

**PERCEPTION AND ATTITUDE OF UNIVERSITY TEACHERS
AND STUDENTS TOWARDS ONLINE TEACHING-LEARNING
IN MIZORAM**

**A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE
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**PERCEPTION AND ATTITUDE OF UNIVERSITY TEACHERS AND
STUDENTS TOWARDS ONLINE TEACHING-LEARNING IN MIZORAM**

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**In partial fulfillment of the requirement of the Degree of Doctor of Philosophy
in Education of Mizoram University, Aizawl**

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Dated Aizawl, the September, 2025

CERTIFICATE

This is to certify that the thesis entitled **‘Perception and Attitude of University Teachers and Students towards Online Teaching-Learning in Mizoram’**, submitted by Ignis R. Lalmuanpuii, Ph. D. Scholar, Department of Education, Mizoram University, Regn. No. MZU/Ph.D./1754 of 01.09.2021, for the degree of Doctor of Philosophy in Education of the Mizoram University, Aizawl, India embodies the record of original investigations carried out by her under my supervision. She has been duly registered and the thesis presented is worthy of being considered for the award of Ph.D. degree. This research work has not been submitted for any degree of any other university.

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I **IGNES R.LALMUANPUII**, hereby declare that the subject matter of this thesis is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to do the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any research degree in any other University / Institute.

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Dated: Aizawl

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CONTENTS

	Page No.
Supervisor's Certificate	<i>i</i>
Candidates Declaration	<i>ii</i>
Acknowledgment	<i>iii</i>
Contents	<i>iv</i>
List of Tables	<i>ix</i>
List of Figures	<i>xvi</i>
 CHAPTER – I: INTRODUCTION	 1-20
1.1 Introduction	1
1.2 Global Context of Online Learning	3
1.3 National context of online learning	5
1.4 Regional context of online learning	6
1.5 Research Gap	8
1.6 Formulation and Statement of the Research Aim	13
1.7 Rationale of the Study	14
1.8 Research Questions	18
1.9 Statement of the Problem	18
1.10 Operational Definitions of Key Terms	18
1.11 Objectives The Study	19
1.12 Concomitant Objectives	20
1.13 Delimitations of the Study	20

CHAPTER – II: REVIEW OF RELATED LITERATURE	21-38
2.1 Teachers' & Students' Perception	21
2.2 Teachers' & Students' Attitude	22
2.3 Gender Based Perceptions and Attitudes	23
2.4 Locale Based Perceptions and Attitudes	24
2.5 Institution Based Perceptions and Attitudes	24
2.6 Socio-Economic Status (SES) Based Perceptions and Attitudes	25
2.7 Disciplinarity Based Perceptions and Attitudes	26
2.8 Attitude towards Technology	27
2.9 Synchronous and Asynchronous Online Teaching- Learning	29
2.10 Usage of Technology and Teaching-Learning Platforms	30
2.11 Problems in Synchronous Online Teaching	30
2.12 Practical Solution Suggested in Studies	32
2.13 Summary of the Reviewed Studies	35
 CHAPTER – III: METHODOLOGY OF THE STUDY	 39-59
3.1 Method Of Study	39
3.2 Sources Of Data	40
3.3 Population	40
3.4 Sample And Sampling Technique	43
3.5 Tools and Techniques of Data Collection	47
3.5.1 A self-made perception cum attitude scale to study the perception and attitude of students towards online learning	48

process	
3.5.2 A self-made perception cum attitude scale to study the perception and attitude of teachers towards online teaching process	49
3.5.2.1 Procedure of Item Analysis for constructed scales	51
3.5.3 A self-made questionnaire to find out the problems faced by teachers and students during synchronous online teaching - learning process and gather suggestions to improve synchronous online teaching-learning.	55
3.5.4 A self-made semi-structured interview schedule to qualitatively explore the feelings, problems and suggestions of students towards online teaching-learning process.	56
3.5.5 Attitude Towards Technology scale	56
3.5.6 Socio-economic Status Scale	57
3.6 Procedure of Data Collection	57
3.7 Statistical Techniques for Data Analysis	59
CHAPTER – IV: ANALYSIS AND INTERPRETATION	60-173
A. Descriptive Analysis	61
4.1 Perception of university teachers and students towards online teaching-learning process	61
4.2 Attitude of university teachers and students towards online teaching-learning process	66
4.3 To find out the university students' and teachers' attitude	71

	towards technology	
4.4	Exploration of the usage of technology and teaching-learning platforms among university teachers and students of different disciplines.	74
B.	Inferential Analysis	76
4.5	Comparison of university students' perception and attitude for online learning with respect to gender, locale, socio-economic status, disciplinarity and type of institution	76
4.6	Comparison of university teachers' perception and attitude for online teaching with respect to gender, disciplinarity and type of institution.	86
4.7	Comparison of university students' attitude towards technology with respect to gender, locale, socio-economic status, disciplinarity and type of institution.	96
4.8	Comparison of university teachers' attitude towards technology with respect to gender, disciplinarity and type of institution.	102
C.	Percentage Analysis	107
4.9	Exploring the problems faced by teachers and students during synchronous online teaching- learning process.	107
D.	Qualitative Analysis	133
CHAPTER – V: MAJOR FINDINGS, DISCUSSION AND CONCLUSION		174-233
5.1	Major Findings	174

5.1.1	Findings related to the Perception and Attitude of university teachers towards online learning	174
5.1.2	Findings related to the Perception and Attitude of university students towards online learning	175
5.1.3	Attitude towards Technology	177
5.1.4	Usage of technology and teaching-learning platforms among university students and teachers of different disciplines	177
5.2	Major Findings from Open Ended Responses	178
5.2.1	Major Findings from Teachers' Response	178
5.2.2	Major Findings from Students' Response	180
5.3	Problems faced by faced by students and teachers during synchronous online learning process.	180
5.3.1	Major Problems faced by Teachers	186
5.3.2	Major Problems faced by Students	189
5.4	Major Finding of Students' Interview	192
5.4.1	Item wise analysis	196
5.5	Discussions	202
5.6	Recommendations	214
5.6.1	Specific recommendations to Overcome Primary Challenges of Online Teaching-Learning	219
5.6.2	General Recommendations for Improving Online Teaching-Learning in line with UGC Guidelines and NEP 2020	223
5.7	Suggestion for Further Studies	227

5.8	Conclusion	228
5.9	Limitations of the Study	232

LIST OF TABLES AND FIGURES

LIST OF TABLES

Table No.	Description	Page No.
3.1	Description of population of teachers and students from Mizoram University (MZU)	41
3.2	Description of population of teachers and students from Institute of Chartered Financial Analysts of India (ICFAI)	43
3.3	Description of sample of teachers and students from Mizoram University (MZU)	44
3.4	Description of sample of teachers and students from Institute of Chartered Financial Analysts of India (ICFAI)	46
3.5	Result of item analysis of Students' Perception Scale	52
3.6	Result of item analysis of Students' Attitude Scale	53
3.7	Result of item analysis of Teachers' Perception Scale	54
3.8	Result of item analysis of Teachers' Attitude Scale	55
4.1	Descriptive Statistics on Perception of University Teachers towards Online Teaching	61
4.2	Categorization of University Teachers' Perception towards Online Teaching	62
4.3	Descriptive Statistics on Perception of University Students towards Online Learning	63
4.4	Categorization of University Students' Perception towards Online Learning	65
4.5	Descriptive Statistics on Attitude of University Teachers towards Online Teaching	66
4.6	Categorization of University Teachers' Attitude towards Online Teaching	67
4.7	Descriptive Statistics on Attitude of University Students	68

	towards Online Learning	
4.8	Categorization of University Students' Attitude towards Online Learning	70
4.9	Descriptive Analysis on Teachers' Attitude Towards Technology	71
4.10	Categorization of University Teachers' Attitude towards Technology	71
4.11	Descriptive Statistics on Students' Attitude Towards Technology	72
4.12	Categorization of University Students' Attitude towards Technology	73
4.13	Usage of Technology and Teaching-Learning Platforms by Teachers and Students	75
4.14	Significance of Difference between Mean Scores on Students' Perception towards Online Learning with respect to Gender	77
4.15	Significance of Difference between Mean Scores on Students' Attitude towards Online Learning with respect to Gender	78
4.16	Significance of Difference between Mean Scores on Students' Perception towards Online Learning with respect to Locale	79
4.17	Significance of Difference between Mean Scores on Students' Attitude towards Online Learning with respect to Locale	80
4.18	One-way ANOVA of Students' Perception towards Online Learning with respect to Socio-Economic Status (SES)	81
4.19	One-way ANOVA for Students' Attitude towards Online Learning with respect to Socio-Economic Status	82
4.20	Significance of Difference between Students' Mean Scores on Students' Perception towards Online Learning with respect to Disciplinarity	83
4.21	Significance of Difference between Students' Mean Scores on Attitude towards Online Learning with respect to Disciplinarity	84

