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Faculty Engagement in Using Teaching Learning Pedagogies of Digital Edge – Technology, Strategies & Challenges

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Abstract— Since 2005, Our institute (TCET) has been dedicated to excellence in teaching learning practices, epitomized by its adoption of the ISO Quality Management System (QMS). This system is pivotal in ensuring exceptional products and services for its primary stakeholders, the students. By meticulously scrutinizing every aspect of its offerings, TCET guarantees consistent delivery of high quality. The integration of quality models into daily academic operations viz. 5W1H etc., in a structured through documented processes as a semester conduct, ensures rigorous adherence. Regular audits reinforce this commitment, while continuous monitoring and review drive ongoing improvement. Embracing Quality Assessment and Accreditation, TCET's quality model is rooted in ISO standards, emphasizing customer satisfaction and a student-centric learning atmosphere in teaching learning practices. Structured around the PDCA cycle, the QMS provides a systematic approach [1] for process development and enhancement, guided by clear responsibilities and accountability. By integrating ISO standards and structured processes, TCET has cultivated a student-centric learning environment that emphasizes innovation and interdisciplinary learning. Impact studies confirm tangible enhancements in education quality, reinforcing TCET's reputation as a frontrunner in academic excellence. Looking ahead, TCET is committed to ongoing enhancement and surpassing standards in teaching and learning methodologies.

The semester conduct ISO institutional process IP-02 extends across all organizational functions, including interactions with regulatory bodies, students, and external providers. Quality Objectives include maintaining high-quality education, enhancing student satisfaction, and fostering innovation. Through innovative practices like Experiential Learning and Collaborative Learning, TCET enriches student abilities and promotes interdisciplinary learning. Impact studies demonstrate tangible improvements, including increased collaborations, publications, and technical skills. Embodying best practices, TCET places the student at the core of all activities, ensuring continuous performance improvement and consistently exceeding expectations through consistent delivery of various teaching learning pedagogies (TLP).

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The outcome result embodies the proof indicating the measurement through student satisfaction survey, continual practice of outcome based education, end semester result & PO attainment of the batch 2022-23 for effective faculty engagement in enriching TLP use of digital age.

Keywords- Due Diligence; ISO processes; PDCA; QMS; RACI matrix; SSS; Stakeholders; SWOT; TCET; TLP.

1. Introduction

TCET is committed to excellence, and to uphold this commitment, we have embraced an ISO Quality Management System (QMS) since 2005. This system serves as a cornerstone in our dedication to providing our students as the primary stakeholders with the exceptional products and services they expect. Through our semester conduct IP-02 ISO process the TCET system meticulously scrutinize every aspect of our teaching learning practices / offerings to ensure consistent delivery of high quality. At our institute, there is an integration of quality models into our daily operations in major functional areas, structuring our activities into documented processes that is rigorously practiced. Regular audits, conducted at specified intervals, reinforce the strict implementation of these processes [1]. In our system continuous monitoring and review of all activities, leveraging the insights gained to foster ongoing improvement and knowledge creation.

2. Motivation

Embracing TLP Quality assessment is essential for the advancement of any organization. Our institute has adopted a robust quality model aimed at fostering a structured and guided teaching-learning environment across all administrative activities. Rooted in the ISO framework, our quality model is primarily focused on ensuring customer satisfaction, driving all endeavors toward creating a student-centric learning atmosphere. Quality Management System (QMS) is to provide a systematic approach for developing and enhancing processes, employing effective deployment coupled with rigorous monitoring and control. This approach is guided by the PDCA (Plan, Do, Check, Act) cycle, ensuring processes operate independently and efficiently. Clear assignment of responsibilities and accountability through documented processes ensures the smooth execution of key activities.

3. Need

In the initial stages of our organization's establishment, there was a lack of coordination and connectivity among various internal activities. However, with the implementation of the ISO quality model, a systematic approach was adopted. Processes were meticulously identified, defined, and implemented following the PDCA cycle. Additionally, records generated from daily operations were identified, maintained according to defined retention periods, and properly disposed of thereafter [2-3]. This transformation has resulted in a highly structured framework where previously disparate records are now seamlessly linked to individual processes.

