YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF ECONOMICS
MASTER OF DEVELOPMENT STUDIES PROGRAMME

ASSESSMENT OF STUDENTS' PERCEPTIONS ON INNOVATIVE PEDAGOGICAL APPROACHES IN LEARNING METHODS AT THANLYIN TECHNOLOGICAL UNIVERSITY

ZIN ZIN OO
MDevS – 55 (18th BATCH)

JUNE, 2025

YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF ECONOMICS
MASTER OF DEVELOPMENT STUDIES PROGRAMME

ASSESSMENT OF STUDENTS' PERCEPTIONS ON INNOVATIVE PEDAGOGICAL APPROACHES IN LEARNING METHODS AT THANLYIN TECHNOLOGICAL UNIVERSITY

A thesis submitted in partial fulfillment of the requirements for the Master of Development Studies (MDevS) Degree

Supervised by

U Hla Aung
Associate Professor
Department of Economics
Yangon University of Economics

Submitted by

Zin Zin Oo
Roll No. 55
MDevS- 18th Batch
(2023-2025)

JUNE, 2025

YANGON UNIVERSITY OF ECONOMICS
DEPARTMENT OF ECONOMICS
MASTER OF DEVELOPMENT STUDIES PROGRAMME

This is to certify that the thesis entitled **"Assessment of Students' Perceptions on Innovative Pedagogical Approaches in Learning Methods at Thanlyin Technological University"** submitted as partial fulfillment towards the requirements for the degree of Master of Development Studies has been accepted by the Board of Examiners.

BOARD OF EXAMINERS

Dr. Tin Tin Htwe
(Chairperson)
Rector
Yangon University of Economics

Dr. Cho Cho Thein
(Examiner)
Pro-Rector
Yangon University of Economics

Dr. Naw Htee Mue Loe Htoo
(Examiner)
Director, MDevS Programme
Professor & Head
Department of Economics
Yangon University of Economics

Dr. Yin Myo Oo
(Examiner)
Professor
Department of Economics
Yangon University of Economics

U Hla Aung
(Supervisor)
Associate Professor
Department of Economics
Yangon University of Economics

JUNE, 2025

ABSTRACT

As education adapts to a fast-evolving society, approaches like active learning, project-based learning, blended learning, inquiry-based learning, experiential learning, and technology integration have become more prominent. This study examines students' views on these methods, focusing on their confidence, learning experiences, and skill development. Quantitative and Qualitative data were collected through a survey of 320 final-year students at Thanlyin Technological University (TTU), selected via simple random sampling. Descriptive statistics and regression analysis were employed to examine the data. The results show that students generally have a positive perception of innovative pedagogies, with high confidence and noticeable skill growth. However, challenges such as limited resources, financial constraints, and time management difficulties were identified as barriers to fully engaging with these methods. This research highlights the valuable insights into student perceptions of innovative teaching strategies.

ACKNOWLEDGEMENTS

First and foremost, I would like to express my sincere and profound gratitude to Dr. Tin Tin Htwe, Rector of Yangon University of Economics and Chairperson of the Board of Examiners. Her visionary leadership and the opportunity she provided to pursue my academic journey at this esteemed institution have been deeply meaningful to me.

I am also truly thankful to Dr. Cho Cho Thein, Pro-Rector, and Dr. Naw Htee Mue Loe Htoo, Professor and Head of the Department of Economics, as well as Programme Director of the Master of Development Studies Programme. Their thoughtful insights and encouragement, both as educators and examiners, played a significant role in shaping the direction and depth of this research.

My sincere appreciation goes to Dr. Yin Myo Oo, Professor, Department of Economics, whose valuable comments and academic guidance as an examiner greatly contributed to the refinement of this thesis. am especially indebted to my supervisor, U Hla Aung, Associate Professor, Department of Economics, Yangon University of Economics. His unwavering support, kind mentorship, and consistent guidance were instrumental throughout each stage of my research. I am truly grateful for his patience, constructive feedback, and belief in my work.

I would also like to express my gratitude to the students and faculty of Thanlyin Technological University for their generous participation and collaboration. Their perspectives added real-world depth and relevance to this study.

Finally, I am deeply thankful to all teachers and friends, whose steady encouragement, understanding, and emotional support have been a source of strength throughout this academic journey. This achievement would not have been possible without their constant presence by my side.

Zin Zin Oo

Roll No. 55

MDevS- 18th Batch

(2023-2025)

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

AI	Artificial Intelligence
ANSYS	Analysis System (Engineering Simulation Software)
Arch	Architecture
ATU-Net	Asia Technological University Network
AUN	ASEAN University Network
AUN-QA	ASEAN University Network-Quality Assurance
B.Arch.	Bachelor of Architecture
BE	Bachelor of Engineering
B-Tech	Bachelor of Technology
CAD	Computer-Aided Design
CAM	Computer-Aided Manufacturing
ChE	Chemical Engineering
CMG	Computer Modelling Group
COE	Centre of Excellence
CESR	Comprehensive Education Sector Review
EC	Electronic Engineering
EEAC	Engineering Education Accreditation Committee
ELT	Experiential Learning Theory
EP	Electrical Power Engineering
ETABS	Extended Three-dimensional Analysis of Building Systems
ETAP	Electrical Transient and Analysis Program
GTC	Government Technological College
GTI	Government Technological Institute
HYSYS	Hyprotech Systems (Chemical Process Simulation Software)
IoT	Internet of Things
ISO	International Organization for Standardization
IT	Information Technology Engineering
MATLAB	Matrix Laboratory
MC	Mechatronic Engineering
M	Mean
ME	Master of Engineering
Mech	Mechanical Engineering

MOE	Ministry of Education
MTU	Mandalay Technological University
MySQL	My Structured Query Language
NESP	National Education Strategic Plan
OBE	Outcome-Based Education
PE	Petroleum Engineering
PETREL	Petroleum Engineering Reservoir Evaluation and Linking
PLC	Programmable Logic Controller
RIT	Rangoon Institute of Technology
SD	Standard Deviation
SDGs	Sustainable Development Goals
SDT	Self- Determination Theory
STAAD Pro	Structural Analysis and Design Program
STEM	Science, technology, Engineering, Mathematics
TIA	Totally Integrated Automation
TTU	Thanlyin Technological University
TVET	Technical and Vocational Education and Training
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNICEF	Unites Nations International Children's Emergency Fun

CHAPTER I
INTRODUCTION

1.1 Rationale of the Study

Across the world, higher education systems are undergoing major transformations in response to globalization, technological advancement, and the evolving needs of the 21st-century workforce. Traditional, lecture-centered teaching approaches are increasingly viewed as insufficient for preparing students to thrive in today's dynamic and complex environments. As a result, educational institutions globally are adopting innovative pedagogical approaches that are more student-centered, interactive, and skills-oriented. These approaches such as project-based learning, inquiry-based learning, blended learning, and experiential learning aim to foster critical thinking, creativity, collaboration, and lifelong learning, which are essential competencies in the modern world.

Countries with advanced education systems have already integrated these pedagogies into curriculum design and classroom practice, leveraging digital tools, problem-solving tasks, and real-world applications. This shift not only enhances academic engagement but also promotes the development of soft and hard skills required for success in professional fields. The trend reflects a global rethinking of teaching and learning, moving from passive knowledge transfer to active student participation.

In Myanmar, the higher education sector is also making efforts to modernize its teaching practices to align with global trends. As part of national reforms in education, universities are encouraged to adopt more inclusive, innovative, and competency-based teaching methods. However, the transition remains in its early stages. Many institutions, particularly technological universities, are still navigating the challenges of implementing new pedagogical models while balancing traditional practices and resource constraints.

Technological universities, such as Thanlyin Technological University (TTU), play a vital role in preparing students for careers in science, engineering, and other technical fields. In these domains, students must not only master theoretical concepts

but also develop hands-on skills, problem-solving abilities, and the confidence to apply their knowledge in real-world contexts. As a result, innovative pedagogies are particularly relevant in this setting, as they are designed to encourage active learning and foster practical competencies. While these methods show great promise, their success heavily depends on how students perceive them. In particular, students' confidence in their learning process defined as their belief in their own ability to succeed is a key factor that can influence academic outcomes. This study focuses on understanding how students' confidence is affected by their perceptions of two main factors: the effectiveness of innovative pedagogical approaches and the development of skills resulting from these methods. If students believe that the approaches are effective and contribute to their skill growth, their confidence is likely to increase. Conversely, if they do not see the value or feel inadequately supported, their confidence may decline.

Therefore, this study seeks to explore two main aspects. First, it examines how students perceive the role of innovative pedagogical approaches in supporting their confidence, skill development, and overall educational experience. Second, it investigates the specific challenges students face in adapting to these new modes of learning. Understanding both the perceived benefits and obstacles is crucial for informing teaching practices that truly reaching the needs of learners.

The findings of this study are intended to contribute to the broader discussion of educational innovation in Myanmar. By shedding light on student perspectives, the study helps valuable guidance for the educators, administrators, and policymakers create more effective, inclusive, and future-ready learning environments. And improving the alignment between pedagogical strategies and student expectations can lead to more meaningful educational experiences and better preparation for the demands of the today workforce.

1.2 Objective of the Study

The objectives of the study are:

- To investigate how students' confidence is influenced by their perceptions of the efficacy and skill development of innovative pedagogies in improving their educational experiences.
- To identify the challenges encountered by students in adopting innovative learning opportunities.

1.3 Method of the Study

This study used regression and descriptive analysis to examine the relationship between students' skills developed during their learning experiences and their confidence in the efficacy of innovative learning techniques. The study used both primary and secondary data to meet its goals. Primary data were collected through a structured questionnaire survey designed to capture quantitative responses. Secondary data were sourced from association records, official publications, websites, and other relevant materials, relevant textbooks, articles, journals, research papers, and internet websites.

1.4 Scope and Limitations of the Study

This study focuses on final-year students from nine academic majors at Thanlyin Technological University (TTU), with a sample size of 230 students. TTU was chosen for its reputation as one of top three technological universities in Myanmar, widely recognized for its effective implementation of innovative pedagogical methods across various engineering majors. The study aims to assess students' confidence in the effectiveness of these methods, their skill development, and the challenges they face in adopting them. The scope of the study is limited to TTU, and therefore, the findings may not be generalizable to other institutions with different pedagogical frameworks or student demographics. Additionally, secondary data from TTU’s student records over the past sixteen years provide valuable insights into long-term trends. However, these data may not reflect broader patterns in other institutions, which limits the generalizability of the results.

1.5 Organization of the Study

This study is organized into five chapters. Chapter (1) introduces the study, covering its rationale, objectives, methodology, scope, limitations, and organization. Chapter (2) is the literature review. Chapter (3) offers an overview of engineering education in Myanmar. Chapter (4) is the survey analysis and Chapter (5) includes Conclusions.

CHAPTER II
LITERATURE REVIEW

2.1 Concept and Role of Innovative Pedagogy in Modern Learning Environment

The term comes from the Greek word "paidagogos," where "paidos" means child, and "agogos" means leader, originally referring to the practice of guiding children. Today, pedagogy refers not just to the act of teaching but also to the theory behind it, which can vary widely depending on educational philosophies and learning environments (Freire, 1970; Alexander, 2008). It can be described as the art and science of teaching which includes the techniques and procedures used by teachers to facilitate learning and ensure students acquire knowledge and skills. Pedagogy encompasses everything from lesson planning and instructional strategies to assessment and classroom management.

Innovative pedagogy refers to teaching methods and strategies that enhance learning experiences by incorporating new ideas, technologies, and approaches. These pedagogical strategies include experiential learning, project-based learning, collaborative learning, and strategic technology use.Such pedagogical innovations respond to the demands of modern learning environments,, which are marked by varied student populations, rapid developments in technology, and shifting societal demands (Smith, 2020). Innovative pedagogies must be incorporated into these settings since traditional teaching approaches frequently fail to satisfy the diverse learning goals and preferences of the students.

The role of pedagogy can greatly improve student learning outcomes and teaching efficacy, allowing students to develop a better comprehension of key ideas. Educators can help students achieve profound learning by using deliberate instructional strategies and fostering a collaborative classroom climate that encourages respect and engagement. Students can analyze, assess, and develop solutions to real-world problems thanks to these pedagogies, which place an emphasis on higher-order thinking abilities. Every student will continue to get an inclusive and successful education thanks to the use of these measures, which also take into account different learning styles. Innovative pedagogies match educational practices with the competencies needed in

today's changing labor market by emphasizing active learning, critical thinking, and practical application.

2.1.1 Students' Perceptions and Engagement in Learning

Students' perceptions of teaching methods significantly influence their engagement and overall academic achievement. When learners find instructional approaches relevant, supportive, and engaging, they tend to participate more actively and develop a deeper understanding of the content (Schunk & DiBenedetto, 2020). Innovative pedagogies, including project-based learning, collaboration, and technology integration, often enhance these positive perceptions by making learning more interactive and aligned with students' interests.

Studies show that students appreciate learning experiences where they can apply knowledge practically, work together with peers, and receive meaningful feedback (Biggs & Tang, 2011). Such environments foster intrinsic motivation and a sense of ownership over their learning (Deci & Ryan, 2000). Additionally, technology-supported learning offers flexibility and personalization, which students commonly view as helpful and motivating (Means et al., 2014).

Engagement is a complex concept involving behavioral, emotional, and cognitive aspects, all closely linked to academic success and retention. Active learning strategies that promote participation and critical thinking tend to increase these forms of engagement (Prince, 2004). For instance, experiential and collaborative learning tasks encourage students to connect with real-world problems, deepening their interest and commitment.

However, students' perceptions and engagement can vary depending on factors such as course design, teaching quality, and individual differences (Appleton, Christenson, & Furlong, 2008). Educators must therefore continuously adjust their methods and consider student feedback to maintain effective and inclusive learning environments.