4.22	Significance of Difference between Students' Mean Scores on Perception towards Online Learning with respect to Type of Institution	85
4.23	Significance of Difference between Students' Mean Scores on Students' Attitude towards Online Learning with respect to Type of Institution	86
4.24	Significance of Difference between Mean Scores on Teachers' Perception towards Online Teaching with respect to Gender	87
4.25	Comparison of University Teachers' Perception towards Online Teaching with respect to their Gender	88
4.26	Significance of Difference between Mean Scores on Teachers' Attitude towards Online Teaching with respect to Gender	89
4.27	Comparison of University Teachers' Attitude towards Online Teaching with respect to their Gender	89
4.28	Significance of Difference between Teachers' Mean Scores on Perception towards Online Teaching with respect to Disciplinarity	90
4.29	Comparison of University Teachers' Perception towards Online Teaching with respect to their Disciplinarity	91
4.30	Significance of Difference between Teachers' Mean Scores on Attitude towards Online Teaching with respect to Disciplinarity	92
4.31	Comparison of University Teachers' Attitude towards Online Teaching with respect to their Disciplinarity	93
4.32	Significance of Difference between Mean Scores on Teachers' Perception towards Online Teaching with respect to Type of Institution	94
4.33	Comparison of University Teachers' Perception towards Online Teaching with respect to their Type of Institution	94
4.34	Significance of Difference between Mean Scores on Teachers' Attitude towards Online Teaching with respect to Type of Institution	95

4.35	Comparison of University Teachers' Attitude towards Online Teaching with respect to their Institution	96
4.36	Significance of Difference between Mean Scores on Student's Attitude Towards Technology with respect to Gender	98
4.37	Significance of Difference between Mean Scores on Student's Attitude Towards Technology with respect to Locale	99
4.38	One-way ANOVA on Student's Attitude Towards Technology with respect to Socio-Economic Status	100
4.39	Significance of Difference between Students' Mean Scores on Attitude towards Technology with respect to Disciplinarity	101
4.40	Significance of Difference between Students' Mean Scores on Attitude towards Technology with respect to Institution	102
4.41	Significance of Difference between Mean Scores on Teachers' Attitude Towards Technology with respect to Gender	103
4.42	Comparison of University Teachers' Attitude towards Technology with respect to their Gender	104
4.43	Significance of Difference between Teachers' Mean Scores on Attitude towards Technology with respect to Disciplinarity	105
4.44	Comparison of University Teachers' Attitude towards Technology with respect to their Disciplinarity	105
4.45	Significance of Difference between Mean Scores on Teachers' Attitude Towards Technology with respect to Type of Institution	106
4.46	Comparison of University Teachers' Attitude towards Technology with respect to their type of Institution	107
4.47	Do you find it difficult to adapt to different online teaching-learning platforms?	108
4.48	Do you feel dissatisfied with the limitations of teaching in online classes?	108
4.49	Do you think that rural students stay behind urban students in online classes due to lack of internet connectivity?	108

4.50	Do you think insufficient supply of electricity is a major hurdle that prevents rural students from attending online classes?	109
4.51	Do you think digital divide poses stress for students of rural origin?	109
4.52	Do you think both urban and rural students face similar internet related problems in online classes?	110
4.53	Are you satisfied with the quality of audio and video during online classes?	110
4.54	Do you face frequent occurrence of low bandwidth of internet transmission resulting in poor signal strength?	110
4.55	Do you think that most students are not well equipped with a good internet connection that is required for online learning?	111
4.56	Is it okay for you that students keep their cameras off during the online classes?	111
4.57	Do you think students may resort to unfair means of passing online tests such as cheating in online mode of examination?	112
4.58	Do you think that facial expressions and other social cues are missing in online classrooms?	112
4.59	Do you think adequate training for conducting online classes was provided from your university?	113
4.60	Do you think you are a computer savvy teacher?	113
4.61	Do you think you lack effective communication skills during online teaching?	113
4.62	Do you think diversity of learners and distance make online teaching much more challenging?	114
4.63	Do you think that male students have an advantage in online learning over female students?	114
4.64	Do you think that male and female students do not differ in their attitude towards online learning?	115
4.65	Do you think students lack effective communication skills for online learning?	115

4.66	Do you think that students do not stay seated during the whole lecture during the online classes?	116
4.67	Have you found students keeping their speakers un-muted and posed interruptions during online lectures?	116
4.68	Do students feel shy to use 'raise hand' features in online classes in case of questions and answers?	117
4.69	Do students fail to give immediate feedback upon their understanding in online classes?	117
4.70	Do you suffer from ailments like headaches, back-pain, neck-pain, wrist pain and eye strain due to prolonged usage of mobile phones/ laptops/tablets/PC for online classes?	118
4.71	Do you feel nervous when it comes to study in an online classroom?	118
4.72	Are you insecure about your computer/electronic device skills?	119
4.73	Are you scared of being misinterpreted while communicating in online classrooms?	119
4.74	Do you own personal devices and stable internet connection at your home for online classes?	120
4.75	Did you face data pack insufficiency while attending the online classes?	120
4.76	Do you think online classes consume large amount of data which pose problems to a lot of students?	121
4.77	Does your internet supply often get interrupted making it difficult to learn in online classes?	121
4.78	Did you face problems with audio quality while attending online classes?	121
4.79	Did you have the problem of poor video quality during video conferencing session in online classes?	122
4.80	Have you ever struggled while downloading assignments or uploading completed work due to internet failure?	122
4.81	Do you think that synchronous online learning platforms	123

	consume more internet data than asynchronous platforms?	
4.82	Do you face problem while logging into live classes, communicating with teacher and friends and creating and submitting work through online learning platforms?	123
4.83	Do you face difficulty in learning where online class videos could not be recorded or watched later?	124
4.84	Did you face your device incompatibility problem with the learning platforms used during online classes?	124
4.85	Did you face problems in learning from home during online classes?	125
4.86	Is your home environment suitable for learning and attending online classes?	125
4.87	Did you have a proper seating area at your home to attend online classes?	125
4.88	Did the noise and disturbances from home prevent you from learning in online classes?	126
4.89	Do you think lack of a real peer group interaction prevented you from doing collaborative activities in online classes?	126
4.90	Is it hard for you to find quiet locations during online classes?	127
4.91	Do you feel that there is boredom in online classes due to repetition of lecture-based teaching?	127
4.92	Do you feel you were given personalized guidance by your teacher for improving and identifying your weakness during online classes?	128
4.93	Do you find it difficult to complete your assignments due to communication barriers in online classrooms?	128
4.94	Do you face difficulty in concentration due to the harmful radiations from device used for online classes?	129
4.95	Do you suffer from ailments like headaches, back-pain, neck-pain, wrist pain and eye strain due to prolonged usage of mobile phones/ laptops/tablets/PC for online classes?	129

4.96	Do you feel sleepy after prolonged exposure to the blue light from mobile phones and computers?	130
4.97	Is it difficult for you to join online class on time?	130
4.98	Did you face the problem of missing out a lecture while changing from one online class to another?	130
4.99	Do you usually finish your online assignment in time?	131
4.100	Do you feel lack of interest and enthusiasm in learning through online classes?	131
4.101	Do you feel unmotivated to visit the online learning portal due to endless oceans of texts, quizzes, and frequent learning assignments?	132
4.102	Do you think that your concentration is diverted during online classes?	132