4. Scope

The ISO QMS model implemented by TCET extends its applicability across all organizational functions, encompassing interactions with regulatory bodies, students, external providers, and other stakeholders.

5. Objectives

The objectives are to maintain and sustain high-quality education, establish trust among consumers, stimulate creativity and innovation, constantly upgrade products and services to fulfill the expectations of students, and Striving for, enhancing, and maintaining excellence in education. Cultivating a culture of innovation and creativity. Ensuring the fulfillment and satisfaction of our students and attaining global competitiveness Enhancing the performance and durability of our students [4]. Then implementing precise measurements for each process through various activities. Assessing the strengths, weaknesses, opportunities, and threats of each process for effective oversight and management. ISO quality objective is attained in all class. The Counseling sessions for the faculty members who had achieved feedback below the quality objective (75%) are conducted by the department HOD.

6. Development Of Best Practice

By forming the processes through QMS, TCET is developing the following best practice points.

A. Best Practice statement – I

Enlisting of daily tasks of every individual on the Discussion room board to monitor and ensure compliance with that the impact: Check of compliance to all the tasks to be done was directly visible and every faculty could monitor what was pending and comply accordingly. (TLP based only)

1) Reframed Statement: Utilizing the Discussion room board to list daily tasks for each individual, facilitating monitoring and ensuring compliance for effective conduct of TLP.

2) Objectives of the Practice: To enhance accountability and oversight by employing the Discussion from board to document and track daily tasks, thereby promoting adherence to established protocols for effective TLP measurement.

3) The Context: Enlisting daily tasks of each individual on the Discussion from board to monitor and ensure compliance of using different TLP pedagogies.

4) The Practice: Incorporating the listing of daily tasks for every participant on the discussion from board to enhance the teaching-learning experience.

5) Enhancing teaching-learning experience: Promoting a more structured and accountable learning environment through the systematic listing and monitoring of daily tasks on the Discussion room board, ultimately enhancing the teaching-learning experience.

6) Evidence of Success: Increased engagement and participation demonstrated through improved task completion rates and adherence to set guidelines on the discussion. Results of students as an outcome through various online & offline teaching mechanisms.

B. Best Practice statement – II

Regular formal and informal counseling of students with respect to the TLP and the other department and institute activities: Findings of dissatisfaction in the TLP were identified, and sessions were arranged for the same.

1) Reframed Statement: Consistent provision of both formal and informal counseling sessions for students, addressing the Teaching-Learning Process (TLP) alongside other departmental and institute activities.

2) Objectives of the Practice: To enrich the teaching-learning experience by providing students with regular formal and informal counseling sessions, specifically addressing the Teaching-Learning Process (TLP) and other relevant departmental and institute activities.

3) The Context: Regular formal and informal counseling of students regarding the Teaching-Learning Process (TLP) and other departmental and institute activities.

4) The Practice: Incorporating consistent formal and informal counseling sessions for students, focusing on the Teaching-Learning Process (TLP) and various departmental and institute activities.

5) Enhancing teaching-learning experience: To enrich the teaching-learning experience through consistent formal and informal counseling sessions for students, specifically addressing the Teaching-Learning Process (TLP) and other relevant departmental and institute activities.

6) Evidence of Success: Measurable improvements in student engagement, performance, and overall satisfaction, evidenced by feedback and performance metrics following the implementation of regular formal and informal counseling sessions.

The following TLP pedagogies are used to enrich the cutting edge mechanism which brings interest in the courses of various types – theoretical, design based, application based, problem solving based etc. The TLP pedagogies are categorized in 03 types as primary (P), Secondary (S) & tertiary (T) based on the complexity level of TLP pedagogies types.