(i) Students' Confidence and Effectiveness of Innovative Pedagogies

Students' confidence in their ability to learn is widely recognized as a vital factor influencing academic success. This confidence, closely intertwined with engagement, significantly boosts motivation and fosters higher achievement. According to Bandura (1997), self-efficacy, or students' belief in their own abilities, is

a critical determinant of motivation and academic performance. According to research, when students have confidence in the methods they are using to study, their engagement rises, resulting in higher levels of accomplishment (Zimmerman, 2000). Student trust in innovative pedagogies can have a substantial impact on their learning outcomes.

Innovative pedagogies, such as project-based learning (PBL), blended learning, and inquiry-based learning, frequently demand students to be more involved in their education, developing greater autonomy and self-regulation. According to studies, when students consider these strategies to be helpful, their confidence in studying grows, thereby improving their whole academic experience. For example, in PBL, students are frequently charged with solving real-world problems, which improves not only their practical abilities but also their confidence in their capacity to achieve (Barron et al., 1998). Similarly, blended learning, which mixes in-person and online learning, has been proven to boost students' confidence in their capacity to learn independently and access resources outside of the traditional classroom (Garrison & Kanuka, 2004).

However, the efficacy of these strategies is determined by students' perspectives. Students' involvement might decrease if they lack confidence in the methods used, resulting in inferior learning outcomes (Stahl 2000). Understanding the relationship between students' confidence and the views of the efficacy of new pedagogies is therefore critical for developing teaching strategies that encourage both confidence and learning.

(ii) Skill Development through Innovative Pedagogies

The necessity to acquire skills that go beyond memorization and recall in order to meet the demands of today's industry typically drives the shift toward creative pedagogy. Bloom's Taxonomy (1956) emphasizes the importance of developing higher-order thinking abilities, such as analysis, synthesis, and assessment, using instructional methods that actively include students in the learning process. Innovative pedagogies, particularly project-based, immersive, and inquiry-based learning, help to achieve these goals by developing critical thinking and problem-solving skills.

According to Thomas (2000), project-based learning enables students to gain not only discipline-specific knowledge but also important skills like teamwork, time management, and communication. These talents are widely recognized as critical to professional success, particularly in career options requiring creative thinking and

teamwork. Furthermore, inquiry-based learning, which encourages students to investigate issues and ask questions, promotes curiosity and intellectual independence, supporting students in developing problem-solving abilities that are in great demand in today's job market (Bransford, Brown, and Cocking, 2000).

Blended learning has also been shown to enhance students' digital literacy and technology skills. Integrating online resources helps students to learn on digital platforms, preparing them for technology-driven jobs (Garrison & Kanuka, 2004). When students believe these tactics are beneficial, they significantly contribute to their skill development, preparing them for the demands of today's labor market.

2.1.2 Innovative Pedagogies for 21st-Century Skills and Workforce Demands

use innovative methodologies, technologies, and philosophies to improve student engagement and lesson delivery. A notable advancement is the use of technology in the education, which has reinforced traditional instruction by providing more interactive and individualized learning opportunities. Intelligent technology, the use of virtual reality, and adaptive educational technologies are being used for accommodate diverse learning styles and personalize lessons. Furthermore, online learning and mixed models have increased education's accessibility and flexibility, allowing students to engage in collaborative learning outside of the traditional learning environments.

Another important thing is the move toward student-focused teaching techniques that emphasize engaged learning, creative thinking, and learning through inquiry. Problem-based learning and project-based learning are becoming more popular as educators recognize the importance of developing students' independence, creativity, and ability to solve problems. There is also growing support for interdisciplinary and hands-on learning that ties classroom lessons to real-world applications, assisting students in both academic and professional settings (National Research Council 2000). Additionally, there is a growing emphasis on inclusive and culturally relevant teaching that honors and celebrates the wide range of students' backgrounds and perspectives. Educators are integrating diverse content, literature, and teaching methods to create learning environments that promote equity, respect, and a sense of belonging for all students.

UNESCO's Future of Learning reports emphasize the importance of equipping students with 21st-century skills to meet the requirements of a rapidly changing global

job market. The following skills are relevant to a rapidly changing world and require an all-encompassing approach to education.

(i) Enhancing Critical Thinking and Problem-Solving Skills

Innovative instructional methods, like project based learning and inquiry-based learning, promote complex analytical thinking and problem-solving among students. These skills are essential for career development as employers increasingly seek individuals who can think creatively and adaptively. (Kivunja, C. 2015) For instance, experiential learning involves students' practical courses or real-life assignments that are enables to apply their knowledge practically.

(ii) Fostering Collaboration and Teamwork

Many innovative pedagogies incorporate collaborative learning strategies, such as collaborative tasks and peer teaching which promote teamwork and communication skills. In the modern workplace, collaboration is key to success. By working in teams, students learn to navigate group dynamics, appreciate diverse perspectives, and develop interpersonal skills that are highly valued by employers. (Dedehouanou, H, 2022)

(iii) Enhancing Employability Skills

Innovative pedagogy directly contributes to the development of employability skills such as adaptability, leadership, and initiative. Through experiential learning opportunities, such as internships or service-learning projects, students can apply their knowledge in real-world settings, making them more attractive to potential employers seek candidates who can not only perform technical tasks but also integrate seamlessly within a team, adapt to changes, and think proactively to overcome challenges. (Dedehouanou, H, 2022) These skills help employees become versatile contributors who can assume different roles, innovate, and improve processes. For students and job seekers, focusing on employability skills can significantly enhance job prospects, bridge the gap that exists between academic knowledge and workplace application, and foster lifelong learning.

(iv) Promoting Lifelong Learning

Innovative pedagogies often emphasize self-directed learning and adaptability, preparing students for continuous professional development. In a world where industries are constantly evolving, the ability of learning new skills and willing to change is critical. Students who engage in self-directed learning become proactive learners, capable of seeking out opportunities for growth and development throughout their careers. (Mi Mi & Khin Hnin Nwe, 2020)

(v) Digital Literacy and Technological Proficiency

The integration of technology in innovative pedagogy enhances the learning experience while preparing students for a tech-driven workforce. By utilizing digital tools and online platforms, students develop digital literacy, an essential skill in nearly every professional field today. As technological advancements continue to reshape industries, students with strong technological proficiency are better equipped to navigate evolving work environments and will hold a competitive edge in the job market.

(vi) Encouraging Creativity and Innovation

Innovative teaching practices inspire creativity and innovation in students. These skills are crucial in an age of technological advancements and global challenges, where the ability to develop new ideas and solutions is essential. By encouraging creativity, educators help students think critically and explore new possibilities in their fields. (Pisanu & Menapace, 2014)

Innovative pedagogy is a vital role in transforming education by enhancing thinking, problem-solving, collaboration, and adaptability among learners. By adopting student-centered teaching methods and incorporating real-world applications, these pedagogies prepare students for the complex demands of the 21st-century workforce. The integration of technology, emphasis on lifelong learning, and focus on employability skills ensure that students are well-prepared for an ever-evolving job market. Furthermore, innovative pedagogical approaches foster inclusive education and creativity, enabling students to thrive in dynamic and competitive environments.

2.1.3 Main Categories of Pedagogical Approaches

Pedagogical approaches in education are distinct with each offering unique methods for supporting student learning and development. These techniques are based on several educational philosophies, which influence how teachers interact with students, how students engage with content, and how learning is structured. Pedagogical approaches are broadly categorized into four categories: behaviorisms, constructivism, social constructivism, and liberationism.

(i) Behaviorisms

The behaviorist approach to pedagogy emphasizes teacher-centered learning, direct instruction, and planned lesson plans. Teachers are the primary educators in the classroom, delivering knowledge through methods such as lecturing, modeling, and rote learning. This technique, based on the studies of Thorndike (1911), Pavlov (1927), and Skinner (1953), emphasizes observable and systematic instructional practices.

Although behaviorism is effective in producing immediate results, it often limits student engagement and critical thinking. Activities in this approach include teacher-led lecturing, choral repetition, and demonstrations. Occasionally, students may take a more active role, such as demonstrating their understanding to peers. However, behaviorism contrasts significantly with the learner-centered ideas of Piaget and Vygotsky, who advocate for student-directed learning.

(ii) Constructivism

In contrast, constructivism emphasizes a student-centered approach, promoting learning through exploration, experience, and reflection. This progressive teaching style positions students as active participants in their education. Constructivist pedagogy encourages methods like project-based learning, play, and inquiry-based exploration, creating opportunities for individualized and slower-paced learning that fosters deeper understanding (Piaget, 1976).

Jean Piaget, a Swiss psychologist, significantly influenced this theory, emphasizing that children engage with learning through schemas—mental frameworks for organizing knowledge. According to constructivist principles, younger children learn best through direct interaction with their environment, while older children can handle more abstract concepts. Teachers facilitate this learning by designing activities that align with students' developmental stages

In practice, constructivist classrooms might adopt the Montessori method, which encourages self-directed learning with teachers serving as guides. Lessons are often student-led, with less emphasis on teacher direction, and may incorporate outdoor learning and interaction with nature to enhance engagement.

(iii) Social Constructivism

Social constructivism blends teacher guidance with student-centered activities, fostering a collaborative learning environment. This approach, grounded in the work of Vygotsky (1978), builds on Piaget's constructivist ideas but places a greater emphasis on the social context of learning. Vygotsky argued that knowledge is built together by students and teachers, emphasizing the importance of collaboration in learning.

In classrooms applying social constructivist pedagogy, small group activities and discussions are common. Teachers use strategies such as modeling, questioning, and facilitating group interactions to guide students. By observing teacher demonstrations, students learn not only tasks but also appropriate behaviors and reactions. This dual role of teachers as guides and collaborators helps foster a community of learners.

(iv) Liberationism

Liberationist pedagogy emphasizes democracy and equity in the classroom; empowering students actively participate in their education. Developed by Paulo Freire, this approach advocates for collaboration between teachers and students to dismantle barriers to learning, such as poverty and social inequality (Freire, 1970).

Freire's pedagogy, detailed in his book Pedagogy of the Oppressed, calls for a democratic classroom culture where students' voices are central, and teachers act as co-learners. In practice, this approach often involves culturally relevant materials and creative methods, such as performances, speeches, or art, allowing students to express their understanding in diverse ways. Liberationist classrooms value student autonomy and encourage learners to explore topics collaboratively. For example, students might choose a lesson topic or assume teaching roles, while the teacher facilitates opportunities for them to demonstrate their knowledge and creativity. (Basith & Sabeena, 2025)

Each of these approaches reflects different styles and theories of learning and has unique implications for classroom dynamics, teaching strategies, and student

outcomes. The choice of approach often depends on the needs, preferences, and abilities of the students, as well as the objectives of the educational program.

2.1.4 Types of Innovative Learning Method

(a) Blended Learning

Blended learning, also known as hybrid teaching, is transforming classroom dynamics by combining digital communication and information technologies. Blended learning is widely adopted in higher education, allowing students to study content independently through online resources while also benefiting from face-to-face sessions that encourage interaction between students and teachers. In-person sessions, guided by the teacher, foster interpersonal engagement and complement online activities, creating a more personalized, stimulating, and efficient learning experience. (Valente, J. A. (2014).

(b) Inquiry-Based Learning

Inquiry-based learning supports students to put forward questions, conduct research, and investigate topics in depth. This approach promotes curiosity and fosters critical thinking as students engage in the learning process through investigation and experimentation (Chen, 2022).

(c) Design- Project Based Learning

Design-based learning engages students in the process of designing solutions to complex problems. This pedagogical approach promotes creativity, critical thinking, and collaboration as students work through the design process, iterating their solutions based on feedback and evaluation (Chen, 2022).

(d) Experiential Learning

Experiential learning involves learning through experience, where students actively engage in hands-on activities and reflect on those experiences. This pedagogical approach allows students to connect theory to practice, fostering deeper understanding and retention of knowledge (Kolb, 2014).

(e) Integration of Technology and Collaborative Learning

The integration of technology in education supports collaborative learning by providing tools that enhance communication, information sharing, and teamwork among students. Technologies such as collaborative software, online discussion forums, and digital tools for project management facilitate group work and promote a more interactive learning environment (Hmelo-Silver et al., 2013).

(f) Heutagogy (Self-Directed Learning)

The heutagogical approach empowers students to identify problems and questions independently, rather than just completing teacher-assigned tasks. It promotes student autonomy, allowing them to explore uncertainties and complexities in their studies. Teachers provide context and facilitate learning by creating opportunities for in-depth exploration of topics (PowerSchool, n.d.).

(g) Adaptive Learning

Adaptive learning is a technology-driven educational approach that personalizes learning experiences based on individual student needs. Using AI and data analytics, adaptive learning systems continuously assess student performance and modify instructional content in real time, ensuring a customized and efficient learning journey (Infosys BPM, n.d.).

(h) Flipped Classroom Learning

Flipped classroom models are instructional strategies in which students are first exposed to new material outside of class—typically through videos or readings—and then use class time to engage in activities that apply and deepen their understanding through problem-solving, discussion, or collaborative tasks (Abeysekera & Dawson, 2015).

2.2 Theoretical Concept related to Educational Engagement

The connection between education and the development of confidence and skills is essential to many theoretical frameworks that investigate how people develop personally and professionally. Education not only provides knowledge, but it also plays an important role in developing self-confidence and practical skills required for success

in the job. Human Capital Theory, Experiential Learning Theory, Self-Determination Theory, and the Theory of Planned Behaviour all emphasize the importance of learning experiences in developing core competencies and a strong feeling of self-efficacy. These viewpoints underscore education's transforming effect in developing individuals who are not just skilled but also confident in navigating their career pathways.

(i) Human Capital Theory (Gary Becker :1993)

Human Capital Theory states that education and training are expenditures of human capital that raise a person's job prospects and efficiency. The theory, which was created by economists such as Gary Becker (1993), contends that obtaining skills and knowledge through education increases a person's worth in the labor market, resulting in improved employment possibilities, greater earnings, and economic expansion. Education is thus regarded as a critical instrument for both individual career advancement and broader economic development.