LIST OF FIGURES

Figure No.	Description	Page No.
4. 1	Bar Graph illustrating the description of perception of university teachers towards online teaching	62
4. 2	Pie Chart illustrating the Percentage of University Teachers' Perception towards Online Teaching	63
4.3	Bar Graph illustrating the description of perception of university students towards online learning	64
4.4	Pie Chart illustrating the Percentage of University Students' Perception towards Online Learning	65
4.5	Bar Graph illustrating the description of attitude of university teachers towards online teaching	67
4.6	Pie Chart illustrating the Percentage of University Teachers' Attitude towards Online Teaching	68
4.7	Bar Graph illustrating the description of attitude of university students towards online learning.	69
4.8	Pie Chart illustrating the Percentage of University Students' Attitude towards Online Learning	70
4.9	Pie Chart illustrating the Percentage of University Teachers' Attitude towards Technology	72
4.10	Pie Chart illustrating the Percentage of University Students' Attitude towards Technology	74

APPENDICES

Appendix 1 - Perception scale to study the perception of students towards online teaching process

Appendix 2 – Attitude scale to study the attitude of students s towards online teaching process

Appendix 3 - Perception scale to study the perception of teachers towards online learning process

Appendix 4 – Attitude scale to study the attitude of teachers towards online learning process

Appendix 5- Questionnaire for teachers to explore the problems faced during synchronous online teaching process

Appendix 6- Questionnaire for students to explore the problems faced during synchronous online learning process

Appendix 7- Interview Schedule for students to qualitatively explore the feelings, problems and suggestions towards online learning process

Appendix 8 – Attitude Towards Technology scale for Teachers and Students

Appendix 9 – Socio-economic Status Scale for Students

REFERENCES

BRIEF BIO-DATA OF THE CANDIDATE

COPY OF PUBLISHED ARTICLES

CERTIFICATES OF PRESENTATION

ANNEXURE – I

ANNEXURE - II

PARTICULARS OF THE CANDIDATE

CHAPTER-I: INTRODUCTION

This chapter deals with an introduction of the study which will include rationale of the study, statement of the problem, and objectives of the study.

1.1 Introduction

Online learning refers to educational instruction delivered via electronic devices, allowing learners to access content remotely (Moore et al., 2011). There are two important key branches of online learning: synchronous and asynchronous learning. According to Mohammadi (2024), asynchronous online learning is an online course that allows students to participate from anywhere at any time, with most of the content delivered online. Synchronous online learning increases the sense of social presence (Lajoie et al., 2020), while asynchronous online learning allows for deeper and more thoughtful communication (Martin et al., 2020)

These two modes form the core of the present research, as they are widely implemented in higher education institutions in Mizoram, a state located in the Northeastern region of India. Synchronous learning involves real-time interactions between teachers and students, such as live classes or discussions, while asynchronous learning allows students to engage with materials at their own pace, outside of a set schedule (Park & Bonk, 2007; Lynch, 2014). By concentrating on these formats, the study aims to examine how they are utilized in relation to higher education in Mizoram and the unique challenges and opportunities they present.

After a century, the world faced a massive pandemic known as COVID-19, which caused chaos in the lives of most people. During this time, the world's operations had to be suspended in every aspect. Education is one of the most crucial factors that aids in a man's progress, development, and growth; nevertheless, it was also discontinued when the pandemic struck (World Economic Forum, 2024). But fortunately, the government across countries found a way to continue education, that is through online or virtual setting. Children and students today, who will eventually take on the role of leading and influencing the world, run the risk of losing the necessary information and becoming less capable of making wise decisions if proactive steps are not taken (World Bank, 2021; Kuhfeld, 2022). Consequently, this

decline in educational engagement may leave individuals inadequately prepared to confront the complex challenges of the future (Kuhfeld, 2022). Acknowledging this global challenge, countries worldwide have been urged to devise innovative strategies to sustain the continuity of education. Among the most prominent responses has been the widespread adoption and integration of online learning platforms as a means to ensure uninterrupted educational delivery. These digital alternatives allow students to access education despite physical barriers, ensuring that learning can persist even in the face of disruptions like global crises or pandemics. Through online learning, countries are striving to equip their future leaders having the abilities and expertise needed to navigate an expanding interconnected and technologically advanced world.

Despite the fact that online learning has made it possible to resume school education, not all students find that this method of instruction always meets their requirements and expectations (Karlsson, Alatalo, Nyberg & Backman, 2023; Serhan, 2020). Substantial challenges have been observed in the transition to online education, particularly during the administration of tests and examinations, posing considerable difficulties for both students and teachers with limited technological proficiency. Students frequently experience anxiety and apprehension when utilizing electronic devices for assessment purposes. They encounter various difficulties, including discomfort with submitting examination papers through email or other digital platforms, coupled with concerns about potential errors such as entering incorrect email addresses or the possibility of their answer scripts not reaching the instructor within the stipulated timeframe. Additionally, there is a fear that technical issues, such as losing internet connection during exams or submission, could jeopardize the performance. Concerns also arise about fairness, such as the possibility of dishonest students receiving higher marks than those who work hard. Such issues and other challenges create substantial obstacles in students' online learning experience. Therefore, it is crucial to develop more effective strategies for navigating technology to facilitate online learning Khoza (2022). Enhancing technological proficiency is essential for both students and teachers to manage digital platforms more confidently and efficiently (Costley, 2014). By improving

skills in using online tools, minimizing technical difficulties, and addressing common concerns like submission errors or connectivity issues, a smoother and more accessible online learning experience can be created (Roddy et.al., 2017). Hence, by providing a supporting online learning environment and prioritizing student well-being in a virtual setting will not only reduce anxiety but also ensures that virtual education meets the needs of all learners, providing a reliable and effective learning environment (Sato et.al., 2023).

We live in a world where technology is essential. Numerous occupations that previously did not require technology now do. Compared to earlier years, more households now own computers, and more people are adept with them. Both adults and children utilize technology on a regular basis for social networking, texting, and web browsing. At present, technology is used for socialization, business, and income generation in addition to providing education (Costley, 2014).

Since online environments lack physical infrastructure and opportunities for in-person interactions, they place a greater emphasis on alternative forms of communication and support. For teachers, skill development is essential to maintaining technological capabilities and promoting a flexible, responsive approach. For students, this means being able to navigate the technology, interact with the learning environment in meaningful ways, and self-regulate learning (Roddy et.al 2017).

1.2 Global Context of Online Learning

Online learning has gradually transformed over the last 2 decades from a supplementary educational method to a standard part of international educational systems. Rapid developments in digital technology, rising internet usage, and the need for flexible, accessible, and lifelong learning possibilities around the world have all contributed to its expansion. The emergence of Massive Open Online Courses (MOOCs) in the early 2010s marked a significant milestone, democratizing access to higher education and enabling millions of learners worldwide to participate in courses offered by leading universities and institutions (Shah, 2021). At the same time, governments and international organizations started to see how digital learning

could help achieve Sustainable Development Goal 4, which places an emphasis on universal access to high-quality, inclusive education (UNESCO, 2015).

However, the role of online learning gained unprecedented urgency and global attention during the COVID-19 pandemic. In early 2020, the closure of schools and universities across nearly 190 countries disrupted the education of more than 1.6 billion learners, representing over 90 percent of the world's student population (UNESCO, 2020). To mitigate this crisis, educational institutions rapidly transitioned to online platforms, adopting tools such as Zoom, Microsoft Teams, and Google Classroom as primary means of instruction. Despite being an emergency response at first, this change sparked one of the biggest global digital learning ventures. Reports indicate that online platforms experienced exponential growth, with Zoom usage increasing from 10 million daily participants in December 2019 to over 350 million by April 2020, and MOOCs recording record enrolments during the same period (Dhawan, 2020; Shah, 2021).