The details of table.1 below states about 20 TLP pedagogies. These pedagogies are based on being used for different types of courses which are designed as theoretical, design based, innovative course based, application based, problem solving based for critical thinking etc. The table below are majorly used by various cutting edge mechanism to make students learn & understand the course with a rudimentary type of understanding. The courses are tailor made based on the type of TLP pedagogies being used.

Table I :
Different TLP Pedagogies as Per Statutory Requirements

Sr. No.	Level	Name of Pedagogy	Sr. No.	Level	Name of Pedagogy
1	P	Classroom Lecture using chalk and talk technique	11	S	Use of project work and field work
2	P	Content-based instruction	12	S	Scenario planning
3	P	Activity -based learning	13	T	Storytelling
4	P	Case study examples and learning by design situations	14	T	Dramatization/Role plays
5	P	Use of practical exercises using ICT tools and Software	15	T	Real-life problems allowing reflection time
6	S	Jigsaws/Quiz	16	T	Debate
7	S	Mind-Mapping	17	T	Analysis of critical incidents originating familiar and non-familiar
8	S	Self-reflection	18	T	Interact with a diverse group
9	S	Peer teaching & think a loud pair problem-solving	19	T	Exploration
10	S	Group discussion with Brainstorming	20	T	Reframing problems

7. Deployment of Best Practice

Following are the stages of deployment mentioned in the Table 2.

Table II :
Stages of Deployment of Teaching Learning Practices – Impact & Alignment With Program Outcomes

Sr. No.	Innovative Practices	Impact Strategies on Process (With, Without)	Alignment with PO's
1	Department has adopted the **Experiential Learning (EL)** through various activities such as categorization of laboratory experiments (Basic, Design and Development and Group Activity), Internships as social & technical, Workshops, Seminars, Project Based Lear ning (PBL), Activity Based Learning (ABL), Activities, Professional Skills (PS), Employability Development Skills (ESD) etc.	Enriches student's ability to adapt to new technical areas/domains. Promoting interdisciplinary learning, social awareness, caree r development, cultural development, leadership, collaboration, and other professional and intellectual skills	Engineering Knowledge, Problem Analysis, Design/Development of solutions, Conduct investigations of complex problems, Modern Tool Usage, The Engi neer and Society, Environment and Sustainability, Individual and Teamwork, Communication, Lifelong learning, Project Management and Finance.
2	**Collaborative learning** : To promote collaborative learning with the increase in the use of reference book from library, tools, e - journals from library or project implementation, Capstone project, competitive exams etc.	Second year and Third year students are aware of technical implementations for various projects, to compete in other hackathon type of events etc. Then some assignments were given as open book test from reference book in library. Students found the collaborative learning experience interesting.	The Engineer and Society, Environment and Sustainability, Communication, Lifelong learning.
3	**Peer learning**: Technical Seminars were conducted for Second year and Third Year students in different sectors of Information Technology & Artificial Intelligence & Data Science domain.	Second year and Third Year students attended peer learning sessions on vari ous session like "Open source OS -Linux" and "Internships and Hackathons" by Final Year students. 90% students attended.	Engineering Knowledge, Problem Analysis, Design/Development of solutions, Conduct investigations of complex problems. Modern tool usage , Individual and Teamwork