(ii) Experiential Learning Theory (David Kolb: 1984)

Kolb's Experiential Learning Theory (ELT), established in 1984, emphasizes learning with experience, for learners moving through a cycle of active exploration, abstract thinking, observation through reflection, and practical application. ELT is especially beneficial for career skill development since it drives students to use their knowledge in real-world circumstances. By doing so, students develop both the practical skills needed for their vocations and the courage to face future problems.

(iii) Self-Determination Theory (SDT) (Deci & Ryan, 1985)

Deci and Ryan established Self-Determination Theory in 1985, which emphasizes the importance of intrinsic motivation in skill development. According to SDT, when people feel autonomy, competence, and connectedness in their learning contexts, they are more likely to acquire confidence and mastery. This theory is significant to education because it emphasizes the necessity of creating an environment that encourages students Students should apply their knowledge in practical settings, which can boost their confidence and career-related skill development.

2.3 Factors Influencing the Effectiveness of Innovative Pedagogies

A wide range of factors influence the effectiveness of new educational pedagogies, shaping both teaching practices and student learning results. A well-designed curriculum, competent teacher training, access to resources and technology, socioeconomic considerations, and institutional support are all essential components for the successful adoption of innovative teaching practices.

(i) Curriculum Design

Curriculum design has become essential for integrating new instructional approaches. A curriculum that points out real-world applications, interdisciplinary learning, and skills relevant to the labor market motivates learners to take an active role in their education. Furthermore, Assessment methods need to be adjusted to take into account students' proficiency in 21st-century abilities and competencies like working together, innovation, and reasoning. This congruence guarantees that learning is both theoretical and practical, equipping students for professional success. (Cet al., 2024)

(ii) Access to Resources and Technology

Access to technical tools and resources greatly improves the implementation of innovative pedagogies. Classrooms equipped with technology facilitate collaborative learning and provide diverse learning materials, enriching the educational experience. According to research, having access to digital resources encourages kids' creativity and inventiveness. (UNESCO, 2017).

(iii) Socio-Economic

Students' socioeconomic situation can influence their ability to access innovative learning alternatives. Students from various backgrounds may encounter hurdles to accessing quality education and resources, limiting their participation in new pedagogies (Hurst, 2018). Addressing these gaps is critical to guaranteeing equal access to career advancement opportunities.

(iv) Institutional Support and Culture

The support of educational institutions is essential for developing novel pedagogies. Schools and colleges that foster an innovative culture, provide resources for experimental teaching, and encourage educator collaboration produce a conducive

environment for optimal learning. Institutional commitment to innovation can result in long-term gains in teaching practices and student performance. (Nachmias et al., 2004)

2.4 Measurement on the level of Confidence in learning Experiences

This study intends to measure students' assessments of their confidence levels in connection to the effectiveness of innovative pedagogies in improving their learning experiences. To do this, a variety of measures were explored to assess how these pedagogical strategies improve students' abilities to manage their learning, apply theoretical knowledge to practical activities, and effectively use digital resources. Furthermore, the study investigates the effect of peer collaboration and group discussions on confidence development. Access to educational materials, support systems, and engagement in innovative learning are all investigated to create a thorough picture of students' confidence in their learning experiences.

(i) Perceived Effectiveness of Innovative Pedagogies

An important part of the research is determining students' confidence in understanding and implementing concepts taught through creative teaching approaches. Students will be asked to rate their confidence in learning using various educational approaches based on their own personal experiences. In addition, participants will assess the perceived efficiency of various learning approaches in improving their capacity to retain knowledge, stay engaged, and keep motivated in their studies. This measure helps establish whether innovative pedagogies have a major impact on students' self-assurance in their academic achievement.

(ii) Self-Assessed Skill Development

To further investigate the role of innovative pedagogies, the study will look at students' self-assessments of skill growth. Students will assess their development in important areas such as critical thinking, problem-solving, cooperation, and adaptability as a result of engaging with novel learning approaches. Understanding how these strategies contribute to students' overall growth will provide insight into the extent to which new pedagogies improve critical qualities required for academic and professional success.

(iii) Identified Challenges and Barriers

While assessing confidence levels, it is also critical to identify the problems that students face when transitioning to innovative pedagogical approaches. Uncertainty about new learning technology, a lack of access to critical resources, and issues with self-directed learning can all have an impact on students' confidence in their learning experiences. By assessing these issues, the study hopes to identify potential impediments to the effective implementation of novel teaching practices and provide solutions to overcome these obstacles.

2.5 Review on Previous Studies

Moe Thuzar Kyaw's (2019) studied on collaborative learning at Sagaing University of Education offers light on second-year students' perspectives of their collaborative learning experiences. The study aimed to assess how students viewed collaborative learning and the impact of social, communication, and learning skills. A purposive sampling method selected 160 candidates from a total of 420 second-year students. The findings demonstrated that students had a generally positive attitude toward collaborative learning, recognizing the social and educational benefits of working in small groups. Students saw greater social skills, a deeper knowledge of course content, and better communication as key benefits for their future employment. However, the study highlighted challenges, particularly gender differences in perceptions. Female students reported more positive views on collaborative learning compared to male students. Additionally, students expressed the need for greater encouragement and engagement, particularly for those less involved in group discussions. The study proposes developing a more inclusive learning atmosphere and giving training to help students improve their collaboration skills.

Mi Mi and Khin Hnin Nwe's (2020) researched on self-directed learning and academic self-efficacy in education College students explored the link between self-management skills and academic confidence. Data were collected from 400 pre-service teachers at Monywa Education College in the last week of January 2019. Teachers selected at random from second-year students (both male and female, with equal representation from arts and scientific specializations) filled out questionnaires containing demographic information. Data was examined using descriptive statistics and t-tests to identify correlations and differences among variables. The study found

substantial gender and subject specialization disparities in Self-Directed Learning, with female students showing higher levels of involvement. The study also discovered a strong positive relationship between self-directed learning and academic self-efficacy, implying that developing both abilities was critical for academic achievement and lifetime learning. The study stressed the need of incorporating self-directed learning methodologies into teacher education programs to improve students' autonomy and problem-solving skills.

Carvalho et al. (2020) conducted a case study of ISAL (the Higher Institute of Administration and Languages) to evaluate the use of pedagogical innovation in higher education, specifically active learning approaches. The study acknowledges the widespread opposition to change in higher education, but it also underlines ISAL students' and teachers' positive attitudes toward new teaching practices. Active learning approaches such as blended learning, project-based work, cooperative/collaborative learning, and research-oriented instruction have been found to promote creativity, critical thinking, autonomy, and deeper knowledge acquisition. According to the findings, these strategies are key for developing abilities such as creativity and critical thinking, both of which are necessary for career success. Furthermore, Carvalho et al. examined the obstacles of implementing these strategies, such as infrastructure restrictions that impede their effectiveness, particularly in the setting of socioeconomic barriers to access. The study identified inappropriate classroom design, overcrowded courses, and a lack of resources as major barriers. The authors suggested that classroom designs be improved and resources be made more accessible in order to promote active learning and more effective student involvement.

Villarroel et al. (2020) analysed the influence of experiential learning in higher education, focusing on students' impressions of their learning. The study discovered that participating in experiential learning activities helped students gain a better understanding of the content, improve problem-solving skills, and apply theoretical knowledge in practical circumstances. This reinforces the central idea of experiential learning, which emphasizes active, student-driven learning and practical application of knowledge. Students also liked the opportunity to work in groups, integrate subject matter, and solve real-world problems, which helped to increase retention and comprehension. The authors emphasized that for effective implementation, instructors must carefully create activities that are aligned with course objectives and provide continuous feedback. Furthermore, the study recognized the more effort required of

both students and instructors in experiential learning contexts, emphasizing the importance of collaborating with outside firms to improve the learning experience and its applicability to real-world concerns.

Naw Ywa Eh's (2023) research on ICT usage at HPA-AN University provides important insights into how technology is integrated into public education and how it affects student involvement, comprehension, and satisfaction. The findings indicated that, while students have a generally good attitude toward ICT tools and appreciate the use of mobile phones for learning and communication, some significant impediments persist, particularly for those from lower socioeconomic backgrounds. These challenges include limited access to crucial resources such as computers and educational software, inadequate internet connectivity, expensive prices, and inconsistent electricity.

CHAPTER III
OVERVIEW OF EDUCATION SYSTEM IN MYANMAR

3.1 Myanmar's Education System and Structure

Myanmar's education system has undergone substantial modifications under successive governments, with the goal of improving educational quality and accessibility. Historically, educational reform programs were constantly changed to reflect the shifting political context. In 2012, the Ministry of Education (MoE) initiated the Comprehensive Education Sector Review (CESR) to assess the situation of education and formulate new policies. This endeavor resulted in the creation of a Comprehensive Educational Plan by 2014. Following this, Parliament approved the New Education Law in 2014, which was later updated to address changing educational demands.

Building on these reforms, the democratic administration implemented the National Education Strategic Plan (NESP) in 2015This long-term strategy is divided into two periods: 2015 to 2021 and 2022 to 2030. The NESP seeks to modernize Myanmar's education sector at all levels, from primary to higher education, while maintaining alignment with national priorities and the Sustainable Development Goals (SDGs).

Myanmar's education system, overseen by the Ministry of Education, is divided into formal and non-formal sectors. It follows the primary Education Strategic Plan (NESP) 2021-2030, which is consistent with the country's primary priorities and the Sustainable Development Goals. The strategy aims to improve access, equity, quality, inclusion, and lifelong learning opportunities (NESP, 2021-2030). Myanmar's education system encompasses pre-primary, basic, technical and vocational education and training (TVET), higher education, and non-formal education. Pre-primary education is for children aged three to five and focuses on early childhood care and development.

Basic education spans 12 years, and includes elementary (Grades 1-5), lower secondary (Grades 6-9), and upper secondary (Grades 10-12) levels. The NESP'

reforms aim to create a more learner-centered curriculum that encourages critical thinking, digital literacy, and problem-solving abilities.

The TVET sector is critical in providing students with practical skills for the workplace, notably in fields like as agriculture, technology, and construction. The NESP emphasizes the necessity for strengthening TVET programs to correspond with labor market demands and create paths to higher education.

Higher educational institutions such as universities, colleges, and specialized institutes that offer 4- to 6-year degrees. The NESP focuses on increasing teaching and research quality, encouraging international collaboration, and upgrading curricula to match global standards. These projects aim to enhance Myanmar's academic standing and contribute to national development.

Non-formal education is attempting to eliminate inequality by reaching out-of-school children and adults with literacy and skill development initiatives. These efforts are consistent with the NESP's emphasis on lifelong learning, albeit limited access and finance in rural locations call their usefulness into question.

Despite constant developments, Myanmar's education system confronts numerous obstacles. To address these difficulties, the NESP suggests a variety of methods, including supporting inclusive education for excluded populations, improving teacher training programs, and incorporating digital resources into classrooms. International collaboration with organizations such as UNESCO and UNICEF strengthens these efforts by offering technical expertise and financial support. Myanmar is working to achieve SDG 4 (Quality Education). Despite persisting issues, Myanmar's education system remains a key component of its socioeconomic development (NESP, 2021-2030).

3.2 Reform of Teaching and Learning Methods in Myanmar

For decades, Myanmar's government schools and seminaries have predominantly used the banking education system. This strategy focuses on the direct transmission of knowledge from professors to students, primarily through lectures. As a result, the amount of knowledge learned by pupils is exactly proportional to the expertise possessed by their instructors. However, children frequently acquire less knowledge than intended by their educators. Over time, this traditional teacher-centered strategy has resulted in a continuous decrease in the amount of knowledge properly communicated, limiting pupils' intellectual development. This method primarily relies

on rote learning, in which pupils memorize information and concepts rather than participating in critical thinking or problem solving (Soe et al., 2017).

Although a curriculum change was adopted between 1995 and 1999, it maintained traditional teaching and learning approaches until the 2015-2016 school year. The emphasis on memorizing has had a substantial impact on student learning results, reducing their capacity to acquire and apply 21st-century abilities in real-world scenarios. However, in contrast, Western educational systems emphasize on student-centered learning, which promotes critical thinking and reasoning skills. er than their ability to analyze and integrate knowledge. As a result, the educational system has not adequately equipped students for modern problems, nor has it fostered independent study and intellectual growth.

Recognizing the long-standing issues, the Ministry of Education launched the Comprehensive Education Sector Review (CESR) in 2012. This evaluation resulted in the creation of the National Education Strategic Plan (NESP), acts as a road map for nationwide educational reforms targeted at enhancing access and quality of education for all children. The NESP (2016) emphasizes the importance of teachers in improving educational outcomes. Teachers are viewed as essential change agents, in charge of implementing a constructivist teaching-learning strategy and a new evaluation system. In accordance with this framework, a new basic education curriculum based on constructivist ideas has been created, emphasizing the development of students' 21st-century skills to assure their readiness for the modern world.

Given the importance of teaching methodologies in student achievement, it is critical to change from traditional teacher-centered methods to constructivist approaches in teacher education. This transformation is vital for developing an education system that encourages critical thinking, creativity, and problem-solving, preparing students to flourish in an increasingly complicated and competitive global economy. (Kyaw,2023)

3.2.1 Strategic Pillars to Achieve the Innovative Educational Transformation

The National Education Strategic Plan (NESP) 2021-2030 for higher education in Myanmar is structured around eight strategic pillars, designed to drive innovative educational transformation. These pillars design on enhancing access, quality, relevance, and sustainability, ensuring that higher education institutions (HEIs) can successfully get students ready for the challenges of the contemporary world.

(i) Pillar One: Access and Inclusion

Myanmar plans to increase access to higher education by extending scholarship programs, student loan opportunities, and infrastructural development. To foster diversity, new universities will be constructed in each state, as well as colleges in ethnic zones. Career counseling and outreach programs will help students overcome hurdles. Teacher training programs will be strengthened by regulatory changes and the establishment of specialized centers to boost instructional quality.