This global shift has also highlighted both the opportunities and the challenges of online education. On the one hand, online learning has proven to be a powerful tool for ensuring educational continuity, offering flexible and self-paced learning environments, and providing opportunities for reskilling and upskilling in response to rapidly changing labour market demands (World Economic Forum, 2022). It has also promoted cross-border learning and collaboration, as learners from different regions can now access high-quality resources and engage with international communities of practice. On the other hand, the pandemic also exposed deep-seated inequalities in education. Millions of students, particularly in developing and under-resourced regions, faced difficulties due to lack of access to reliable internet, digital devices, and adequate digital literacy (UNESCO, 2021). These disparities not only reinforced the digital divide but also emphasized the need for targeted policies to ensure inclusive access to online education.

The lasting impact of this global transformation is evident even in the post-pandemic context. Online learning is no longer viewed merely as a temporary substitute for face-to-face teaching, but rather as an integral component of blended

and hybrid models of education. Universities, schools, and training providers continue to integrate digital tools and platforms into their pedagogical practices, recognizing their potential to enhance flexibility, reach, and personalization. Furthermore, the global embrace of online learning aligns with broader societal trends towards digitalization, globalization, and knowledge-based economies. As such, the pandemic has not only accelerated the adoption of online learning but has also redefined its role as a permanent and transformative element of the global educational landscape (Dhawan, 2020; UNESCO, 2021; World Economic Forum, 2022).

1.3 National Context of Online Learning

National initiatives led by the University Grants Commission (UGC) and the Ministry of Education (previously MHRD) have shaped the development of online learning in India. Since its introduction in 2017, the SWAYAM platform has provided free MOOCs at all levels, from school to postgraduate, with the option to transfer credits toward higher education (UGC, 2018; Wikipedia, 2024). The National Digital Library, e-PG Pathshala, Virtual Labs, e-Shodh Sindhu, Shodhganga, and SWAYAM Prabha (DTH channels) are examples of complementary programs under the National Mission on Education through ICT (NMEICT) that enhance digital resources for higher education (ResearchGate, 2024). At the school level, DIKSHA, which was also introduced in 2017, offers resources that are multilingual and QR-enabled. During the COVID-19 pandemic, it was designated as the PM e-Vidya program's "One Nation, One Digital Platform" (Wikipedia, 2024).

However, these reforms also highlight India's persistent digital divide. Access to internet in rural areas remains significantly lower, out of every 100 people living in rural India, only about 38 people have an internet subscription (mobile or broadband) indicating that the majority of rural residents do not have reliable internet access (TRAI, 2021). Additionally, when internet services are available, most people do not actually know how to use them effectively, only 22.9% of individuals aged 15 and above reported being able to use the internet, revealing significant

inequalities in digital literacy (NSSO, 2018). Socioeconomic and regional inequalities further restrict equitable access, creating challenges towards inclusive online education (Arxiv, 2021).

1.4 Regional Context of Online Learning (Mizoram)

High-speed internet serves as the foundation for all digital initiatives (Express Computer, 2018). In Mizoram, as in other North Eastern states, poor digital connectivity remains the greatest hurdle and is expected to persist for some time despite the joint efforts of different stakeholders (Express Computer, 2018). In Mizoram, despite achieving a remarkable 98.2% literacy rate and becoming India's first fully literate state (The Times of India, 2024), equitable access to inclusive digital learning is hindered by its hilly terrain and remote location particularly in rural areas. However, mobile network and internet infrastructure has improved over the years, where out of 378 villages in Mizoram, 365 border villages are now connected to mobile networks, indicating a significant progress in bridging digital gaps in remote areas with the state boasting the highest tele-density in Northeast India 113.29 overall which means there are approximately 113 telephone connections for every 100 individuals, including 94.19 in rural areas and 128.83 in urban regions as well as increasing broadband and fibre coverage which is a crucial tool for implementing successful online education, e-governance, and digital services (The Times of India, 2024; The Times of India, 2025).

It is indeed true these wires and towers do not reach everywhere. In many rural villages like Mawhrei and Pukzing Vengthar in Mizoram, students trek 3 to 4 km uphill, sometimes through forests, to reach spots with even a marginal signal remote huts built by local student organizations become their only access point for online classes and exams and also for submitting their assignments (Business Standard, 2021; NorthEast Now, 2021; The Hindu, 2021; India Today, 2022). Even during rainy conditions, students were often compelled to travel long distances to find areas with stable internet connectivity. Reports from Mamit and Siaha districts indicated that, in order to appear for their online semester examinations, some students had to climb to hilltops where the signal was comparatively reliable. To protect themselves

from the rain, they occasionally constructed temporary shelters using bamboo, tarpaulin, and banana leaves. Such experiences highlight the significant challenges and struggles faced by students in accessing online education during the COVID-19 pandemic due to poor network connectivity (Business Standard, 2021). Besides problems from internet connectivity issues, many villages also struggle with irregular electricity supply, leaving students unable to charge their devices and making online learning nearly impossible (The Hindu, 2021). Moreover, a significant number of families in rural areas cannot afford smartphones for the children's studies, the situation is worsened by construction and widening projects which often damaged optical fibre cables which disrupt connectivity (The Hindu, 2021). Considering these challenges, it has been urged that University Grants Commission should have taken poor connectivity into account when fixing examination fees, expecting students to pay full amount, despite their inability to access libraries, laboratories, and other institutional facilities, appears unjust (The Hindu, 2021).

On the teachers' side, many schools which is about 50% of school surveyed lack internet entirely, and even when equipment is available, teachers often lack adequate training to use digital tools effectively (LiveMint, 2016). Moreover, the state's geography and infrastructure gaps such as prone to landslides, rains, and frequent roadworks further delay the rollout of fibre networks and digital services (Express Computer, 2018; India Today NE, 2022). Mizoram requires stronger internet and telecommunication services more urgently than many other regions due to its remote location as the state continues to lag behind in road, rail, and air connectivity (India Today NE, 2022).

Still, institutions like Mizoram University are pioneering e-governance and university-wide online exams, supported by NGOs and local councils who provide scanning, printing, and connectivity support where possible (Telegraph India, 2021; The Times of India, 2025). It is also reported that although students are deprived of traditional classroom learning, they have also gained the chance to explore knowledge from different sources (Telegraph India, 2021). The Governor of Mizoram praised Mizoram University (MZU) for its recent development in

introducing online courses in line with the National Education Policy (NEP) 2020, as well as for implementing the Academic Bank of Credits. The University's contribution to research was also highlighted, with its achievements reflected in an H-Index of 98 and the registration of 46 patents. Furthermore, MZU has been recognized for its pioneering role in promoting online education through Massive Open Online Courses (MOOCs) and the SWAYAM platform. Adding to its distinction, MZU holds the unique position of being the sole host of the Defence Research and Development Organisation (DRDO) Industry Academic Centre of Excellence (The Times of India, 2025).

1.5 Research Gap

Even though the number of academic articles on online learning is increasing both internationally and inside India, there is still a small number of studies that particularly address the context of digital education in Mizoram.

Beyond these isolated initiatives, there is an obvious absence of thorough, extensive, longitudinal, and context-sensitive research examining the combined effects of geography, infrastructure, sociocultural elements, and educational policy on digital learning in Mizoram., which, while valuable, leave broader systemic questions underexplored.

Findings from national and international studies cannot be readily generalized to universities located in regional contexts, particularly in remote and hilly areas such as Mizoram, due to distinct infrastructural and technological constraints. Consequently, the present study seeks to address this gap by offering context-specific insights and empirical evidence on online teaching–learning practices in Mizoram.

Although only limited research has been conducted in Mizoram, this study situates its investigation within the broader global discourse on the perception and attitudes of teachers and students in relation to online learning.