4	**Activities through Student Body:** Different activities were organized through professional body S4DS and student focused group Mind-Benders that was constituted by the department.	Inter-department and inter-college interaction of the students improved.	Modern Tool Usage, The Engineer and Society, Ethics, Individual & Teamwork, Communication, Life -long Learning, Project Management & Finance
5.	**TLP- Pedagogies-** **a) Think Pair and Share (TPS):** An effective technique that can be used across various subjects and grade levels among students. **b) Real life problems** : To link up the concepts discuss din classroom, labs with real-time applications to bring interest among students to learn the concepts. **c) Peer teaching** : Students of Final year supporting students of third & second year to cope up with difficult subjects by sharing their experiences **d) Brain storming** : To discuss on difficult topics with rigor so that the concepts are very well clear am ong all students by solving similar examples of difficult questions **e) Mindmap**: To create a map to link the flow of any given detailed topic into small steps with the flowchart support. To begin the flow from the root position & build logic step by step so that the whole of the detailed topic is clear considering each fundamental topic required to be used in each small step **f) Flipped classroom**: A flipped classroom is structured around the idea that lecture or direct instruction is not the best use of cla ss time [7-8]. Instead students encounter information before class, freeing class time for activities that involve higher order thinking. **g) Designing online quiz through Mentimeter**: Quiz is created in online mode and shared among students during the lect ure delivery to check whether the topics/concepts taught by faculty members are well understood by students [9]. The choice of the answer could be as **True/False or Yes/No** and take the poll from	**Impact results in the increased engagement, Student Reflection, Peer Interaction, Active Listening, Quick Formative Assessment** **a)** The concept of TPS deals in bringing the concepts among students clear. On any gi ven specific topic when TPS activity is conducted on each pair of students then the combined solution view on that topic is discussed and cleared among all students present in the class [5-6]. **b)** The real life problems are discussed considering the actual technical basis of a problem to link to the real-life applications to make students understand a specific solution to a specific problem. **c)** Peer teaching among students of same discipline or inter -disciplinary or of same class creates a platform wherein students are allowed to interact and share the thoughts, concepts, solutions to understand few difficult concepts among peer. **d)** Brainstorming is required in class to make students understand difficult concepts, mathematical derivations, algorithms with rigorous discussions & make students understand or practice multiple times to understand the concepts. **e)** Mindmap is a mechanism which deals to make a logical complete flow plan in a step by step flow so that the large tasks, problems can be solved in a systematic way. **f)** Flipped classroom is a structured way to disseminate the idea of a concept explained in a very structured step by step by manner to other students in a class. This is a tried & tested mechanism wherein students of class grasp the concepts very well with finesse understanding.	Engineering Knowledge, Problem Analysis, Design/Development of solutions, Conduct investigations of complex problems. Modern tool usage, Modern Tool Usage, Individual and Teamwork, Communication, Life -long learning & Project management

A. Challenges faced:

During TLP delivery various challenges that come across are viz. pace of lecture delivery, no. of lectures planned & lectures actually delivered doesn't match, Students attendance, students' attention in class due to the fact of concepts being difficult or not interesting etc. To mitigate all these problems above discussed various TLP pedagogies are used to make students understand difficult concepts resulting in high passing percentage, make students technically competent.

The figure 1 below indicates about the process of the mapping,

attainment of the COs, POs, PEOs & mission vision statements (MVS) keywords. The mapping mechanism is from top to bottom whereas the attainment is from bottom to top approach. The measurement as attainment of POs for any course indicates the strength of each course learning is successfully learnt by students. To increase the educational productivity, the measurement of POs is carried out for each course to understand the outcome as a results are measured. This is also termed as outcome based education (OBE).

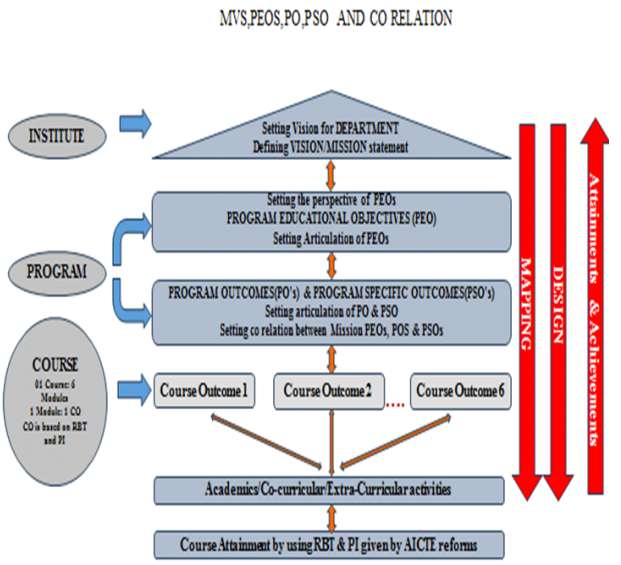

Fig 1 : OBE approach indicating correlation between MVS, PEOs, POs, PSOs

8. Student Satisfiction Survey

The provided text appears to be a segment of a student satisfaction survey (SSS). It aims to gather feedback from students on various aspects related to their learning experience. Here's a breakdown of the questions:

A. Inquiry about the coverage of the syllabus in the class, which indicates whether students feel the curriculum was adequately addressed.