(ii) Pillar Two: Modern Curriculum

Myanmar will upgrade its higher education curricula to meet global labor market demands. STEM, Economics, Law, and practical skills will receive greater attention. Universities will create specialized curriculum development teams to assure continual growth. Furthermore, career advising and language competency programs will be enhanced to improve students' employability.

(iii) Pillar Three: Innovative Teaching and Learning

Myanmar plans to modify educational methods by transitioning from rote memorization to interactive and critical thinking-based learning. Comprehensive professional development programs will increase teacher training and lower classroom sizes. The incorporation of digital tools and technologies will improve the learning experience while maintaining modern and effective educational procedures.

(iv) Pillar Four: Aligned Assessment

Myanmar will improve assessment procedures in higher education institutions to ensure compliance with international academic norms. Evaluations will include both theoretical knowledge and practical skills. Students and instructors will be encouraged to participate in global academic competitions and capacity-building activities in order to improve their worldwide performance.

(v) Pillar Five: Modern Management and Quality Assurance

Myanmar will modernize university governance by granting institutions greater autonomy, improving financial sustainability, and ensuring adherence to international quality assurance standards. A structured credit transfer system will be implemented to facilitate academic mobility and support student transitions between institutions.

(vi) Pillar Six: Sustainable Financing

Myanmar will maintain the financial viability of higher education institutions by increasing public investment, developing strategic infrastructure, and implementing faculty training initiatives. Additional funding will be provided for research in developing sectors such as the Web of Things, robotics, and machine learning. Universities will also look into external financing sources through private sector collaborations and international alliances.

(vii) Pillar Seven: Internationalization and Partnerships

Myanmar will increase global academic engagement by forming links with international institutions. Student and faculty exchange programs will be increased, aided by reciprocal recognition of qualifications and credit transfer agreements. Adoption of online and mixed learning technologies will increase access to high-quality education and boost global competitiveness.

(viii) Pillar Eight: Research and Innovation

Myanmar will improve research and innovation by building cutting-edge research facilities and encouraging collaboration between university and industry. A national school-industry partnership initiative will be launched to encourage applied research. International academic exchange programs and research conferences will allow for knowledge sharing and interdisciplinary collaborations. Myanmar's higher education system is being modernized, globally integrated, and innovation-driven through strategic initiatives, ensuring that students, educators, and institutions are well-equipped to thrive in an increasingly competitive and knowledge-based global economy. This transformation not only strengthens national development but also positions Myanmar as a key player in the regional and international education landscape.

3.3 History of Technological University in Myanmar

The engineering education system in Myanmar has significantly evolved over the decades, shaped by historical developments and government policies. Myanmar's engineering education began in 1923 with the establishment of the Department of Engineering at Rangoon University, which introduced a B.Sc. (Engineering) degree in Civil Engineering by 1924. In 1927, Burma Oil Company (B.O.C) established B.O.C

College of Mining Engineering where the Department of Engineering was relocated. . As an Engineering University, separated to open in 1961, was called Burma Institute of Technology (BIT). This institution was later renamed the Rangoon Institute of Technology (RIT) in 1964. RIT adopted a professional curriculum, offering six-year Bachelor of Engineering (B.E.) and Bachelor of Architecture (B.Arch.) programs, which played a significant role in shaping the educational landscape.

In 1967, the institution introduced a continuous learning pathway, allowing students who obtained a diploma from Government Technical Institutes (G.T.I.) to join RIT as third-year students for a Bachelor of Engineering degree. RIT underwent another transformation in 1990 when it was renamed the Yangon Institute of Technology (YIT). By 1999, the institution had become Yangon Technological University (YTU), located in the western part of Gyogone, with a campus built with assistance from the Soviet Union.

In 2000, Myanmar introduced the Three-Step Ladder Engineering Education System to modernize technical education. This system provides a structured pathway for engineering studies, beginning with a two-year technician training (Diploma), followed by two years of technologist education and training (Bachelor of Technology), and culminating in an additional year for students pursuing a Bachelor of Engineering (B.E.) degree. This tiered approach ensures students acquire both technical expertise and theoretical knowledge at progressively advanced levels, preparing them as well-rounded engineers.

A new phase in Myanmar's engineering education commenced in 2012 with the establishment of Yangon Technological University (YTU) and Mandalay Technological University (MTU) as Centers of Excellence (COEs). On December 3, 2012, these institutions launched six-year Bachelor of Engineering (B.E.) and Bachelor of Architecture (B.Arch.) programs, setting high academic standards. Entry into YTU and MTU is highly competitive, with the highest admission scores among Myanmar's universities, determined by the National Matriculation Examination. Students meeting the qualifying scores can enroll in the six-year Bachelor of Engineering or Bachelor of Architecture programs.

Graduates of these six-year programs, if eligible, may further their education by applying for a one-year Postgraduate Diploma or pursuing a Master of Engineering (M.E.) degree, which typically takes two to three years.

In the 2016–2017 academic year, Myanmar introduced the KG+12 system of education as a component of its fundamental reform. The 2024 matriculation exam marked the first under this revised curriculum, with the first cohort of students entering university. This transition necessitated adjustments to the existing six-year Bachelor of Engineering (B.E.) and Bachelor of Architecture (B.Arch.) programs. Beginning in the 2024–2025 academic year, new students will enroll in a five-year B.E. program, aligning with curriculum modifications. To meet international standards, these programs will further transition to a 12+4 system, ensuring compatibility with global higher education frameworks. (Tint, K. M, 2016)

Table (3.1) List of Technological Universities (Division and State)

Division / State	Technological Universities
Yangon Division	Yangon Technological University (YTU)
	West Yangon Technological University (WYTU)
	Technological University Thanlyin (TTU)
	Technological University (Hmawbi)
Mandalay Division	Mandalay Technological University
	Technological University (Meiktila)
	Technological University (Mandalay)
	Technological University (Kyaukse)
	Technological University (Yadanarbon cyber city)
Ayeyarwady Division	Technological University (Pathein)
	Technological University (Maubin)
	Technological University (Hinthada)
Bago Division	Technological University (Taungoo)
	Pyay Technological University
Magway Division	Technological University (Magway)
	Technological University (Pakokku)
Tanintharyi Division	Technological University (Myeik)
	Technological University (Dawei)

Table (3.1) List of Technological Universities (Division and State) (Continued)

Sagaing Division	Technological University (Monywa)
	Technological University (Sagaing)
	Technological University (Kalay)
Rakhine State	Technological University (Sittwe)
	Technological University (Kyaukphyu)
Mon State	Technological University (Mawlamyaing)
Kachin State	Technological University (Myitkyina)
	Technological University (Bhamo)
Shan State	Technological University (Panglong)
	Technological University (Kyaingtong)
	Technological University (Lashio)
	Technological University (Taunggyi)
Kayah State	Technological University (Loikaw)
Kayin State	Technological University (Hpa-An)

Source: Ministry of Science and Technology,2024

Currently, there are 32 technological universities across the country, operating under the Ministry of Education. These institutions focus on producing skilled engineers and researchers to support national development. The table (3.1) categorizes the 32 technological universities in Myanmar by their respective divisions and states. There are 22 technological universities in seven divisions and 11 technological universities in 7 states. Among them YTU and MTU were selected as Coes, with YTU serving students from Lower Myanmar and MTU serving students from upper Myanmar. Hmawbi Technological university, WYTU and TTU are the top three technological university in Yangon.

3.3.1 Statistical Insights into Technological Universities in Myanmar

To understand the impact of engineering education reforms, it is essential to analyze statistical data related to student enrollment, graduation rates, and institutional capacities. The following section presents an overview of enrollment and graduate lists, highlighting the growth and challenges faced by technological universities in Myanmar.

Table (3.2) Statistical Data of Technological Universities in Myanmar

Technological Universities	Enrollment Lists	Graduate Lists	
		Engineering	Architecture
2015-2016	7469	35450	389
2017-2018	6314	15248	466
2018-2019	5977	10788	-
2019-2020	6618	-	-
2020-2021	-	571	10
2021-2022	4462	1011	6
2022-2023	-	2969	47
2023-2024	5129	-	-

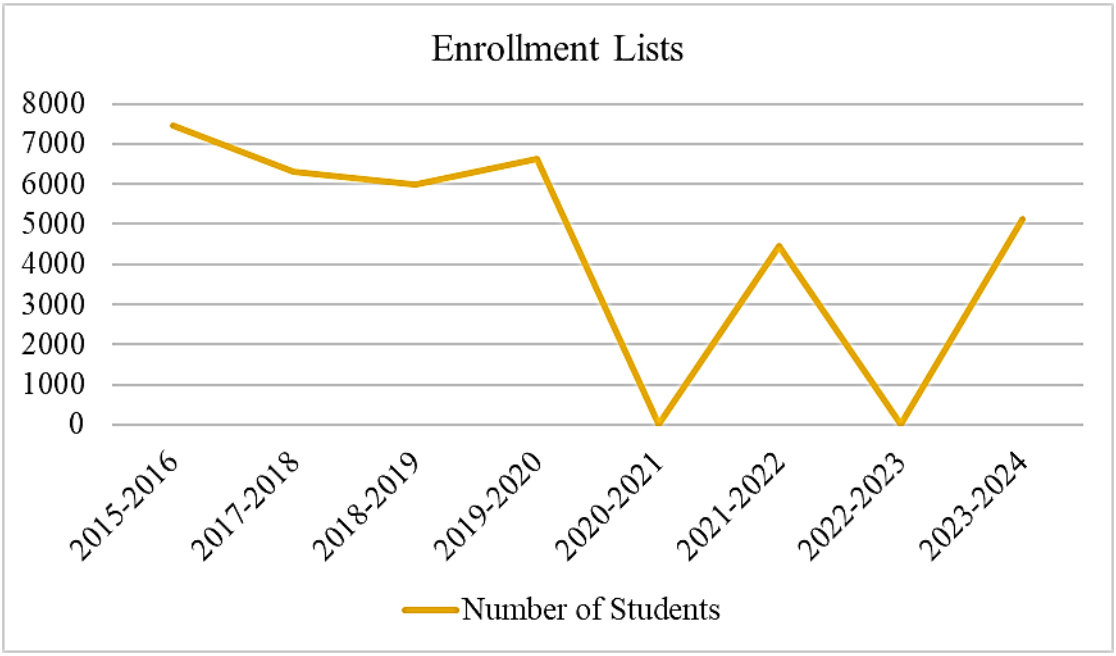
Source: Statical Year Book ,2024

The enrollment trends at Technological Universities in Myanmar, as shown in Table 3.2, displayed significant fluctuations between the 2015–2016 and 2023–2024 academic years. Initially, the enrollment numbers were relatively high, with 7,469 students in the 2015–2016 academic year. However, a gradual decline occurred in the following years, reaching 5,977 students by the 2018–2019 academic year.

A slight increase in student enrollment was recorded in the 2019–2020 academic year, suggesting a temporary reversal of the downward trend. However, the 2020–2021 academic year saw a dramatic drop in enrollment (no students enrolled), which could be attributed to the disturbances brought on by the COVID-19 outbreak. The pandemic led to widespread educational interruptions, including school closures, economic instability, and uncertainties regarding higher education, all of which substantially impacted student enrollment.

A notable recovery occurred in the 2021–2022 academic year, with 4,462 students enrolling, possibly indicating efforts to restore normalcy within the education sector following the pandemic. However, this recovery was followed by another sharp decline in 2022–2023 because of the pandemic's aftereffects and adjustments in government policy. In contrast, the 2023–2024 academic year saw a significant increase in enrollment, with 5,129 students, suggesting a potential stabilization of the higher education system. This growth was likely linked to the full implementation of the KG+12 education system, which aligned Myanmar’s education framework with international standards, thereby facilitating greater access to university education.

Figure (3.1) Technological Universities 's Students Enrollment



Source: Statical Year Book ,2024

The enrollment trends shown in Figure 3.1 highlight the complex interaction between educational reforms, external disruptions, and government policy changes in influencing student participation in higher education. The fluctuations observed over the years emphasize the need for continuous evaluation of policies and the implementation of strategic interventions to ensure stability and accessibility in the university enrollment process.

3.4 Historical Background and Development of Thanlyin Technological University

Technological University, Thanlyin (TTU) is a specialized higher education institution located in Thanlyin township within the Yangon Region of Myanmar. Covering a substantial area of 310.05 acres, TTU primarily focuses on the fields of engineering and architecture. The university is recognized for offering programs and degrees designed to equip students with strong practical skills and comprehensive technical knowledge. It serves as an important academic and research hub, playing a significant role in the development of skilled professionals to support Myanmar's infrastructure, technology, and economic growth.

The establishment of the Technological University (TTU) in Myanmar can be traced back to the creation of the Industrial Training Center (ITC) in March 1993. The ITC was initially founded in response to the increasing demand for a skilled workforce

to support Myanmar's growing industrial sector. At this stage, the focus was on providing vocational education and training that would equip students with practical skills necessary for employment in various technological fields.

In November 1995, the ITC was upgraded to a Government Technological Institute (GTI), marking a significant shift in its role within the educational landscape of Myanmar. This transition was part of the broader governmental reforms aimed at improving technical education in the country. As a GTI, the institution expanded its academic offerings to include two-year vocational diplomas in technical disciplines, thereby providing students with a more structured and formalized form of technical education. This move reflected the country's recognition of the need for higher levels of technical expertise in the workforce, contributing to national development goals.

Further progress occurred in October 1999 when the institution was restructured into a Government Technological College (GTC). This change represented an important development in Myanmar's higher education system, as the GTC began to offer three-year Bachelor of Technology (BTech) programs. The introduction of these undergraduate programs was a response to the growing demand for more academically advanced education in the fields of technology and engineering. By providing students with the opportunity to obtain a formal bachelor's degree, the GTC aimed to foster a more highly educated workforce, capable of addressing the increasingly complex technological challenges facing the nation.