In online learning, an important research gap is the lack of clear understanding of how different teaching methods affect different types of students. While online learning studies have expanded in recent years, there is limited knowledge about the effectiveness of instructional strategies across various demographics, socioeconomic background, emotional health, should not only limited to students' perception but also among teachers and stakeholder, and learning styles, etc (Chai et.al.2024; Hongsuchon et.al. 2022). Additionally. Addressing these gaps could lead to more inclusive and effective online learning models that cater to a broader spectrum of learners. The present study tried to accommodate some of the major factors responsible for developing perceptions and attitude towards online teaching-learning processes. The factors that create a research gap in online teaching-learning are found in areas such as:

Age Factor: Research on the influence of age in online learning is still limited. Although age plays an important role in shaping technology use, learning preferences, and participation, very few studies examine how age-related challenges or benefits affect online learning outcomes in the state. Younger students may find it easier to adjust to digital platforms because of their familiarity with technology, while older students and faculty often struggle with issues such as digital literacy and cognitive demands. Existing research demonstrated that attitudes toward technology and competence in using digital tools vary among age groups, impacting how effectively learners participate in online activities (Adenuga et al., 2011; Akbar, 2016; Dhamija, 2014).

Gender: Research on online learning has mostly cantered on students' views and attitudes, while the perspectives of teachers, particularly in relation to gender, remain largely overlooked (Akram et al., 2022; Goudarzi et al., 2023). Existing studies often highlight gender differences among students (Korlat et al., 2021; Greier et al., 2022) but pay little attention to how male and female educators perceive and adapt to online teaching methods. Such research is important to understand whether gender shapes teaching styles, use of technology, and interaction with students in online learning environments.

Locale: In this area, although numerous studies focus on students, research investigating teachers' perceptions and attitudes toward online learning, particularly in relation to their geographical location or work setting (urban vs. rural), remains scarce and limited. Locale can significantly impact access to resources, technological infrastructure, and training opportunities, which in turn affect teachers' experiences and effectiveness in online learning (Ferlanda, 2022); Amirova et al., 2023; AnanthaRamu, 2024). Studies addressing these disparities could provide insights into bridging gaps in digital education across diverse regions.

Discipline-Specific Perception: The perception and attitude of both educators and learners from STEM and non-STEM disciplines towards online learning are rarely studied. The needs and challenges faced by these groups can differ significantly due to the nature of their subjects. Due to the fact that STEM subjects often require hands-on experiments and lab work, which are challenging to replicate in an online format, whereas non-STEM disciplines may rely more on textual and theoretical approaches (Owston et al., 2020; Newsome et al., 2022; Al-Zohbi et al., 2022; Das & Bhattacharyya, 2023; Parviz, 2024).

Type of Institution: Limited research exists on how the type of institution, whether public, private, or semi-private shapes perceptions and attitudes towards online learning. Institutional factors, such as funding, infrastructure, technological access, and policy support, can play a significant role in determining the success of online education (Kizza et al., 2021; Nasir & Neger, 2022). Understanding these variations could help policymakers and administrators design more equitable and effective online learning strategies.

Socio-Economic-Status: There is a lack of extensive research on how students' socio-economic status influences their perceptions and attitudes toward online learning. The extent to which students from upper, middle, or lower socio-economic backgrounds have equitable and quality access to essential resources remains underexplored. Studies have shown that socio-economic background plays a vital role in shaping students' engagement with and attitudes toward digital education, as learners from disadvantaged families often face limited access to

devices and reliable internet connectivity (Adenuga et al., 2011; McKenzie et al., 2014; Cuisia-Villanueva & Núñez, 2021; Al-Ajeely et al., 2023; Hai Rul Halim & Safiai, 2024). These socio-economic differences significantly affect students' ability to access necessary tools for effective learning. Acknowledging and addressing these disparities can assist policymakers and educational institutions in developing appropriate and inclusive curriculum designs that are universally applicable (Aswathi & Haneefa, 2020; Ikebuchi, 2023).

Socioeconomic disparities poses a challenge in accessing learning specifically for lower socio-economic students. Students from low-income backgrounds may lack reliable access to technology, internet, and a quiet, stable study environment, impacting their ability to engage and succeed in online learning. Studies often overlook these barriers, leading to gaps in understanding how SES influences online learning outcomes and access equity (Cuisia-Villanueva & Núñez, 2021; Ullah et. al., 2021). Socioeconomic status often correlates with digital literacy levels. Students with limited exposure to digital tools may struggle in online environments, affecting their academic success and engagement. Research frequently assumes a baseline digital literacy level, leaving gaps in understanding the challenges faced by digitally underserved populations (Cuisia-Villanueva & Núñez, 2021; Ullah et. al., 2021).

Attitude towards Technology: The attitudes of both students and teachers toward technology in education remain relatively underexplored, despite the increasing reliance on digital tools for teaching and learning (Mahajan, 2016; Akram et al., 2022; Guillén-Gámez & Rodríguez-Fernández, 2022). Understanding these attitudes is crucial, as they significantly influence the effectiveness of technology integration in educational settings (Hoque et al., 2020; Pan, 2020; M. Yasin Pir & Bintul Islam, 2024).

As digital tools and platforms evolve, research struggles to keep pace with new technologies. The rapid technological advancement leads to outdated studies that may not fully represent the capabilities and impacts of current e-learning technologies (Garlinska et al., 2023; Soja & Cunha, 2015).

Diverse Learning Environments and Needs: Diverse learning environments and needs serves another gap. Online learning encompasses a broad range of learners with varying backgrounds, ages, and access levels, making it challenging to develop universally applicable conclusions. The diversity in learning environments often results in gaps when research does not account for these variations (Kim, Sallar & Kiramba, 2020).

Lack of Longitudinal Studies: Most online learning research focuses on short-term outcomes rather than long-term impacts on knowledge retention, practical skill application, and career development. This limited and lack of longitudinal studies contributes to a gap in understanding the sustained effectiveness of online learning (Wang et al., 2014; Lampropoulos & Sidiropoulos, 2024).

Access and Equity Issues: Access and equity issues is another gap that needs to address. Variability in access to technology, internet connectivity, and suitable learning environments affects student engagement and learning outcomes, creating gaps in research that often assumes a level of uniform access (Tate et al., 2022).

Declined Student motivation and Engagement: Student motivation and engagement fluctuate significantly in online learning, and factors driving them are complex and underexplored. Research frequently overlooks the psychological and social factors that influence student involvement over time (Liu et.al.2024).

Rapid shift to online learning: Rapid shift to online learning during the pandemic pose a problem among the administrator, teachers and students. The sudden transition to online learning, especially during the COVID-19 pandemic, created a surge in research but often without the rigorous planning typical of educational studies. Many studies were conducted quickly to address immediate needs, leading to incomplete findings (Goudarzi et.al., 2023).

Ethical concerns: Ethical concerns need to be considered. Online learning platforms like Zoom have provided valuable communication tools for teachers and students during the pandemic, but they have also contributed to psychological strain and mental exhaustion, ultimately leading to disengagement and a lack of attentiveness (Bailenson, 2021). Educational institutions need to establish clear

policies on how data is collected, stored, and used, ensuring that students adhere to ethical standards during classes while their privacy is safeguarded (William, 2024).

Health-Related Barriers: Health-Related Barriers created by online learning is also a problem experienced by users that needs to be considered. Physical and mental health challenges can hinder students' participation in online learning, especially in asynchronous settings where self-discipline and independent work are crucial. The effects of chronic illness, stress, or mental health issues on engagement and performance in online formats are seldom addressed, leaving a gap in comprehensive learner support strategies (Chu & Li, 2022).

Lack of Support Systems and Resources: Lack of support systems and resources is another obstacle face by some learners. Access to academic and mental health support is often limited for students in lower Socio-Economic Status brackets, yet online learning platforms rarely address or measure the impact of these missing support systems on student outcomes (Walsh et.al, 2024; Cuisia-Villanueva & Núñez, 2021; Ullah et. al., 2021).

Therefore, addressing these gaps would provide a more inclusive framework for online learning, recognizing and accommodating diverse student needs for better educational equity and success with regard to Mizoram which is the geographical focus of the study.

Without addressing these gaps, online learning may not meet its potential or adequately support students, educators, and institutions. Closing these research gaps is essential to enhance the quality, accessibility, and equity of online education and to ensure it can effectively support a diverse range of learners over time.