B. Assessment of the effectiveness of teacher preparation for classes, focusing on how well-prepared instructors were before teaching.

C. Evaluation of teacher communication proficiency, indicating whether educators effectively conveyed information to students.

D. Assessment of the fairness of the internal evaluation process conducted by teachers, seeking feedback on the objectivity and equity of assessments.

E. Inquiry into the overall teaching approach employed by teachers, aiming to understand the methods and strategies used in teaching.

These questions aim to gather comprehensive feedback from students to evaluate different aspects of their learning experience and identify areas for improvement.

Some example of Student Satisfaction Survey is showed below in Table 3.

The provided example outlines the Teaching-Learning Process (TLP) in an educational institution, focusing on process planning, consistency in quality objectives, and the implementation of an open elective project.

Based on PDCA method the table [3] is below explained in this parameter:

Plan: In this phase, you establish objectives and processes necessary to deliver results in accordance with the expected outputs. Here, the plan could involve setting targets for improving satisfaction scores based on the feedback received.

Do: This phase involves implementing the plan, executing the process, and making the improvements. In the context of the student satisfaction survey, this could involve implementing changes based on the feedback received to address areas of dissatisfaction or to further enhance areas of satisfaction.

Then Next step will be based on check & Act method

Check: This phase involves monitoring and evaluating the implemented changes to see if they have achieved the desired results. Checking involves comparing actual results to expected results and analyzing the variations. In the context of the survey, this could involve regularly checking the satisfaction scores to see if they have improved following the implementation of changes.

Act: Based on the results of the 'Check' phase, appropriate actions are taken. If the results meet the desired objectives, then the changes may be standardized, and the process continues. If not, further adjustments may be made, and the cycle continues. In the context of the survey, if satisfaction scores have improved, the actions taken may be institutionalized as best practices. If not, further actions may be identified and implemented to address the issues.

A. Process Planning (TLP):

This section describes the meticulous planning and preparation of the curriculum, involving various stakeholders and ensuring alignment with industry standards.

Table III :
Student Satisfaction Survey Feedback Statistics

S. No	Questions	Very Dissatisfied	Dis-satisfied	Neither	Satisfied	Very Satisfied
Q 1	Please confirm this is the first and only time you answer this survey.	86	0	0	0	786
Q 2	How much of the syllabus was covered in the class ?	5	7	62	288	510
Q 3	How well did the teachers prepare for the classes ?	4	14	66	510	278
Q 4	How well were the teachers able to communicate ?	11	32	155	330	344
Q 5	Fairness of the internal evaluation process by the teachers.	12	59	162	372	267
Q 6	The teacher's approach to teaching can best be described as	15	24	147	394	292
Q 7	Was your performance in assignments discussed with you?	28	64	192	325	263
Q 8	Teachers inform you about your expected competencies, course outcomes and programme outcomes.	20	50	162	351	289
Q 9	Your mentor does a necessary follow -up with an assigned task to you.	34	57	155	320	306
Q 10	The teachers illustrate the concepts through examples and applications.	16	45	139	354	318
Q 11	Teachers are able to identify your weaknesses and help you to overcome them.	56	69	182	321	244
Q 12	The institute takes active interest in promoting internship, student exchange, field visit opportunities for students.	36	62	155	314	305
Q 13	The teaching and mentoring process in your institution facilitates you in cognitive, social and emotional growth.	32	54	206	321	259
Q 14	The institution provides multiple opportunities to learn and grow.	17	34	162	396	263
Q 15	The institution makes effort to engage students in the monitoring, review and continuous quality improvement of the teaching learning process	19	43	187	372	251
Q 16	Teachers encourage you to participate in extracurricular activities	16	40	192	358	266
Q 17	The overall quality of teaching -learning process in your institute is very good.	13	36	189	381	253
Q 18	The teachers identify your strengths and encourage you with providing right level of challenges.	29	48	202	351	242
Q 19	The institute/ teachers use student centric methods, such as experiential learning, participative learning and problem solving methodologies for enhancing learning experiences.	22	35	152	400	263
Q 20	Efforts are made by the institute/ teachers to inculcate soft skills, life skills and employability skills to make you ready for the world of work.	19	34	133	379	307
Q 21	What percentage of teachers use ICT tools such as LCD projector, Multimedia, etc. while teaching.	18	29	124	359	342
	Total	**508**	**836**	**3124**	**7196**	**6648**
	%	**2.95%**	**4.86%**	**18.16%**	**41.84%**	**38.65%**