In January 2007, the institution's status was elevated to that of a Technological University, a milestone that reflected its growing stature in the realm of higher education. As a Technological University, the institution introduced a wider range of academic programs, including Bachelor of Engineering (BE), Bachelor of Architecture (BArch), and Master of Engineering (ME) degrees. This expansion of programs allowed the university to cater to a broader spectrum of students and respond to the nation's need for a higher caliber of professionals in the engineering, architecture, and technological fields. The transformation into a Technological University not only marked the culmination of its evolution but also signified its role as a key institution in Myanmar’s higher education system (Thanlyin Technological University,2025).

3.4.1 Academic Accreditation and Recognition

TTU is one of the leading technological universities in Myanmar and holds significant academic recognitions. It is the second earliest university in Myanmar to be acknowledged as an associate member of the ASEAN University Network (AUN) and was the first technological university in the country to receive ASEAN University Network-Quality Assurance (AUN-QA) certification in 2017. TTU is also progressing toward becoming a core member of AUN and is a member of the Asia Technological University Network (ATU-Net). Additionally, many of TTU's engineering programs have received full or provisional accreditation from the Engineering Education Accreditation Committee (EEAC)

Furthermore, the university has been certified under ISO 9001:2008 and ISO 9001:2015 quality management systems, awarded by Bureau Veritas, a globally recognized certification body established in 1828. These certifications reflect TTU's commitment to maintaining international standards in academic and administrative processes (Thanlyin Technological University,2025).

3.4.2 Organization Structure and Departments of TTU

The Technological University (TTU) is structured into four main departments, each with its distinct role and responsibility within the university. Three of these departments are primarily academic, while the fourth focuses on administrative functions that support the university's operations.

(i) Academic Departments

The Department of Engineering and Architecture is one of the core academic departments at TTU. It offers a variety of Bachelor's programs in engineering and architecture designed to equip students with the knowledge and skills necessary to pursue successful careers in their respective fields. These programs are aimed at providing students with a comprehensive understanding of engineering principles, hands-on experience, and preparation for the challenges of the modern technological and architectural industries. The following table presents the bachelor's degree programs offered at Thanlyin Technological University.

Table (3.3) Lists of Bachelor Degree Program in TTU

Major Name	Program Name
BE(Civil)	Bachelor of Civil Engineering
B.Arch(Architecture)	Bachelor of Architecture
BE(EP)	Bachelor of Electrical Power Engineering
BE(EC)	Bachelor of Electronics Engineering
BE(Mech)	Bachelor of Mechanical Engineering
BE(MC)	Bachelor of Mechatronics Engineering
BE(IT)	Bachelor of Information Technology
BE(ChE)	Bachelor of Chemical Engineering
BE(PE)	Bachelor of Petroleum Engineering

Source: Thanlyin Technological University,2025

The table (3.3) outlines the various Bachelor's degree programs available at TTU. Specifically, it lists nine distinct programs, categorized under different departments within the university's academic structure. Out of these, eight programs are Bachelor of Engineering (BE) degrees, spanning a diverse range of fields, including Civil Engineering, Electrical Power Engineering, Electronics Engineering, Mechanical Engineering, Mechatronics Engineering, Information Technology, Chemical Engineering, and Petroleum Engineering. Each of these programs is designed to provide students with specialized knowledge and skills in their respective areas of engineering.

In addition to the engineering programs, the university also offers a Bachelor of Architecture (B.Arch) program, catering to students interested in the field of architecture. This program is the sole non-engineering offering in the list, demonstrating the university's broad focus on both technical and design-related fields.

(ii) Science Departments

The Department of Science at TTU provides foundational scientific knowledge that supports students in various technical fields. This department offers courses that are essential for the development of students' understanding of the underlying scientific principles that inform engineering, technology, and applied sciences. Its academic offerings typically cover subjects such as engineering mathematics, engineering

physics, engineering chemistry all of which are integral to the broader technical education provided by the university.

(iii) Language Departments

The Department of Language plays a significant role in fostering communication skills among students. It offers courses designed to improve proficiency in both the national Myanmar language and foreign English languages, with an emphasis on technical writing and communication.

(iv) Administrative Department

Unlike the academic departments, the Department of Administration is responsible for the operational and organizational aspects of the university. This department oversees the administrative functions, including student admissions, human resources, finances, and general university management. Its role is critical in ensuring the smooth running of the university and supporting both faculty and students in achieving their academic and professional goals. Source: (Thanlyin Technological University,2025)

3.4.3 Graduated Student Lists of Thanlyin Technological University

This section presents the graduation student lists over the past 16 years for various majors at the Technological University (TTU). It provides an overview of the number of graduates by major, offering insights into the progression and output of various academic departments, serving as a reflection of student engagement, retention, and academic achievement.

By examining these graduation trends, the study seeks to identify patterns that may relate to the effectiveness of teaching strategies, curriculum developments, and the broader implementation of innovative pedagogical approaches within the university. Furthermore, fluctuations in graduation numbers may highlight successes in different academic programs, providing a contextual foundation for understanding how institutional practices and learning environments influence student outcomes.

Table (3. 4) Total Number of Graduates by Major (Academic Year 2006-2024)

NO.	Year	Civil	Arch	EC	EP	Mech	MC	IT	ChE	PE	Total
1	2006-07	59	15	55	46	104	55	63	51	13	461
2	2007-08	66	37	46	46	101	50	39	49	11	445
3	2008-09	87	48	113	141	201	585	56	82	27	813
4	2009-10	83	39	70	65	100	36	51	21	14	481
5	2010-11	170	31	124	75	74	63	68	70	24	699
6	2011-12	173	16	146	149	165	75	74	80	44	922
7	2012-13	290	35	206	134	132	29	43	23	16	908
8	2013-14	412	47	149	152	118	20	49	28	17	992
9	2014-15	607	38	194	44	189	21	18	15	17	1143
10	2015-16	744	67	375	312	352	72	110	24	50	2106
11	2016-17	No Graduate									
12	2017-18	664	108	269	349	319	95	155	19	59	2037
13	2018-19	279	48	182	148	159	55	60	27	51	1009
14	2019-20	96	15	50	71	87	21	18	7	22	387
15	2020-21	11	2	5	4	9	3	1	1	6	42
16	2021-22	118	18	72	97	84	16	27	20	31	483
Total		3859	564	2056	1833	2194	669	832	517	404	12928

Source: Thanlyin Technological University,2025

The data from table (3.4) presents the distribution of graduates across nine academic disciplines within the fields of engineering, architecture, and information technology, comprising a total of 12,928 graduates. Among these disciplines, Civil Engineering accounts for the highest proportion, with 3,859 graduates, representing approximately 29.9% of the total. This notable figure underscores the prevailing emphasis on infrastructure-related education and reflects the continuing importance of civil engineering in national development strategies.

Mechanical Engineering and Electrical Power Engineering follow, with 2,194 and 2,056 graduates, respectively. Collectively, these two disciplines contribute over 32% of the total graduates, indicating a sustained demand for expertise in mechanical systems, energy production, and industrial technologies. Electronic Engineering, with 1,833 graduates (14.2%), also constitutes a significant portion of the graduate population, likely due to the expanding role of electronics in modern industrial and consumer applications.

In contrast, disciplines such as Information Technology (832 graduates), Mechatronics Engineering (669 graduates), and Architecture (564 graduates) produce comparatively fewer graduates. These fields, while essential to innovation and urban development, may reflect either limited program availability or evolving market demands. The relatively low numbers in Chemical Engineering (517 graduates) and Petroleum Engineering (404 graduates) further suggest that these are specialized areas with more selective entry requirements or niche industrial applications.

It highlights fluctuations in the data, influenced by academic program adjustments and external factors such as the COVID-19 pandemic and government policy changes. From 2006-2007 to 2015-2016, the number of students on the graduate list increases steadily, ranging from approximately 445 to 2106 students. This gradual growth suggests a consistent rise in the number of graduate students, with no major disruptions or changes during this period.

3.5 Teaching and Learning Methods at Thanlyin Technological University

Thanlyin Technological University has evolved significantly in its educational philosophy and practice, transitioning from traditional didactic instruction to more dynamic and student-centered teaching methods. Recognized by several external quality assurance bodies including ISO certification, the Engineering Education Accreditation Committee of the Myanmar Engineering Council, and the ASEAN University Network Quality Assurance (AUN-QA) . TTU demonstrates a strong commitment to ensuring high-quality education aligned with regional and international benchmarks. These accreditations reflect the institution's continual effort to modernize curricula, improve instructional quality, and integrate innovative pedagogical practices across its nine major academic departments.

TTU incorporates a multi-modal teaching framework that combines traditional lectures with innovative pedagogies such as:

- Project-Based Learning (PBL)
- Problem-Based Learning (PBL)
- Blended and Flipped Classrooms
- Simulation and Virtual Labs
- Collaborative and Peer-to-Peer Learning
- Industry-Based Capstone Projects
- Digital and E-Learning Platforms

These methods are designed to foster critical thinking, creativity, communication, collaboration, and digital literacy the core competencies of 21st-century learners. Through carefully structured learning activities, students are encouraged to explore real-world problems, work in multidisciplinary teams, and apply engineering principles in innovative ways. Additionally, TTU is enhancing its digital transformation initiatives by introducing Learning Management Systems (LMS) such as Moodle, and digital assessment tools to streamline learning analytics and provide personalized student feedback.

Each academic department at TTU integrates tailored pedagogical models to meet specific disciplinary needs, while aligning with national education policies and global engineering standards.

(i) Civil Engineering

Teaching emphasizes experiential and simulation-based learning, with students using tools like AutoCAD, STAAD Pro, and ETABS. Projects related to structural design, hydrology, and urban infrastructure promote contextual problem-solving. Fieldwork, such as site surveying and soil testing, strengthens practical competencies.

(ii) Architecture

The curriculum relies on design studio pedagogy, where students undergo iterative design processes through individual critique sessions, portfolio development, and model-making. Integration of green building practices and climate-responsive design is emphasized to align with sustainable development goals.

(iii)Electrical Power Engineering

Students engage in hands-on laboratory experiments, electrical circuit modeling, and power system analysis using software like MATLAB/Simulink, ETAP, and PowerWorld. Industry internships and live project demos bridge the gap between theoretical learning and practical application.

(iv)Electronic Engineering

This department adopts inquiry-based learning, promoting student-led projects in digital electronics, microcontrollers, and control systems. Innovative assessment includes functional prototyping, circuit debugging tasks, and IoT integration, using platforms like Arduino and Proteus.

(v) Mechanical Engineering

Students apply core engineering concepts in thermodynamics, fluid mechanics, and CAD/CAM using tools like SolidWorks and ANSYS. Learning is reinforced through workshops, mechanical fabrication labs, and team-based design challenges addressing real-world issues like energy efficiency.

(vi)Mechatronics Engineering

The interdisciplinary nature of Mechatronics is supported by robotics labs, automated system development, and PLC programming using Siemens TIA Portal.

Learning is structured through capstone projects, where students integrate mechanical, electronic, and software systems into autonomous models.

(vii) Information Technology

The IT curriculum uses problem-based and collaborative learning, where students develop full-stack applications, data systems, and cybersecurity solutions. Technologies such as Python, Java, MySQL, and cloud platforms are introduced early, supported by participation in coding competitions and hackathons.

(viii) Chemical Engineering

Teaching combines laboratory experimentation, process simulation using Aspen Plus and HYSYS, and case-based learning involving industry problems. Students explore themes like waste minimization, process optimization, and green chemistry, reinforcing the relevance of chemical engineering in sustainable development.

(ix) Petroleum Engineering

Students engage in reservoir simulation, drilling operations, and petrophysics, applying software like PETREL, Techlog, and CMG. Field visits, case studies, and industry-led seminars connect academic learning to Myanmar's resource-based economy and global energy transitions.

In line with the National Education Strategic Plan (2016–2021) and the goals of the Comprehensive Education Sector Review (CESR), TU Thanlyin has launched efforts to become a digitally integrated campus. Initiatives include:

- Online registration and e-learning support
- Virtual lab integration in select courses
- Industry partnerships with local and international companies
- Joint research with ASEAN partner institutions
- Faculty development workshops on active learning and curriculum reform

Furthermore, TTU is committed to enhancing faculty teaching capacity through regular training programs in outcome-based education (OBE), student assessment, and curriculum design, ensuring that pedagogical approaches remain responsive to global education trends.

TTU envisions itself as a national leader in engineering education—an institution where all students across Myanmar aspire to study. The university continues to cultivate a learner-centered environment where students are empowered to innovate, lead, and contribute meaningfully to national development. By combining academic rigor, hands-on experience, and a commitment to educational equity, TTU stands at the forefront of Myanmar's higher education transformation.

CHAPTER IV
SURVEY ANALYSIS

4.1 Survey Profile

This study investigates the relationship between students' confidence levels and their perceptions of the effectiveness, skill development, and challenges associated with innovative teaching methods in enhancing their learning experiences. A total of 320 respondents were selected through simple random sampling from the final-year student population at Thanlyin Technological University (TTU), located in Thanlyin, Yangon Division.

TTU is ranked as the second-best technological university among the 33 in Myanmar and holds the eighth position out of 164 universities nationwide. It is certified by the ASEAN University Network Quality Assurance and holds ISO 9001:2008 and ISO 9001:2015 certifications from Bureau Veritas. Additionally, most of its programs are accredited by the Engineering Education Accreditation Committee. The university is also providing students with an environment that balances practical learning with theoretical knowledge.

The respondents were selected from nine different majors at TTU, including Civil Engineering, Architecture, Electrical Power Engineering, Electronics, Mechanical Engineering, Mechatronics, Information Technology, Chemical and Petroleum Engineering. The distribution of students across these diverse programs ensured that the sample represented the various academic backgrounds present at the university.

Table (4.1) shown the current list of final-year students from the nine disciplines at TTU for the 2024-2025 academic year. This table provides an overview of the student distribution across the various majors, reflecting the number of students approaching graduation in this academic year.