1.6 Formulation and Statement of the Research Aim

This research aims to assess and evaluate the level of awareness and readiness for online learning among university teachers and students. While many students and educators may be familiar with virtual environments and video conferencing, there is still a gap in their experience as effective virtual learners and instructors (Sato et.al., 2023). The study also seeks to delve into the specific

experiences and challenges faced by both teachers and students during the pandemic, as it is evident that numerous difficulties arise in the online learning landscape. By examining these issues, the research intends to shed light on the obstacles encountered in virtual education and highlight the areas that need improvement for a more effective and inclusive online learning experience. Thus, this study aims to draw conclusions and investigate such problems and propose a solution to tackle those problems and offer recommendations to improve and enhance the quality of online teaching-learning.

1.7 Rationale of The Study

In the light of reviewed studies an appropriate rationale for the conduct of proposed study is derived. The present study is an attempt to explore the very freshly acquired perceptions of students and teachers of higher education since the onset of COVID- 19 pandemic in the state of Mizoram.

Mizoram, also known as ‘Land of Blue Mountains’ is largely covered by a dense forest, accounting for about 85.34% of its geographical area (Rising Northeast, 2025; Planning & Programme Implementation, Government of Mizoram, 2025). The state shares borders with Myanmar, Bangladesh, Tripura, Manipur and Assam which enable trade and commerce activities more feasible. The state is also well-known and recognised for its massive production of bamboo resources and a cultivation of various crops. There are eleven districts in the state of Mizoram, with Aizawl serving as its capital. The land area of the state is 21,081 square kilometres. The state has a population of about eleven lakhs (1.1 million) according to the 2011 census, and a literacy rate of 98.2 % declaring the state with fully literate status in 2025 (The Times of India, 2025). With the support of government policies, Mizoram holds strong potential to attract tourism, encourage investment across multiple sectors, and develop into an emerging business hub (Rising Northeast, 2025).

In Mizoram, the Covid-19 epidemic has been a significant issue. Soon after the initial Covid-19 pandemic lockdown, Mizoram's educational institutions switched to online instruction in an effort to slow the virus's spread. The review of related literature is indicative that, prior to 2022, no research had examined the

perspectives of students and teachers in Mizoram, except for a single study reported by Lalduhawma, Thangmawia, and Hussain. Hence the present study was rightly timed and required in order to explore the students' and teachers' perspective in Mizoram.

On March 24, 2020, Prime Minister Narendra Modi called for a complete lockdown of the entire nation for 21 days in an effort to contain the COVID-19 pandemic (The Economic Times, 24 March, 2021). The pandemic has severely overblown education and educational systems across the world. Educational sector was under the immediate impact of Covid-19 pandemic. However, online learning emerged out to be a blessing in disguise amidst the pandemic, it has its own challenges, particularly in context of our country. It is seen that students are inexperienced as virtual learners and many of the online students were not active enough and showed low levels of engagement (Ismailov & Chiu, 2022). The prevailing view that treats synchronous technology merely as a lifeline or emergency tool for students and teachers must change. Instead of seeing online learning as just a temporary substitute, it should be re-envisioned and strengthened into a form of rigorous, effective, and resilient education (Bonk, 2020). This new perspective emphasizes the intentionality, quality, and structured approach necessary for impactful digital learning, moving beyond makeshift emergency measures toward a sustainable model of teaching excellence. With this shift, online education is no longer a stopgap measure but a refined, purpose-driven approach that can deliver comprehensive, lasting learning experiences. The pandemic is a chance to use online tools like Zoom, Skype, and Microsoft Teams for global collaboration and interaction of one's students with experts in the field. At the same time, administrators should realize that it is time to allocate more resources to distance education, online training programs and lifelong education initiatives while outlining the road ahead (Rodrigues et.al.2023).

The rapid expansion of online learning has reshaped higher education, providing new learning formats that transcend geographical boundaries. However, this shift has also exposed significant challenges that impact the effectiveness of online education, particularly in terms of accessibility, quality, and student well-

being (Cuisia-Villanueva & Núñez, 2021; Al-Ajeely et al., 2023). This study aims to explore the multifaceted challenges of online learning, with a focus on how socio-economic status, unmet learner needs, health issues, mental health concerns, decreased engagement during instruction, and barriers to technology adoption affect student outcomes and equity in higher education.

The socio-economic status of students often determines their access to essential learning resources, from stable internet connections to updated devices. Students from lower-income backgrounds frequently face technological barriers that can hinder their participation and performance in online classes (McKenzie et al., 2014; Cuisia-Villanueva & Núñez, 2021). Furthermore, disparities in digital literacy across socio-economic lines exacerbate these inequities, leading to an urgent need for inclusive digital education strategies that provide all students, regardless of background, with the skills to effectively engage in online learning environments (Al-Ajeely et al., 2023; Hai Rul Halim & Safiai, 2024).

Unmet learner needs such as inadequate academic support and a lack of tailored instructional resources also persist as significant challenges in online education. Many students struggle to find guidance that addresses their specific learning goals, which can lead to feelings of isolation and frustration (Abbasi et al., 2020; Adnan & Anwar, 2020; Amirova et al., 2023). Additionally, the absence of personalized support systems makes it harder for students to remain motivated, particularly in an asynchronous format where students often have fewer interactions with instructors and peers (Almahasees et al., 2021; Alzahrani et al., 2023).

The rapid transition to online learning, often adopted as a crisis response, has also highlighted mental and physical health issues among students. Increased screen time, limited physical activity, and reduced social interaction can contribute to a range of health problems, including eye strain, fatigue, anxiety, and depression. This reality emphasizes the need to develop holistic online learning environments that consider both academic and well-being needs, encouraging universities to adopt wellness-oriented policies and practices (Chu & Li, 2022; Azmi, Khan & Azmi, 2022).

Lower student engagement is another critical issue in online education, with many students reporting difficulties in maintaining focus and participation. The shift to remote learning has disrupted traditional classroom dynamics, making it challenging for students to build meaningful connections with peers and instructors. As engagement is a crucial factor in academic success, understanding and addressing the underlying causes of disengagement is essential for developing online programs that foster active and sustained participation (Adnan & Anwar, 2020).

Access and equity issues remain prominent in the online learning landscape, with students facing a wide range of obstacles that impact their learning experiences and outcomes. These issues include geographic limitations, language barriers, and inadequate support for students with disabilities. Acknowledging and addressing these disparities is crucial to ensuring that all students have equitable opportunities to benefit from online education (Cuisia-Villanueva & Núñez, 2021; Al-Ajeely et al., 2023; Ikebuchi, 2023).

Finally, the study seeks to address the role of digital literacy, as many students and educators lack sufficient training in navigating online tools and platforms effectively. This gap often leads to inefficiencies and reduced confidence in using technology for academic purposes. By identifying and addressing these barriers, institutions can foster an online learning culture that promotes technological competence and confidence.

In summary, this study will investigate the interplay of gender, locale, disciplinarity, institution differences, socio-economic factors, digital literacy, support systems, and health-related challenges with regard to online education, with the goal of proposing actionable strategies to build more inclusive, supportive, and effective online learning environments. Addressing these issues is essential not only for enhancing individual student experiences but also for promoting equity and excellence in the broader landscape of higher education.

Thus, the rationale of the study leads to some research questions emerging in the mind of the researcher. The present study aims to understand the perceptions of university teachers and students towards synchronous and asynchronous online

teaching- learning. Also, the study will attempt to study the awareness and preparedness of university teachers and students and to find out the specific experiences and problems faced by them during pandemic with regard the synchronous mode. Thus, for achieving the aim following research questions are proposed which needs to be answered:

1.8 Research Questions

1. What is the perception of university students towards online learning process?
2. What is the perception of university teachers towards online teaching process?
3. What is the attitude of university students towards online learning process?
4. What is the attitude of university teachers towards online teaching process?
5. How students and teachers of different disciplines differ in usage of technology and online teaching-learning platforms?
6. How students' socio-economic status, gender, locale and attitude towards technology influence the online learning process?
7. What kind of problems are faced by teachers and students during synchronous online teaching-learning process?
8. How can online teaching-learning process be improved for enhancing quality of education?