Before designing the curriculum for a computer science course, faculty members collaborate to outline the course structure, including theory hours, practical sessions, and tutorials. They consult with industry experts to ensure the syllabus reflects current industry demands. Once finalized, the curriculum is reviewed by the department head, domain experts, and the Board of Studies (BOS) committee before implementation.

B. TLP Consistency:

It emphasizes maintaining consistent quality objectives over a period of time, accreditation status, academic reputation, faculty development, and providing a holistic learning experience.

The institution regularly reviews its Program Educational Objectives (PEOs), Course Outcomes (COs), Program Outcomes (POs), and Program Specific Outcomes (PSOs) to ensure they align with accreditation standards. Faculty members undergo continuous professional development to stay abreast of emerging trends in their field. Additionally, the institution emphasizes experiential learning and critical thinking to provide students with a well-rounded education.

C. Open Elective:

It introduces an open elective project aimed at exploring the concept of indeterminacy across disciplines, fostering critical thinking, creativity, and adaptability. The practical is attempted to make the open elective in the courses as Blockchain, Robotic Process Automation, Software Process Automation are made technically enriched. The TLP pedagogies as Brainstorming sessions, Think Pair share, and Flipped classroom pedagogies are used.

In an open elective project focused on indeterminacy, students from various disciplines engage in interdisciplinary discussions and research. They explore how uncertainty manifests in different contexts, analyze its implications, and propose innovative solutions. Through this project, students develop not only subject-specific knowledge but also critical thinking skills and the ability to navigate ambiguity in real-world scenarios.

D. Research Based Learning:

The inculcation of practical courses knowledge is linked to the project implementation of mini projects with literature survey, identifying problem definition, exploring appropriate methodology, implementation flow, verification & validation of results & conclusion on the work implementation. The problem statements are taken from SIH portal etc.

E. Professional Skills:

The skill based learning is inculcated among students through the training on skillset of IT industry requirements so that students are employable. The skills as python programming, Google cloud, Latex etc., make students industry ready. The ICT tool as Google classroom, flipped classroom etc. are used to gather assignments, assess them and make an interactive case study so that the learning is among all students.

F. Internship:

The students are required to complete 600 hours of internship throughout 4 years of engineering graduation. The students complete internships in two major categories as social & technical internship. The internships are carried out in-house & out house to make students employable & industry ready. The in-house internships are carried out and the assessment of students is done by verifying on the learning on internship projects. These projects are measured using jig saw puzzle mode, mentimeter, classroom teaching, mind mapping, interact with a diverse group of like-minded interns industry experiences etc.

The internships are also of type paid in nature where the students are taken as interns in small midcap IT firms where they solve the real-time societal projects and earn while learn. The quality of learning & experiences gathered by interns boosts their overall technical skills.

Overall, the example demonstrates a comprehensive approach to curriculum planning, quality assurance, and student engagement within the framework of the Teaching-Learning Process.

9. Results Of Best Practice

Improved efficiency: By standardizing processes and procedures, organizations can streamline operations, reduce waste, and enhance overall efficiency.