Table (4.1) List of Total Population and Survey Respondents

No.	Major	Student Population	Survey Sample
1	Civil	58	46
2	Architecture	12	12
3	Electronic Engineering	68	43
4	Electrical Power Engineering	47	41
5	Mechanical Engineering	84	40
6	Mechatronic Engineering	12	11
7	Chemical Engineering	10	7
8	Petroleum Engineering	14	7
9	Information Technology Engineering	23	23
Total		328	230

Source: Thanlyin Technological University,2025

4.2 Survey Design

To address the research objectives, this study will collect primary data from final-year students at Thanlyin Technological University (TTU) through a structured questionnaire. A sample of 230 respondents will be selected using simple random sampling. This approach ensures that the sample is representative of the entire final-year student population, thus enhancing the generalizability of the findings.

The questionnaire will be distributed via nine major Viber groups representing different academic disciplines, with support from the Heads of Department to facilitate smooth communication and encourage participation. To further enhance response rates and ensure broad participation across the university, a Google Form will be used for data collection. The use of a digital platform will allow for easy access, convenient completion of the questionnaire, and faster data collection, as students can complete the survey at their convenience.

The survey analysis included both descriptive and Regression Analysis. Descriptive statistics (mean and standard deviation) to summarize students' responses and provide an overall view of their experiences. Regression analysis to determine whether factors like prior exposure to innovative learning approaches significantly

influence students' confidence. A reliability test (e.g., Cronbach's alpha) will be conducted to assess the internal consistency of the Likert scale items, ensuring the reliability of the quantitative data.

The questionnaire was includrd into two main sections. Part A collected demographic information such as gender, age, academic program, and awareness of innovative teaching methods. The part B was designed to capture quantitative responses, enabling a comprehensive exploration of students' confidence in innovative teaching methods and the challenges they face in adopting them. The quantitative section of the questionnaire will consist of close-ended questions, primarily Using a 5-point Likert scale, respondents indicate how strongly they agree or disagree with each statement, where 1 represented "Strongly Disagree," 2 was "Disagree," 3 indicated "Neutral," 4 stood for "Agree," and 5 corresponded to "Strongly Agree." ratings, to assess students' confidence levels, their perceptions of the effectiveness and skill development of innovative pedagogies, and the types of challenges they encounter. The questionnaire is further divided into five sections, as follows:

Section 1: Confidence in Learning Experiences – Focuses on students' confidence in managing their learning experiences and using modern pedagogical techniques, such as project-based learning, digital tools, and group work.

Section 2: Perceived Effectiveness of Innovative Pedagogies – Assesses how students perceive the effectiveness of different teaching methods such as blended learning, AI-driven learning, and project-based learning.

Section 3: Self-Assessed Skill Development – Investigates how students feel their skills (critical thinking, problem-solving, teamwork, etc.) have developed as a result of engaging with innovative pedagogies.

Section 4: Challenges and Barriers – Identifies the difficulties and barriers students face in engaging with innovative learning methods, such as financial constraints, access to technology, and time management issues.

Section 5: Open-ended Questions _ captures deeper insights into students' experiences, revealing their needs for additional support, preferred learning methods, and the specific skills they believe were most enhanced through innovative pedagogies.

Data visualization tools, including charts and tables, were created to present the analysis results. Microsoft Excel was used for data analysis, enabling the findings to be displayed in a clear and accessible format.

By integrating both Descriptive and Regression analysis, this study will offer a richer and more nuanced comprehension of students' perceptions innovative pedagogies, the confidence they place in them, and the obstacles that may hinder their engagement.

4.2.1 Determination of Sample Size

The sample size for this study, consisting of 230 students, was determined using Yamane's formula (1967), which is widely used for calculating sample size from a finite population when employing simple random sampling. Given the total population of 328 students from various majors at the Technological University, and applying a 95% confidence level with a margin of error of 5%, the sample size was calculated as follows:

$$n = \frac{328}{1 + 328(0.05^2)} = 180$$

Where:

n =Sample size,

N = Total Population size,

e = the acceptable sampling error (assumed to be 5% margin of error at a 95% confidence level).

This computation results in a sample size of 180 to the nearest whole number.

However, after considering specific factors relevant to the study, a final sample size of 230 respondents was chosen to enhance the accuracy and robustness of the findings.

4.3 Survey Results

This section presents a comprehensive analysis of the survey results, building upon the survey design and data collection process. The data will be analyzed using Microsoft Excel to conduct various statistical tests. The analysis will commence with an examination of the demographic characteristics of the respondents, providing essential context for the interpretation of the data. Reliability analysis, specifically Cronbach's Alpha, will be employed to assess the internal consistency of the survey variables, ensuring the robustness of the measurement instrument. Descriptive statistics, including the mean and standard deviation, will be calculated to summarize respondents' perceptions. Following this, correlation analysis will be conducted to

explore the relationships between key variables. Finally, regression analysis will be performed to determine the extent to which factors such as prior exposure to innovative learning approaches significantly influence students' confidence. Together, these analytical methods will facilitate a thorough understanding of the data for the valuable insights and informing the broader implications of the study.

4.3.1 Demographic Information of the Respondents

Table (4.2) presents the demographic characteristics of the final-year students who participated in this study. The gender distribution is relatively balanced, with 50.87% identifying as female and 47.39% as male, while 3.04% preferred not to disclose their gender. This balance ensures that perspectives from different gender identities are fairly represented.

Table (4.2) Demographic Information of the Respondents

No.	Items	Description	Respondents Number	Percentage (%)
1.	Gender	Male	109	47.39
		Female	117	50.87
		Prefer not to say	7	3.04
2	Age	18-22	68	29.57
		23-27	151	65.65
		28-32	9	3.91
		33 and above	2	0.87
3.	Major	Civil	46	20.00
		Architecture	12	5.22
		Electronic Engineering	43	18.70
		Electrical Power Engineering	41	17.83

Table (4.2) Demographic Information of the Respondents (Continued)

No.	Items	Description	Respondents Number	Percentage (%)
3.	Major	Mechanical Engineering	40	17.39
		Mechatronic Engineering	11	4.78
		Chemical Engineering	7	3.04
		Petroleum Engineering	7	3.04
		Information Technology Engineering	23	10.00
4	Awareness of Innovative Teaching Methods in Courses	Yes	180	78.26
		No	23	10.00
		Not Sure	27	11.74

Source: Survey Data, 2025

In terms of age, the majority of respondents (65.65%) fall within the 23–27 age range, followed by 29.57% aged 18–22. A smaller number are between 28–32 years old (3.91%), and only 0.87% are aged 33 and above. These figures align with the academic level of the participants, as most are final-year students who are either completing their undergraduate studies or preparing to transition into professional or postgraduate pathways. The respondents represent a wide range of academic disciplines within engineering and architecture. Civil Engineering accounts for the largest group (20%), followed by Electronic Engineering (18.70%), Electrical Power Engineering (17.83%), and Mechanical Engineering (17.39%). Other majors such as Architecture, Mechatronics, Information Technology, Chemical Engineering, and Petroleum Engineering are also included. This diversity strengthens the study by allowing for a broader understanding of final-year students' experiences across different technical fields. When asked about their awareness of innovative teaching methods such as

blended learning, project-based learning, and AI-assisted instruction. The majority (78.26%) reported that they were aware of these approaches. Only 10% indicated they were not aware, and 11.74% were unsure. This high level of awareness is notable, especially among final-year students, as it suggests that many have encountered or at least been exposed to modern pedagogical strategies during their academic journey.

In summary, the demographic profile reflects a well-rounded group of final-year students from diverse disciplines, with a strong awareness of innovative teaching practices. Their experiences and perspectives offer valuable insights into how emerging educational methods are perceived by students who are on the verge of entering the professional world.

4.3.2 Reliability Analysis of the Variables

To ensure the internal consistency and reliability of the survey instrument, a reliability analysis was conducted using Cronbach's Alpha. This statistical measure evaluates how closely related a set of items are as a group, providing an estimate of the consistency of responses across items measuring the same underlying construct. In this study, Cronbach's Alpha was applied to the key sections of the questionnaire, including items related to students' confidence levels, perceptions of the effectiveness of innovative pedagogies, Self-Assessed Skill Development and the challenges they encounter. A Cronbach's Alpha value of 0.70 or higher is generally considered acceptable for social science research, indicating that the scale items reliably reflect the construct being measured.

Table (4.3) Reliability Analysis of the Variables

No.	Variables	No. of Item	Cronbach's Alpha
1	Confidence in Learning Experiences of the Respondents	5	0.79
2	Perceived Effectiveness of Innovative Pedagogies	10	0.89
3	Self-Assessed Skill Development	7	0.9
4	Challenges and Barriers	5	0.83

Source: Survey Data ,2025

The reliability analysis presented in Table 4.3 provides a critical assessment of the internal consistency of the survey variables, as indicated by the Cronbach's Alpha values for each construct. For the variable Confidence in Learning Experiences of the Respondents, the Cronbach's Alpha of 0.79 suggests a moderate level of reliability, which is within the generally accepted range of 0.7 to 0.8. This value indicates that the survey question 5 items measuring this construct are sufficiently consistent, making them a reliable measure of respondents' confidence in their learning experiences. The Perceived Effectiveness of Innovative Pedagogies variable shows a high Cronbach's Alpha of 0.89, reflecting strong internal consistency. This value suggests that the survey question 10 items assessing the perceived effectiveness of innovative pedagogies are highly correlated, offering a reliable measure of respondents' perceptions of the effectiveness of such approaches.

Similarly, the Self-Assessed Skill Development variable exhibits excellent internal consistency with a Cronbach's Alpha of 0.90. This value indicates that the survey question 7 items measuring self-assessed skill development are highly reliable, providing a robust reflection of respondents' perceptions of their skill improvement. Lastly, the Challenges and Barriers variable demonstrates good internal consistency with a Cronbach's Alpha of 0.83, which is above the acceptable threshold of 0.7. This indicates that the survey question 5 items used to assess challenges and barriers are reliable and adequately capture respondents' perceptions of the difficulties they face. In sum, all the Cronbach's Alpha values exceed the minimum threshold of 0.7, thereby demonstrating that the survey instruments used to measure these constructs exhibit satisfactory to excellent internal consistency. This reliability ensures that the data gathered from these variables are robust and valid for subsequent analysis, providing a solid foundation for drawing meaningful and reliable conclusions.

4.3.3 Descriptive Analysis of Survey Results

This section provides a thorough descriptive analysis of the survey results, focusing on the relationship between students' confidence in learning and their perceptions of the effectiveness and skill development associated with innovative pedagogies. The aim is to understand how these factors contribute to enhancing students' overall learning experiences. The analysis is divided into four key areas: (i) confidence in learning experiences, (ii) perceived effectiveness of innovative pedagogies, (iii) self-assessed skill development, and (iv) challenges and barriers to

engaging with innovative learning strategies. Each area is examined to provide insights into how innovative teaching approaches influence students' confidence based upon on effectiveness and skills development, and the challenges they face in adopting these methods.

(i) Confidence in Learning Experiences of the Respondents

This section presents the respondents' levels of confidence in their learning experiences, particularly in relation to the use of innovative teaching methods. The results are based on five key items that reflect different aspects of learning confidence, including self-directed learning, application of theoretical knowledge, use of digital tools, collaborative learning, problem-solving and so on.

Table (4.4) Confidence in Learning Experiences of the Respondents

Confidence in Learning Experiences		Mean	Deviations
1	I feel confident in managing my learning independently when engaging with innovative teaching methods.	4.03	0.95
2	I can easily apply theoretical knowledge to practical tasks using modern pedagogical techniques.	3.68	0.97
3	I am confident in using digital tools (e.g., learning management systems, online simulations, educational apps) for learning.	4.02	0.90
4	Engaging in group discussions and collaborative projects has improved my confidence in learning.	3.95	0.86
5	I believe that innovative learning methods have enhanced my ability to solve complex academic problems.	3.94	0.89
Overall Mean		3.92	0.91

Source: Survey Data, 2025

According to the Table (4.4), the overall mean score across all five items is 3.92, indicating a generally high level of confidence among respondents when engaging

with innovative learning approaches. The highest mean score (M = 4.03, SD = 0.95) was recorded for the item, “I feel confident in managing my learning independently when engaging with innovative teaching methods”, suggesting that most final-year students feel capable of self-directed learning within technologically enhanced environments. Similarly, high levels of confidence were observed in the use of digital tools (M = 4.02), highlighting students' familiarity and comfort with platforms such as learning management systems, online simulations, and educational applications.

Confidence was also strong regarding group-based and collaborative learning experiences (M = 3.95) and problem-solving using innovative methods (M = 3.94). These findings indicate that interactive and student-centered approaches may have a positive impact on students’ ability to engage deeply with academic content. However, the item with the lowest mean score (M = 3.68, SD = 0.97) pertains to the application of theoretical knowledge to practical tasks, suggesting that while students may be confident overall, they feel relatively less assured when translating conceptual learning into real-world practice.

In conclusion, the data reflect that final-year students generally possess a high level of confidence in their learning when supported by innovative teaching strategies. Nonetheless, the slightly lower confidence in practical application suggests a potential area for improvement in curriculum design particularly in bridging the gap between theory and practice through experiential or project-based learning models.

(ii) Perceived Effectiveness of Innovative Pedagogies Among Respondents

This section explores respondents’ perceptions of the effectiveness of various innovative teaching methods, including project-based learning, AI tools, blended learning, multimedia content and so on. The aim is to assess how students perceive these pedagogical approaches in terms of their contribution to learning outcomes such as concept retention, engagement, motivation, application of knowledge, and academic performance.