1.9 Statement of The Problem

The present study is therefore entitled as “***Perception and Attitude of University Teachers and Students towards Online Teaching-Learning in Mizoram***”

1.10 Operational Definitions of Key Terms

- **Perception:** Perception is an idea, a belief or an image people have as a result of how to see or understand (Hornby, 2006).
- **Attitude:** An attitude is a mental or neural state of readiness, organized through experience, exerting a directive or dynamic influence on the individual's response to all objects and situations to which it is related (Allport, 1935)

- **University Teachers:** In the present study University teachers refers to teachers teaching in the universities of Mizoram.
- **University Students:** In the present study University students refers to students studying in the universities of Mizoram.
- **Online Teaching-Learning:** Online teaching-learning refers to processes happening in online classes which fall into two categories-synchronous and asynchronous, each of which aligns with different students' interests, personalities, and learning styles. Synchronous teaching-learning refers to real-time online teaching-learning event in which a group of students are engaged in learning by a teacher at the same time unbound by space through virtual mode. It is best exemplified by online classes, training sessions, and webinars taught through an online platform. Asynchronous online teaching-learning is where teaching materials are posted online, and learners work through them in their own time, communicating with each other and the teacher via discussion boards or forums, or even by email.

1.11 Objectives the Study

1. To study the perception of university teachers and students towards online teaching-learning process.
2. To study the attitude of university teachers and students towards online teaching-learning process.
3. To find out the university teachers' and students' attitude towards technology.
4. To explore the usage of technology and teaching-learning platforms among university teachers and students of different disciplines.
5. To compare university students' perception and attitude towards online learning with respect to gender, locale, socio-economic status, disciplinarity and type of institution.
6. To compare university teachers' perception and attitude towards online teaching with respect to gender, disciplinarity and type of institution.
7. To compare university students' attitude towards technology with respect to gender, locale, socio-economic status, disciplinarity and type of institution.

8. To compare university teachers' attitude towards technology with respect to gender, disciplinarity and type of institution.
9. To explore the problems faced by teachers and students during synchronous online teaching-learning process.

1.12 Concomitant Objectives

1. To construct a perception cum attitude scale to study the perception and attitude of students towards online learning process.
2. To construct a perception cum attitude scale to study the perception and attitude of teachers towards online teaching process.
3. To construct a questionnaire to find out the problems faced by teachers and students during synchronous online teaching-learning process and gather suggestions to improve synchronous online teaching-learning
4. To construct a self-made semi-structured interview schedule to qualitatively explore the feelings, problems and suggestions of students towards online learning process.

1.13 Delimitations of The Study

The scope of the present study is confined to University Teachers and Students from Mizoram University (MZU), a Central University and Institute of Chartered Financial Analysts of India (ICFAI), a Private University in Mizoram.

CHAPTER-II: REVIEW OF RELATED LITERATURE

This chapter is devoted to present the various Thematic review of related literature in the arena of Online Teaching-Learning Processes. The researcher reviewed 117 empirical studies, with a period ranging from 2009 to 2024.

2.1 Teachers' & Students' Perception

Both teachers and students accepted that online learning is beneficial in the midst of the pandemic but regarded as only a temporary solution and could not replace in-person instruction. (Almahasees, Mohsen & Amin, 2021). Moreover, teachers have good impressions of technology integration in teaching-learning practices as technology improves their instructional methods, makes students engaged and makes learning interactive (Akram et.al., 2022). However, some studies claimed teachers had more negative opinions on online teaching and learning than students (Yau, Yeung & Lee, 2022).

Students have unfavorable opinions about online learning and did not favor it over in-person instruction during the lockdown as they were more worn out and overall felt more less optimistic as switching to remote learning had effects on motivation, social relationships, and healthy habits in addition to academics (Abassi et al., 2020; Ramirez et al., 2021). Students' online learning experience was also impacted by their decreased attendance and interest in live lectures as majority found it difficult to keep in touch with teachers, peers and to keep up with the speed of their assignments. However, they felt comfortable engaging with instructors online, suggesting online learning features could improve in-person classes (Zhu et al., 2020).

Furthermore, despite a number of obstacles, students believe that online learning is just as effective as in-person instruction, entertaining, allows them to learn at their own pace, is simple to access, and encourages active involvement (Akuratiya & Meddage, 2020). Perceptions of social presence, social engagement, and contentment were higher for live instruction than for online learning. Since online learning gave them the opportunity to use computer technology creatively,

several students felt very at ease with it and participants thought the online courses were engaging and fun, and they thought they were pertinent to their clinical practice and learning goals (Bali & Liu, 2018; Agarwal & Kaushik, 2020). Although students found distance learning essential, they faced limited access to devices and were inspired to employ educational tools and applied a variety of learning methodologies during the COVID-19 pandemic, rating university assistance as moderate (Avila et al., 2021)

2.2 Teachers' & Students' Attitude

With regard to teachers' attitude towards online learning, a study found that most of the teachers of about 63% had a moderate or neutral attitude of online learning, while 21% held a positive attitude and 16% had a negative attitude. Majority of teachers are not supportive to online instruction as they lack e-learning skills, which is probably caused by the absence of prior experience with online instruction and their lack of comfort with ICT (Gururaja, 2021). Teachers' attitudes on online instruction during the COVID-19 shutdown are completely unsatisfactory which is mainly due to their lack of proficiency with e-learning (Kar, 2020).

Similarly, the attitude of university students on online education revealed that most of them struggle with internet access because of both budgetary and technical constraints. Significant concerns were also raised about the absence of classroom socializing, poor response times, and lack of in-person connection (Adnan & Anwar, 2020). Unfavourable attitudes of students were formed due to loss of engagement with teachers, a loss of campus socialization, a lack of technology proficiency, and a lack of suitable content for online courses and group projects could all contribute to the unintended outcomes of online learning (Xia et al., 2022). Students also cited several other reasons, such as preference for assignments over in-depth explanations of the topic and erratic internet connections and the switch from traditional to online learning decreased quality, decreased motivation, and deteriorated academic performance and self-directed learning abilities and due to the high level of difficulty in comprehending and utilizing the online learning program without the proper guidance ((Ullah, Khan & Khan, 2017; Mukhametshin et al., 2021).

On the other hand, students at the same time are stimulated to encounter the online learning environment and hope to continue using it when the pandemic is over. During the pandemic, students generally had a positive attitude and received generous support from their professors, highlighting the crucial role teachers play in enhancing the value of digital learning and also gives students new opportunities to study on their own, work together, and form bonds with their peers (Mushtaque et al., 2021; Xia et al., 2022).

2.3 Gender Based Perceptions and Attitudes

Previous studies present mixed findings on gender-based differences in online education. Some studies report no significant differences in perceptions or attitudes based on gender (Mahnun et al., 2022; Kamal et al., 2023; Islam & Mehmood, 2024; Saranya & Manivannan, 2024), while others reveal notable distinctions.

Male teachers and students are often found to have more positive attitudes toward ICT and online instruction (Oduol, 2019; Kar, 2020; Gururaja, 2021; Siddiqui, Shah & Arisar, 2021; Zulfiqar, Ajmal & Bano, 2023). They also tend to excel in technical aspects and use computers more frequently (Bast, 2021; Idrizi, Filiposka & Trajkovik, n.d.), showing greater confidence in e-assessment tools (Bahar & Asil, 2018).

Conversely, female students frequently encounter more challenges, including adapting to new software, stress, and poor home setups (Greier, Drenowatz & Sappl, 2022). However, they often demonstrate stronger study orientation, self-control, and persistence (Korlat et al., 2021; Yu, 2021).

Some studies highlight a gender digital divide, with males having better access to devices and internet, especially in certain regions like Iraq (Kamal et al., 2023).

Both genders, however, cited social isolation as a major drawback. Males and students from wealthier families used computers more, while females relied more on mobile phones (Bast, 2021). Despite these differences, overall attitudes toward

online learning did not vary significantly by gender (Mahnun et al., 2022; Kamal et al., 2023). However, male students and teachers generally performed better and had more positive attitudes than females (Zulfiqar et al., 2023).