Table IV :
End Semester Exam Results Of First Year, It and Ai&ds Department Attainments W.r.t Set Standard Benchmark Quality Objective

Sr. No.	Quality Objectives	Set Benchmark as per institute level	Parameter	Value attained in IT	Value attained in AI&DS
1	To improve Students' performance quantitatively and qualitatively	The passing % per semester should be at least 75% out of which 50% must have first class or distinction	FE ESE Results	82.72% (Sem I 2023-24)	81.1% (Sem I 2023-24)
2	To improve Students' performance quantitatively and qualitatively	The passing % per semester should be at least 75% out of which 50% must have first class or distinction	S.E. ESE Result	97.8% (May 2023) 94.24 % (Dec 2022)	100% (May 2023) 85.71% (Dec 2022)
3	To improve Students' performance quantitatively and qualitatively	The passing % per semester should be at least 85% out of which 50% must have first class or distinction	T.E. ESE Result	100% (May 2023) 100 % (Dec 2022)	100% (May 2023) 94.29% (Dec 2022)
4	To improve Students' performance quantitatively and qualitatively	The passing % per semester should be at least 90% out of which 50% must have first class or distinction	B.E. ESE Result	100% (May 2023)	NA

Implementing and deploying the ISO 9001:2015 Quality Management System (QMS) results in enhanced efficiency through standardized processes, streamlined operations, waste reduction, and overall improvement. This initiative emphasizes student-centric practices, fosters leadership skills, engages personnel at all levels, adopts structured process-oriented approaches, integrates holistic systems perspectives, commits to ongoing enhancement, utilizes factual data for decision-making, and establishes mutually beneficial relationships with suppliers.

Comparison of results between two departments namely IT and AI&DS to understand the attainment of Quality Objective as per the set benchmark set as per institute standards is mentioned in Table 4.

Case A - After analyzing these data, it is clear that first-year students in both areas perform academically well. The percentages acquired across the two semesters and branches do, however, differ slightly. Compared to the AI & DS branch, the IT branch displays a higher percentage in both semesters. Notwithstanding these variations, both branches have excellent performance, demonstrating the value of the educational initiatives in supporting students' learning and growth.

To guarantee ongoing academic achievement, more research could be done to determine the variables influencing performance variances and pinpoint areas in need of development.

Case B- The results of IT department show a high level of success every year, with the Third Year and Final Year ESE tests showing especially noteworthy accomplishments with flawless marks in May 2023 and December 2022. The overall performance is still excellent even if there was a minor decline in the Second Year ESE scores from December 2022 to May 2023. Overall, these outcomes demonstrate the students in the IT department's commitment to excellence in their studies.

Case C - The Artificial Intelligence and Data Science (AI &DS) Branch was established in the 2021–2022 academic year. The findings show that the students performed well on the SE and TE ESE exams, achieving perfect scores in May 2023.

However, there was a minor drop in the SE results from December 2022 to May 2023. Overall, the establishment of the AI & DS branch has produced encouraging academic results, as students have proven to be proficient and excellent learners.

Table V :
Po Attainment of Batch 2022-23

PO	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PO-9	PO-10	PO-11	PO-12	PSO-1	PSO-2	PSO-13
Target	2.50	2.24	2.14	2.18	2.53	2.17	2.57	2.22	2.50	2.25	2.23	2.60	2.74	2.46	2.18
Attained	2.08	2.02	1.96	1.87	2.06	1.99	2.32	2.00	1.91	1.48	2.20	2.21	2.29	2.10	1.93
Gap Identification	0.42	0.22	0.18	0.31	0.47	0.18	0.25	0.22	0.59	0.77	0.03	0.39	0.46	0.36	0.25

Inference of table 5 - The target values of POs is calculated based on the CO-PO mapping carried out for all the courses of the IT program in levels - 3, 2 & 1 which is indicated also as High-H, Medium-M & Low-L respectively. The level 3 is based on mapping the correlation above 70%, level 2 attainment is mapped from 60% to 70% and the level 1 is mapped for less than 60% respectively. The average value for all the courses is taken which is termed as target POs of the IT program.

