropriate physical infrastructure, curriculum structure, MOU with industry have moderate importance. Generally, students are very fascinating about office automation, state of the art technology and their feedback redressed, that’s why they have given less importance.

<table>
<thead>
<tr>
<th>Rank</th>
<th>Factors</th>
<th>Total Respondents</th>
<th>Total Score</th>
<th>RII In %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Quality infrastructure (classrooms and laboratories)</td>
<td>104</td>
<td>472</td>
<td>90.6</td>
</tr>
<tr>
<td>2</td>
<td>Faculty and supporting staff</td>
<td>104</td>
<td>457</td>
<td>87.7</td>
</tr>
<tr>
<td>3</td>
<td>Academic performances</td>
<td>104</td>
<td>439</td>
<td>84.4</td>
</tr>
<tr>
<td>4</td>
<td>Placement and career counseling</td>
<td>104</td>
<td>434</td>
<td>83.4</td>
</tr>
<tr>
<td>5</td>
<td>Appropriate physical facilities</td>
<td>104</td>
<td>433</td>
<td>83.2</td>
</tr>
<tr>
<td>6</td>
<td>Curriculum structure</td>
<td>104</td>
<td>430</td>
<td>82.6</td>
</tr>
<tr>
<td>7</td>
<td>MOU with industry</td>
<td>104</td>
<td>428</td>
<td>82.3</td>
</tr>
<tr>
<td>8</td>
<td>State of Art Technology</td>
<td>104</td>
<td>425</td>
<td>81.6</td>
</tr>
<tr>
<td>9</td>
<td>Office automation system</td>
<td>104</td>
<td>423</td>
<td>81.2</td>
</tr>
<tr>
<td>10</td>
<td>Feedback from students</td>
<td>104</td>
<td>420</td>
<td>80.6</td>
</tr>
</tbody>
</table>

![Relative Importance Index](image.png)

Figure 1. Relative importance index for service quality factors

6. Conclusion
This paper reports the importance of ranking associated with the service quality factors in the polytechnic institutions situated in Madhya Pradesh, India. It is exceedingly necessary for these institutions to examine their services designed for sustainable existence. It would be a challenge intended for the polytechnic institutions to afford quality services for the students. The adaptation success of service quality factors in polytechnic education institutes would bring quality students having excellent skills and knowledge required by industries and another sector for job purpose. However, in quest of ranking these service quality factors, Relative Importance Index was used. The result suggested that the most important service quality factors were quality infrastructure, faculty and supporting staff and academic performance, placement and career counseling and appropriate physical facilities. The result of this study discussed by the authors with a panel of educational experts and the experts validated the outcomes based on their experiences. The panel experts are having more than 10 years’ experience in educational quality enhancement field. This research will undoubtedly assist the polytechnic institutions in determining their optimal strategies in order to take student perception in increasing the service quality levels of polytechnic institutions in Madhya Pradesh, India.

This research will also help to design quality education model to ensure quality enhancement in polytechnic institutions. Further studies for measuring service quality factors may focus on issues of sub criteria’s effect on quality enhancement. The research may expose new aspects of service quality factors in polytechnic institutions for quality enhancement and to be integrated into the extent of an attempt to further explore the concept of service quality in technical education. However large dataset may be used involving more number of stakeholders like faculties, administration, industries to get a clear picture about quality enhancement in polytechnic institutions of Madhya Pradesh, India.

References


**Biographies**

**Pramod Kinker** is a part-time research scholar at Mechanical Engineering Department at National Institute of Technology, Raipur, India. He is also a Senior Lecturer in the Mechanical Engineering Department, Kalaniketan Polytechnic College Jabalpur, India. He has completed his bachelor degree from Guru Ghasidas University Bilaspur Madhya Pradesh, India and completed his master degree in heat power from Rajiv Gandhi ProdyogikiVishwavidyalaya, Bhopal, Madhya Pradesh, India. He has eighteen years of experience in teaching. His area of interest is the refrigeration system, education management, etc.

**Dr. Shailesh Vaidya** is Incharge Workshop at National Institute of Technology, Raipur India. He completed his Bachelor of Engineering degree in Mechanical engineering from GEC, Rewa MP. He has M. E. degree in Industrial Engineering and Management from Ujjain College of Engineering. He holds a Ph.D. in Management Studies from PACIFIC University, Rajasthan, India. He has 12 years of Industrial experience and has 8 years of academic experience. His areas of specialization are education management, workshop technology, etc.

**Dr. A. R. Singh** is an Assistant Professor in the Mechanical Engineering Department at National Institute of Technology, Raipur, India. He has completed his Bachelor of Engineering degree in Mechanical engineering from U.P.T.U, University, India. He has a Master of Technology degree in CAD-CAM from Motilal Nehru National Institute of Technology, Allahabad, India. He holds a Ph.D. in Mechanical Engineering from Motilal Nehru National Institute of Technology, Allahabad, India. His areas of specialization are operation research, supply chain management, optimization techniques, omnichannel, blockchain, education policy, and multi-criteria decision making. He has published more than 30 papers in International journals and International/National Conferences. Some of the international journals in which papers are published include – International Journal of Advanced Manufacturing Technology, International Journal of multi-criteria decision making, Journal of intelligent manufacturing, International Journal of Design Engineering, International journal of manufacturing systems, Applied Mathematics and Computation, etc.
Appendix

Expectations on Polytechnic Education Institutions (Students Perspective)

( Questionnaire)

(Your response be imperative to oblige to signify valuable views on your expectations while choosing a Polytechnic Institution for your technical study)

With reference to you:
1) Name:
2) Gender: Male          Female
3) Address:

Please indicate your valuable views on a scale of 1 - 5
5- Most Important (MI), 4-Important (I), 3-Neutral (N), 2-Not Important (NI), 1-Not at all Important (NAI)

<table>
<thead>
<tr>
<th>S</th>
<th>Factors</th>
<th>MI</th>
<th>I</th>
<th>N</th>
<th>NI</th>
<th>NAI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Academic performances</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Institution results compare to university results and whether results perform the provisions to appear in placement activities.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Appropriate physical facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adequate parking area, hostel, garden, cafeteria, reprography, sports facilities, auditorium, and studio.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Curriculum structure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The program of study motivated by preferred education outcomes defined in the university's strategic plan.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Faculty and supporting staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For the implementation of the latest updated changes in the field of academics and administration.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Feedback from students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>The student’s opinions are considered by policy developers.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>MOU with industry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For strengthening industry interface and entrepreneurship development in the institute.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Office automation system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For better record keeping and render services.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Placement and career counseling</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Practice recognizes to afford student’s career and survival decisions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Quality infrastructure (classrooms and laboratories)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Well equipped modern facilities in classroom, laboratories and library services.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>State of Art Technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For the implementation of the latest technology.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>