Table (4.5) Perceived Effectiveness of Innovative Pedagogies Among Respondents

Perceived Effectiveness of Innovative Pedagogies		Mean	Deviations
1	I believe that innovative teaching methods improve my ability to retain and understand concepts.	3.86	0.81
2	Technology-enhanced learning helps me stay engaged and motivated in my studies	4.00	0.90
3	Project-based learning allows me to apply knowledge more effectively than traditional methods.	4.10	0.91
4	The use of AI and adaptive learning tools has improved my understanding of complex topics..	4.12	0.90
5	Blended learning (a mix of online and in-person instruction) provides a more effective learning experience.	3.61	1.04
6	Interactive learning approaches, such as inquiry-based and problem-solving activities, have enhanced my academic performance.	3.91	0.85
7	I believe that integrating real-world applications into coursework improves learning effectiveness.	4.09	0.86
8	The use of online simulations and virtual labs has contributed to my academic growth.	3.99	0.94
9	Flipped classroom models (where students study before class and apply knowledge in class) enhance my learning experience.	4.01	0.75
10	I feel that learning through digital and multimedia content (videos, animations, gamification) is more effective than reading textbooks alone.	3.86	1.01
Overall Mean		4.00	0.90

Source: Survey Data ,2025

The table (4.5) shows that the overall mean score across all items is 4.00 (SD = 0.90), indicating that, on average, respondents perceive innovative pedagogies to be effective in enhancing their learning experiences. The highest-rated item was “The use of AI and adaptive learning tools has improved my understanding of complex topics” (M = 4.12, SD = 0.90), suggesting that students recognize the potential of AI to facilitate deeper understanding through personalization and intelligent content delivery. Project-based learning (M = 4.10) and the integration of real-world applications into coursework (M = 4.09) also received high ratings, highlighting students' appreciation for experiential and applied learning environments that extend beyond traditional classroom settings. Other methods perceived as effective include the flipped classroom model (M = 4.01), technology-enhanced learning for engagement and motivation (M = 4.00), and the use of online simulations and virtual laboratories (M = 3.99). These findings suggest that students value instructional strategies that promote active participation and simulate real-world problem-solving scenarios.

However, the lowest mean score was observed for the item “Blended learning provides a more effective learning experience” (M = 3.61, SD = 1.04). This relatively lower score, combined with the highest standard deviation among all items, may indicate varying levels of satisfaction or uneven implementation across courses. Similarly, the item related to learning through digital and multimedia content (M = 3.86, SD = 1.01) exhibited considerable variation in responses, suggesting mixed experiences with such formats.

In conclusion, the data indicate that final-year students generally perceive innovative pedagogical strategies as effective tools for the student’s Confidence.

(iii) Self-Assessed Skill Development of the Respondent

This section explores respondents’ self-assessed development of key academic and professional skills as influenced by innovative learning strategies. The items measured include critical thinking, problem-solving, technology use, leadership and teamwork, decision-making, and overall personal and professional growth.

Table (4.6) Self Assessed Skill Development of the Respondent

Perceived Effectiveness of Innovative Pedagogies		Mean	Deviations
1	I believe that innovative learning methods have improved my critical thinking skills.	4.01	0.75
2	My problem-solving abilities have strengthened through engagement in non-traditional learning activities.	3.95	0.88
3	I feel more confident in using technology for research and academic tasks.	4.10	0.82
4	Participating in group projects has enhanced my leadership, communication, Collaboration and teamwork skills.	4.07	0.87
5	Innovative pedagogies have prepared me for real-world applications and industry-related challenges.	3.91	0.87
6	I am more capable of making data-driven decisions due to technology-enhanced learning.	3.99	0.87
7	I believe that integrating real-world applications into coursework improves learning effectiveness.	3.97	0.80
Overall Mean		4.00	0.84

Source: Survey Data, 2025

Table 4.6 presents students' perceptions of how innovative learning strategies have contributed to their skill development. The overall mean score for this construct was 4.00 (SD = 0.84), suggesting that students generally agree these methods have had a positive impact.

The statement with the highest mean score was "I feel more confident in using technology for research and academic tasks" (M = 4.10, SD = 0.82), indicating that final-year students feel increasingly comfortable with digital tools in academic settings. Similarly, the item regarding the benefits of group projects in developing leadership, communication, and teamwork skills received a high rating (M = 4.07), highlighting the value of collaborative learning in building soft skills.

Items related to critical thinking (M = 4.01) and data-driven decision-making (M = 3.99) also received favorable responses. These results suggest that students recognize the cognitive benefits of innovative teaching methods, particularly in terms of analytical and reflective thinking. Additionally, the belief that such strategies contribute to personal and professional development (M = 3.97) points to students' understanding of the broader, long-term advantages of these approaches.

The lowest mean scores were reported for items concerning real-world application and industry preparedness (M = 3.91), as well as problem-solving in non-traditional contexts (M = 3.95). While still moderately high, these scores may indicate that students perceive a gap between classroom learning and the demands of professional environments. This highlights the need for more experiential and industry-integrated learning opportunities.

In summary, the findings suggest that students view innovative learning strategies as effective in enhancing a variety of academic and professional skills. While they express confidence in using technology and working collaboratively, there is slightly less assurance in their readiness for real-world challenges. Therefore, curriculum design should aim to strengthen the connection between academic learning and practical, industry-relevant experiences.

(iv) Challenges and Barriers

The following table presents the perceived challenges and barriers to participating in innovative or technology-driven learning activities, as indicated by the mean responses and standard deviations of the participants.

Table (4.7) Challenges and Barriers of the Respondents

Challenges and Barriers		Mean	Deviations
1	Financial constraints (such as tuition fees, cost of digital devices, or internet access) limit my ability to fully engage in innovative learning.	4.00	1.00
2	Socio-economic challenges affect my ability to participate in group-based or technology-driven learning activities.	3.61	1.12

Table (4.7) Challenges and Barriers of the Respondents (Continued)

3	Group work and collaboration can sometimes be ineffective due to varying levels of participation.	3.77	1.08
4	Limited access to digital resources (e.g., internet, devices, software) affects my ability to engage in innovative learning.	3.87	0.99
5	Time management is a challenge when participating in collaborative or technology-driven learning activities.	3.73	1.04
Overall Mean		3.80	1.05

Source: Survey Data ,2025

The data from table (4.7) indicates that students encounter several substantial challenges in engaging with innovative or technology-enhanced learning activities. The most significant barrier identified is financial constraint, which yielded the highest mean score of 4.00. This category encompasses the cost of tuition, digital devices, and internet access, all of which significantly restrict student participation in such learning environments. Closely related to this issue is limited access to digital resources, which received a mean score of 3.87. This suggests that inadequate availability of reliable internet connectivity, technological devices, or necessary software remains a persistent obstacle to meaningful engagement.

Group work and collaboration emerged as another area of concern, with a mean score of 3.77. Challenges in this area are primarily attributed to uneven levels of participation among peers, which can undermine the effectiveness of collaborative learning experiences. Time management also poses difficulties for students, as reflected in a mean score of 3.73, indicating that students often struggle to allocate sufficient time to collaborative or technology-driven tasks within their academic and personal schedules. Additionally, socio-economic challenges, while slightly lower with a mean score of 3.61, continue to have a considerable impact on students' capacity to fully engage in innovative learning contexts.

The overall mean score of 3.80 across all categories suggests that these barriers are commonly encountered by students. Moreover, the moderate standard deviations (ranging from 0.99 to 1.12) indicate variability in individual experiences, emphasizing

that while these challenges are widespread, their intensity and impact differ among students. These findings underscore the importance of implementing targeted interventions, including financial support, enhanced access to digital tools, and initiatives to strengthen collaborative and time management skills, in order to promote equitable and effective participation in technology-driven educational practices.

4.3.3 Examining the Relationship Between Dependent and Independent Variables

Regression analysis is a statistical method employed to examine the relationship between a dependent variable and one or more independent variables. The primary objective of regression analysis is to model these relationships in order to predict outcomes, understand their underlying dynamics, or test specific hypotheses.

Regression Model Equation

The regression model is expressed as:

$$\widehat{\boldsymbol{Y}} = \boldsymbol{b_0} + \boldsymbol{b_1}\widehat{\boldsymbol{X}}_{\boldsymbol{1}} + \boldsymbol{b_2}\widehat{\boldsymbol{X}}_{\boldsymbol{2}} + \boldsymbol{b_3}\widehat{\boldsymbol{X}}_{\boldsymbol{3}} + \hat{\boldsymbol{\epsilon}}$$

Where:

$\hat{Y}$ = Dependent Variable

b_0 = Intercept Value

$b_1 + b_2$= The coefficients of the Independent Variables

$\hat{X}_1 + \hat{X}_2 + \hat{X}_3$ =Independents Variables

$\hat{\boldsymbol{\epsilon}}$ = Error Term

The regression analysis conducted in this study aimed to explore the relationship between students' confidence in their learning experiences (dependent variable) and three independent variables (Perceived Effectiveness of Innovative Pedagogies, Self-Assessed Skill Development and Challenges)

Table (4.8) Result of Regression Analysis

Variables	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.468	0.193	2.427	0.016	0.088	0.848
Perceived Effectiveness (X_1)	0.503	0.066	7.616	0.000	0.373	0.633
Self-Assessed Skill Development (X_2)	0.325	0.07	4.672	0.000	0.188	0.461
Challenges and Barriers (X_3)	0.05	0.038	1.304	0.194	-0.025	0.123
R Square	0.621					

Source: Survey Data ,2025

The table (4.8) shows that the R-squared value of 0.621 indicates that approximately 62% of the variation in the dependent variable (students' confidence in learning) can be accounted for by the independent variables in the model.

The regression analysis provides crucial insights into the factors influencing students' confidence in their learning experiences. The results intercept of 0.468 suggests that, when all independent variables (Perceived Effectiveness, Self-Assessed Skill Development, and Challenges and Barriers) are set to zero, students' baseline confidence in learning experiences is estimated to be 0.468. This value is statistically significant, as indicated by the p-value of 0.016, which is below the conventional threshold of 0.05. Thus, the baseline confidence in learning experiences is not negligible and is significantly different from zero.

Regarding the independent variables, Perceived Effectiveness (X_1) has a positive coefficient of 0.503, signifying a strong and statistically significant relationship with students' confidence. The coefficient indicates that, for every one-unit increase in students' perception of the effectiveness of innovative pedagogies, their confidence in their learning experiences increases by 0.503 units, holding other variables constant.

This positive effect is statistically robust, as evidenced by a p-value of 0.000, which is well below the 0.05 threshold for significance. This finding suggests that students who perceive the pedagogical approaches as more effective are more likely to experience greater confidence in their learning.

Similarly, Self-Assessed Skill Development (X_2) also exhibits a positive and statistically significant relationship with students' confidence in learning experiences. The coefficient of 0.325 indicates that for every one-unit increase in students' self-assessment of their skill development, their confidence increases by 0.325 units, all else being equal. The p-value of 0.000 confirms that this relationship is statistically significant, underscoring the importance of skill development in enhancing students' confidence. This suggests that students who feel that they are developing their skills through their education are more likely to report higher levels of confidence in their learning experiences.

In contrast, the variable Challenges and Barriers (X_3) shows a coefficient of 0.050, which is positive but not statistically significant, as indicated by a p-value of 0.194, which is greater than the conventional significance level of 0.05. This implies that while challenges and barriers might have some effect on students' confidence in learning experiences, this effect is not statistically significant. The confidence interval for this variable, ranging from -0.025 to 0.123, also includes zero, further suggesting that the relationship between challenges and barriers and students' confidence is weak and not reliably different from zero.

Since, the p-value for Challenges and Barriers (X_3) is greater than 0.05 (0.1936), it is not statistically significant, and therefore, it can be removed from the regression equation. Therefore, the equation will be

$$\widehat{\boldsymbol{Y}} = 0.468 + 0.503\widehat{\boldsymbol{X}}_{\boldsymbol{1}} + 0.325\widehat{\boldsymbol{X}}_{\boldsymbol{2}}$$

Where,

$\widehat{\boldsymbol{Y}}$ = Confidence in their learning experiences

$\widehat{\boldsymbol{X}}_{\boldsymbol{1}}$ = Perceived effectiveness

$\widehat{\boldsymbol{X}}_{\boldsymbol{2}}$ = self-assessed skill development

In summary, the regression equation demonstrates that improving Perceived Effectiveness and Self-Assessed Skill Development will likely lead to a positive change

in the outcome variable (Y), confidence in their learning experiences. However, challenges and barriers were not found to significantly affect students' confidence levels. This implies that while overcoming barriers is important, focusing on improving teaching strategies and helping students assess and develop their skills may be more effective in boosting their learning confidence.

4.3.4 Interpretation of Responses to Open-Ended Questions

The analysis of the open-ended responses to section (5) provides rich insight into students' perspectives on the implementation, effectiveness, and outcomes of innovative teaching methods.

A number of participants indicated important support requirements in order to successfully implement new learning strategies. Most frequent requests were access to digital tools like laptops, projectors, lab equipment, simulation software and internet connectivity. The practical learning opportunities in virtual lab, field visits, and project -based work are written over everything section. Students also emphasized that they need to be taught by professional teachers with good pedagogical training and asked for institutional support to provide resources, financial resources and flexibility in schedules. These responses underscore the necessity of both technological infrastructure and hands-on learning environments for effective innovation in education.

When asked about effective learning activities, students overwhelmingly preferred practical, hands-on methods. Activities such as lab experiments, circuit design, and real-time projects were cited as especially impactful. Project-based, problem-based, and blended learning approaches were frequently mentioned as effective, particularly when combined with real-world applications or industry exposure. Students also valued interactive strategies like group discussions and multimedia resources including videos and diagrams which helped them grasp complex concepts. These findings suggest that active, student-centered learning promotes stronger understanding and retention.

Regarding skill development, students reported noticeable growth in both technical and soft skills due to innovative teaching methods. The most commonly mentioned were critical thinking and problem-solving abilities. Many also noted gains in technological proficiency, particularly in using software and collaborative tools. Other frequently developed skills included teamwork, communication, time

management, and self-directed learning. Some students also highlighted improvements in creativity, leadership, and project management, particularly when involved in real-world simulations or design-based tasks. Overall, these responses indicate that innovative teaching methods contribute significantly to preparing students for both academic success and future professional challenges.