The CO-PO attainment is carried out as per the mapping & attainment indicated in figure 1 above.

The difference in the target & attained value is considered as gap identified. The continuous efforts are carried out at the department to minimize the gaps received. It is dominantly seen that the gaps identified is large for PO-9 & PO-10 respectively in comparison with other POs and PSOs.

The PO-9 is based on individual & team work whereas PO-10 is based on Communication as per NBA Washington DC accord standards. The efforts are continually carried out by the faculty members at the department to mitigate the PO-9 & PO-10 gaps through getting practical's, mini projects, capstone projects etc. so that PO-9 that is individual & team work is built along with the communication of PO-10 is also strengthen from time to time.

10.Impact Study

Impacts of implementing this Quality model in the organization are:

In academia, there is a focus on enhancing quality through various initiatives. Application-based BE projects are developed using Agile Methodology, while Research-based BE projects adhere to the Traditional Waterfall Methodology. To enhance students' technical understanding, poster-making sessions for projects (SE, TE, BE) are conducted. Additionally, each class conducts two Formative Assessments as student assignments, with the quality of learning assessed and validated by all faculty members.

Collaborations are encouraged through the involvement of stakeholders such as industry experts, parents, alumni, and class representatives in advisory and BOS meetings. As a result of input from BOS meetings, the scheme and syllabus are revised, the PG scheme/syllabus now includes specializations in AI, web development, and cybersecurity and a new program was put into place for SE Batch 23–27.

Further developments involve collaborations through MoUs, workshops on Design Thinking, and participation in the UNESCO India Africa Hackathon. The department organized the International Conference ICCN-2023 and a Multicon W 2023 Professional Body QP Workshop, resulting in quality paper publications and an emphasis on industry collaboration, evidenced by the increase in patents and the development of Library Automation Software. Outhouse Paid Internships increased, and technical skills improved through various initiatives.

11. Why Is It Best Practice

It embodies best practices by placing the customer/student at the core of all planning, design, development, and deployment activities within the organization. Clear individual responsibilities and time targets are established to ensure the accomplishment of expected tasks, addressing operational deficiencies through corrective and preventive measures. Quality is no longer solely product-centric but also emphasizes people-centric approaches. Therefore, the implementation of Quality Management System (QMS) enriches the

organization by nurturing its personnel and fostering partnerships. Through ongoing quality auditing procedures, all resources, including intangible ones, are maximized to their fullest potential. QMS implementation ensures continuous performance improvement, thereby consistently surpassing customer expectations [10-14].

A. RACI (Responsible, Accountable, Consulted & Informed):

A RACI matrix is a simple, effective means for defining teaching learning pedagogies to improve TLP in various project roles and responsibilities, providing a comprehensive mechanism of who is responsible, accountable, consulted, and informed in every step of the way to deliver effective TLP among students. The faculty members are responsible to deliver the contents during the lectures/practical's/tutorials where in the accountability is of students to understand the topics discussed. The faculty members are consulted by the students & are informed that the topics discussed are very well understood by them during the lectures / practical's from time to time [15].

B. Due Diligence:

Due diligence is an investigation, audit, or review performed to confirm facts or details of the concepts taught by the faculty members with the use of various TLP pedagogies as a matter under consideration to make lectures/practical's interesting. In delivering the technical concepts, due diligence requires an examination of TLP pedagogies as case studies before starting a proposed topic with all students of the class.

Conclusion

In this TCET's commitment to excellence in teaching and learning practices, evidenced by its adoption of the ISO Quality Management System, has greatly enhanced the quality of education for its students. Through systematic integration of ISO standards and structured processes, TCET has fostered a student-centric learning environment that prioritizes innovation and interdisciplinary learning. Impact studies have shown tangible improvements, reaffirming TCET's position as a leader in academic excellence. Moving forward, TCET remains dedicated to continuous improvement and exceeding expectations in teaching and learning pedagogies.

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