CHAPTER V
CONCLUSION

5.1 Findings

The results of the study indicate that students generally hold positive attitudes toward their learning experiences with innovative pedagogies. Students reported high confidence in managing their learning, with a mean score of 3.92 (SD = 0.91). The perceived effectiveness of these pedagogical approaches was even higher, with a mean score of 4.00 (SD = 0.90), suggesting that students view innovative teaching methods as highly effective. Similarly, the mean score for self-assessed skill development was 4.00 (SD = 0.84), reflecting students' belief that these approaches have contributed significantly to both their academic and personal growth. However, the score for challenges and barriers was slightly lower at 3.80 (SD = 1.05), indicating that some obstacles—such as financial constraints, limited access to learning resources, time management difficulties, and student collaboration—may hinder full engagement with innovative learning strategies.

Regression analysis further demonstrated that improvements in perceived effectiveness and self-assessed skill development are strong predictors of increased confidence in learning experiences. Interestingly, the impact of challenges and barriers on students' confidence levels was not statistically significant. This suggests that while addressing barriers is important, enhancing teaching strategies and supporting skill development may be more effective in boosting students' confidence and engagement.

The open-ended responses reinforced these findings. Students expressed a strong need for additional support, especially access to laptops, internet, lab tools, and well-trained instructors. They emphasized the importance of practical learning methods—such as project-based work, lab experiments, virtual labs, and field visits—as most effective for retaining knowledge. In terms of skills developed, students frequently mentioned improvements in critical thinking, problem-solving, teamwork, communication, and technological proficiency. These responses highlight the value of active, well-supported, and real-world learning experiences in driving both academic and personal growth.

5.2 Suggestions

Based on the findings, several recommendations can improve innovative pedagogies, address challenges, and enhance student confidence and learning experiences.

Firstly, to help students apply theoretical knowledge to real-world situations, universities should increase opportunities for experiential and project-based learning. Incorporating more hands-on activities like site visits and projects into the curriculum will connect theory with practice, boosting student confidence and skill development.

Secondly, inadequate resources, such as unreliable internet and outdated devices, create barriers. Universities should enhance access to digital tools and resources, particularly for financially disadvantaged students. Offering digital literacy training and workshops will improve proficiency and overall learning experiences. Time management challenges also hinder student success. Universities should offer time management workshops and tools to help students organize their workloads, especially in flexible learning environments. Investing in instructor professional development will also ensure the effective implementation of innovative pedagogies. Lastly, financial support for students facing economic barriers is crucial to ensuring equal access to innovative pedagogies.

In conclusion, addressing challenges like financial constraints, limited resources, and difficulties applying theory to practice will enhance innovative pedagogies. By increasing experiential learning opportunities, improving access to digital tools, and offering support like time management workshops and instructor training, universities can create a more engaging, inclusive, and effective learning environment, boosting student confidence and academic outcomes.

REFERENCES

Abeysekera, L., & Dawson, P. (2015). Motivation and cognitive load in the flipped classroom: Definition, rationale and a call for research. *Higher Education Research & Development, 34*(1), 1–14.

Ajayan, Ruskin & George. (2024). *Innovative pedagogies: Adapting teaching strategies for modern learning environments.* https://doi.org/10.58532/nbennurctch9

Bandura, A. (1997). Self-efficacy: *The exercise of control.* New York, NY: W.H. Freeman.

Barron, B. J., Schwartz, D. L., Vye, N. J., Moore, A., Petrosino, A., Zech, L., & Bransford, J. D. (1998). Doing with understanding: Lessons from research on problem- and project-based learning. *The Journal of the Learning Sciences, 7*(3-4), 271–311.

Basith, A. P., & Sabeena, P. S. (2025). Pedagogical approaches in education with reference to NEP 2020. *International Journal for Multidisciplinary Research (IJFMR), 7*(2), 1

Best, J. W. (1977). *Research in education*. Prentice-Hall.

Biggs, J., & Tang, C. (2011). Teaching for quality learning at university (4th ed.). Open University Press.

Bloom, B. S. (1956). *Taxonomy of educational objectives: The classification of educational goals*. David McKay.

Bransford, J. D., Brown, A. L., & Cocking, R. R. (Eds.). (2000). *How people learn: Brain, mind, experience, and school (Expanded ed.).* National Academy Press.

Carvalho, A., Teixeira, S., Olim, L., Campanella, S., & Costa, T. (2020). Pedagogical innovation in higher education and active learning methodologies: A case study. *Education and Training, 62*(4), 471–486. https://doi.org/10.1108/ET-05-2020-0141.

Chen, J. (2022). *Cognitive mapping for problem-based and inquiry learning: Theory, research, and assessment*. Taylor & Francis.

Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*(4), 227–268.

Dedehouanou, H. (2022). Strategies for implementing a “Service Learning Program” in higher education institutions (HEIs): Learning strategies to improve employability. *Creative Education, 13*, 1543-1553.

Freire, P. (1970). *Pedagogy of the oppressed*. Continuum Books.

Garrison, D. R., & Kanuka, H. (2004). Blended learning: Uncovering its transformative potential in higher education. *The Internet and Higher Education, 7*(2), 95–105.

GNLM. (2023, November 25). Technological, computer universities to admit enrolment till 30 November. *Global New Light of Myanmar*.

Hmelo-Silver, C., Chinn, C., Chan, C., & O’Donnell, A. (Eds.). (2013). *The international handbook of collaborative learning*. Routledge.

Hurst, A. L. (2018). *Class and campus life: Managing and experiencing inequality at an elite college*. Cornell University Press.

Infosys BPM. (n.d.). *The future of education: How AI and adaptive learning are shaping the classrooms of the future*

Kolb, D. A. (2014). *Experiential learning: Experience as the source of learning and development*. FT Press.

Kivunja, C. (2015). Using De Bono’s Six Thinking Hats Model to teach critical thinking and problem-solving skills essential for success in the 21st-century economy. *Creative Education, 6*, 380-391.

Learning Journals. (2021, August 17). What are the different pedagogical approaches to learning? *Learning Journals*. https://learningjournals.co.uk

Means, B., Toyama, Y., Murphy, R., Bakia, M., & Jones, K. (2014). The effectiveness of online and blended learning: A meta-analysis of the empirical literature. *Teachers College Record, 115(3*), 1–47.

Mishra, P., & Koehler, M. J. (2006). Technological pedagogical content knowledge: A framework for teacher knowledge. *Teachers College Record, 108(6),* 1017–1054.

Mi Mi, & Khin Hnin Nwe. (2020). Self-directed learning and academic self-efficacy of education college students. *Journal of Myanmar Academy of Arts and Science*, *18*(9B), 595-604.

Ministry of Science and Technology. (2024, November 10). *၂၀၂၄ ခုနှစ်၊ တက္ကသိုလ်ဝင်စာမေးပွဲအောင်မြင်ခဲ့ကြသူများအတွက် ပထမနှစ်ဝင်ခွင့်ရသူများ စာရင်းများကြေညာခြင်း*. Department of Advanced Science and Technology.

Min Zaw Soe, Aye Mya Swe, Nan Khin Moe Aye & Nan Htet Mon. (2017). Reforms of the education system: Case study of Myanmar. Parliamentary Institute of Cambodia.

Moe Thuzar Kyaw. (2019). Student perception of the effectiveness of collaborative learning. Research Journal of the 26th Anniversary of Sagaing University of Education, 2019-2020, No. 2, 429-439.

Myanmar Ministry of Education. (2021). *National Education Strategic Plan (NESP) 2021–2030*.

Nachmias, R., Mioduser, D., Cohen, A., Tubin, D., & Forkosh-Baruch, A. (2004). Factors involved in the implementation of pedagogical innovations using technology. *Education and Information Technologies, 9*(3), 291–308

National Research Council. (2000). *How people learn: Brain, mind, experience, and school*. National Academies Press.

Naw Ywa Eh. (2023). *Students' perception of the use of ICT in learning activities: Case study in Hpa-An University* (Master's thesis). Yangon University of Economics, Department of Economics.

Piaget, J. (1976). *To understand is to invent: The future of education*. Penguin Group.

Pisanu, F., & Menapace, P. (2014). Creativity & innovation: Four key issues from a literature review. *Creative Education, 5*(3), 145-154.

PowerSchool. (n.d.). *Heutagogy explained: Self-determined learning in education.*

Prince, M. (2004). Does active learning work? A review of the research. *Journal of Engineering Education, 93*(3), 223–231.

Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social-emotional learning: Theory, research, and practice. In T. Lovat, R. Toomey, & N. Clement (Eds.), *International research handbook on values education and student wellbeing* (pp. 131–148). Springer.

Smith, J. (2020). Innovative pedagogies: Adapting teaching strategies for modern learning environments. *Journal of Education, 15*(2), 45–62.

Stahl, R. J. (2000). The essential elements of cooperative learning in the classroom. In R. Stahl (Ed.), *Cooperative learning in social studies*: A handbook for teachers (pp. 15–22). National Council for the Social Studies.

Technological University, Thanlyin. (2024). About TTU.

Thiri Pyae Kyaw. (2023). Teaching-learning perceptions of Myanmar student teachers: A pilot study. ResearchGate. Uploaded March 16, 2023.

Thomas, J. W. (2000). *A review of research on project-based learning*. The Autodesk Foundation.

UNESCO. (2017). *ICT in education policy formulation and implementation: A sourcebook*.

UNESCO. (2021a). *The futures of education: Learning to become*.

UNESCO. (2021b). *The futures of education: Learning to change*.

UNESCO. (2021c). *The futures of education: Learning to transform*.

Valente, J. A. (2014). Blended learning and hybrid teaching: Integrating technologies in higher education. *Educational Research Journal, 23*(2), 45–58.

Villarroel, V., Benavente, M., Chuecas, M. J., & Bruna, D. (2020). Experiential learning in higher education: A student-centered teaching method that improves perceived learning. *Journal of University Teaching & Learning Practice, 17*(5).

Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.

Zimmerman, B. J. (2000). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology, 25*(1), 82–91

APPENDIX

QUESTIONNAIRE

Assessment of Students' Perceptions on Innovative Pedagogies Approaches in Learning Methods at Thanlyin Technological University

This survey aims to assess your confidence in the effectiveness of innovative pedagogical methods in enhancing your learning experience. Your responses will remain confidential and will be used solely for research purposes

PART A

Demographic Information

1. What is your major?

- Civil Engineering
- Mechanical Engineering
- Electrical Power Engineering
- Electronic Engineering
- Mechatronics Engineering
- Chemical Engineering
- Information Technology
- Architecture
- Petroleum Engineering

2. What is your Gender?

- Male
- Female
- Prefer not to say

3. What is your Age?

- 18-22
- 23-27
- 28-32
- 33 and above

4. Are you aware of innovative teaching methods used in your courses (e.g., blended learning, project-based learning, AI-driven learning, etc.)?

- o Yes
- o No
- o Not Sure

PART B

To what extent do you agree or disagree with the following statements? Tell us your opinion on scale of (1) Strongly disagree (2) Disagree (3) Neutral (4) Agree (5) Strongly Agree. Please √ the column to enter your answer.

Section 1: Confidence in Learning Experiences

No.	Statement	1	2	3	4	5
1	I feel confident in managing my learning independently when engaging with innovative teaching methods.					
2	I can easily apply theoretical knowledge to practical tasks using modern pedagogical techniques.					
3	I am confident in using digital tools (e.g., learning management systems, online simulations, educational apps) for learning.					
4	Engaging in group discussions and collaborative projects has improved my confidence in learning.					
5	I believe that innovative learning methods have enhanced my ability to solve complex academic problems.					

Section 2: Perceived Effectiveness of Innovative Pedagogies

No.	Statement	1	2	3	4	5
1	I believe that innovative teaching methods improve my ability to retain and understand concepts.					
2	Technology-enhanced learning helps me stay engaged and motivated in my studies.					
3	Project-based learning allows me to apply knowledge more effectively than traditional methods.					
4	The use of AI and adaptive learning tools has improved my understanding of complex topics.					
5	Blended learning (a mix of online and in-person instruction) provides a more effective learning experience.					
6	Interactive learning approaches, such as inquiry-based and problem-solving activities, have enhanced my academic performance.					
7	I believe that integrating real-world applications into coursework improves learning effectiveness.					
8	The use of online simulations and virtual labs has contributed to my academic growth.					
9	Flipped classroom models (where students study before class and apply knowledge in class) enhance my learning experience.					
10	I feel that learning through digital and multimedia content (videos, animations, gamification) is more effective than reading textbooks alone.					

Section 3: Self-Assessed Skill Development

No.	Statement	1	2	3	4	5
1	I believe that innovative learning methods have improved my critical thinking skills.					
2	My problem-solving abilities have strengthened through engagement in non-traditional learning activities.					
3	I feel more confident in using technology for research and academic tasks.					
4	Participating in group projects has enhanced my leadership, communication, Collaboration and teamwork skills.					
5	Innovative pedagogies have prepared me for real-world applications and industry-related challenges.					
6	I am more capable of making data-driven decisions due to technology-enhanced learning.					
7	I believe that innovative learning strategies have contributed to my overall personal and professional development.					

Section 4: Challenges and Barriers

No.	Statement	1	2	3	4	5
1	Financial constraints (such as tuition fees, cost of digital devices, or internet access) limit my ability to fully engage in innovative learning.					
2	Socio-economic challenges affect my ability to participate in group-based or technology-driven learning activities.					
3	Group work and collaboration can sometimes be ineffective due to varying levels of participation.					
4	Limited access to digital resources (e.g., internet, devices, software) affects my ability to engage in innovative learning.					
5	Time management is a challenge when participating in collaborative or technology-driven learning activities.					

Section 5: Open-ended Questions

1. What additional support would you like to receive for using innovative learning techniques?
2. What types of learning activities help you retain knowledge the most?
3. Have you noticed any skills that you developed significantly due to innovative teaching methods?

****