2.4 Locale Based Perceptions and Attitudes

Teachers and students from rural areas faced more difficulties with online learning than urban ones, mainly due to poor internet connectivity, lower participation, decrease satisfaction, decrease performance, limited resources, and less exposure to technology, higher stress and weaker classroom connection due to infrastructure issues, while urban regions have greater access to gadgets, higher internet speed, and supportive environments leading to stronger engagement (Siddiqui, Shah & Arisar, 2021; Irfan, 2022; Chavan & Begum, 2022; AnanthaRamu, 2024; Yanlin & Royo, 2024). Furthermore, urban students and students from higher socioeconomic status were more open to online learning and in using computer more during the COVID-19 lockdown, while females relied more on mobile phones (Bast, 2021).

As a result, urban students and teachers generally showed greater interest, satisfaction, and performance in online or blended learning settings which is due to that cities are more exposed to technology than those in rural areas (Dhamija, 2014; AnanthaRamu, 2024). This indicates that technology, internet, and direction are all crucial components (Chavan & Begum, 2022).

Though there were minor differences in areas like learning motivation, style, and course aim fit, students from urban and rural locations expressed similar opinions about synchronous learning, indicating that synchronous learning worked well throughout the epidemic for both groups (Septianingsih & Erliza, 2021).

2.5 Institution Based Perceptions and Attitudes

Both instructors and students at private universities view e-learning positively but have low confidence in its effectiveness, which is affected by their readiness like prior exposure and ICT supportive environment, influencing their perceptions across public and private institutions. A hybrid learning model is

generally preferred by both groups (Kizza, 2021). In contrast, teachers at government and assisted schools have a more favourable attitude toward online instruction, whereas teachers at private, unassisted schools are less enthusiastic, mostly because their motivation is heavily impacted by their drastically lower pay (Gururaja, 2021). With no definite preference for either good or negative views, students from both public and private schools have a mixed impression about online learning. Following the pandemic, the majority of Iraqi students supported in-person instruction, although some preferred a hybrid approach that included online and conventional learning methods (Kamal et al., 2023). Students at both public and private universities concur that the most significant element affecting their attitudes toward online learning is self-motivation, whereas technical support has the least effect. Both institutions found the online platform useful in avoiding session delays and finishing their semesters on time, despite conflicting opinions regarding the online education system (Nasir & Neger, 2022).

2.6 Socio-Economic Status (SES) Based Perceptions and Attitudes

Students from higher socioeconomic backgrounds generally have better access to technology and are well-equipped with resources such as computers and stable internet, leading to greater participation and engagement in online education (Bast, 2021; Ullah et al., 2021; Al-Ajeely et al., 2023; Halim & Safiai, 2024), highlighting the necessity of planning to narrow the digital gap and guarantee that everyone has access to online education (Al-Ajeely et al., 2023). In contrast, those from lower socioeconomic groups face more challenges, including limited access to devices, poor connectivity, less parental support, financial constraints, unsupportive environment, incompetent instructors, which negatively affect their e-learning experiences and exacerbating the gap in their academic progress (Cuisia-Villanueva & Núñez, 2021; Ullah et al., 2021; Siddiqui, Shah & Arisar, 2021; Chavan & Begum, 2022; Halim & Safiai, 2024). Despite these challenges with internet access, finances, and understanding the subject matter, most students had a positive view of online learning, highlighting the necessity of providing support like free internet for those in need and ensuring clear teaching to help students succeed is crucial to learners succeed (Saputra et al., 2022).

While Socioeconomic Status influences access and performance, its effect on attitudes toward online education is mixed. Some studies found no significant impact of SES on attitudes (Carmi, 2024; Prakasha et al., 2022), while others observed negative attitudes toward ICT among students across different socio-economic background due to limited resources and incompetent instructors (Adenuga et al., 2011).

2.7 Disciplinary Based Perceptions and Attitudes

Studies reveal mixed attitudes toward online learning between STEM (Science, Technology, Engineering, and Mathematics) and non-STEM students and teachers. STEM teachers argued the internet was not the most effective place to learn sciences primarily due to restrictions in the communication process and teachers fail to apply basic skills as efficiently as they could (Sajidan, 2021). There are significant variations in the inclination of teachers in different disciplines to support online instruction as the standard; teachers in the natural sciences were more in favour of it, while those in the social sciences were less favourable (Jiang, 2023). Both STEM and non-STEM educators viewed AI integration in education positively (Parviz, 2024). However, some studies stated STEM student teachers displayed more positive attitudes and less worries toward AI compared to non-STEM peers due to their prior experience making them more techno savvy, more inclined to attend class and showed a deeper comprehension of the benefits than non-STEM peers, arguing that AI should be incorporated into non-STEM teacher curricula in order to prepare them for future (Das & Bhattacharyya, 2023; Aktulun, Kasapoglu & Aydogdu, 2024). Moreover, STEM students outperformed non-STEM students in lab assignments and performed better on tests administered online than in person because recorded lessons and continuous study boosted STEM performance which maintained non-STEM outcomes (Al-Zohbi et al., 2022). While STEM students scored better than their non-STEM counterparts in blended learning, they gave blended courses a lower rating highlighting the need to redesign blended learning for STEM areas and further study is required to investigate and address low student satisfaction in non-STEM areas (Owston et al., 2020). Some studies also highlight STEM students rated blended learning lower than non-STEM students and were less satisfied and more

negative attitude with online learning, especially with tools, assessments, and course design (Owston et al., 2020; Newsome et al., 2022).

Moreover, STEM students showed increased confidence and enjoyment, while non-STEM peers displayed growing interest, highlighting the need for tailored teaching approaches to the target audience to optimize engagement and reinforcement (Bush et al., 2016). Both groups appreciated the flexibility of e-learning but also pointed out areas for improvement such as increased student engagement in pre-class tasks and issues with high teacher workload (Ortiz-Rojas et al., 2023). Science students demonstrated more positive attitudes toward e-learning than arts students (Siddiqui, Shah & Arisar, 2021), though some studies found no significant attitude differences between Arts and Science, suggesting that arts students are becoming more tech-savvy and are becoming more competent with science students (Dhamija, 2014). Differences in course commitment were noted, with non-STEM students having steadier attendance while engagement remained constant across both groups (Kalyanasundaram & Madhavi, 2021). Overall, students held favorable views of online learning, though satisfaction in science-technology courses was lower due to reduced peer interaction and poor pandemic experiences. Motivation and professor engagement were key to increasing acceptance (del Gobbo et al., 2021).

2.8 Attitude towards Technology

Teachers and students show varied attitudes toward ICT in education based on gender, location, institution type, and socio-economic background. Many teachers avoid ICT due to fear of technology, requiring regular practice and up-to-date training to build confidence (Mahajan, 2016). While some studies report no gender difference in ICT attitudes (Islahi & Nasrin, 2019; Sehjal, 2021), others stated female teachers have more positive views than males (Guillén-Gámez & Rodríguez-Fernández, 2022). Private school teachers show greater openness to ICT than those in government institutions (Sehjal, 2021), while this study is in contrast with the study of Pir, & Islam (2024) who states that those from Government institutions

shows more openness and enthusiasm, highlighting their view and desire to use ICT in the classroom may be influenced by the work sector.

Students' experiences differ too. Male and female university students were dissatisfied with the technology utilized in distant learning because it was complicated to use, neglecting to consider students' learning preferences, lacked flexibility and also due to that they had no prior experience with online courses before enrolling in college (Alharthi, 2020). Rural students showed more favorable ICT attitudes than urban counterparts (Hassan & Akbar, 2016). Socio-economic status (SES) significantly influences ICT use where students from higher SES backgrounds are more skilled, confident, and active in using technology, while those from lower SES backgrounds are more hesitant, reluctant and less likely to use technology for academic purposes and creating content, indicating a subtle digital gap that may affect their future job prospects (Lebens et al., 2009; McKenzie et al., 2014; Henry & Olukemi, 2015).

Disciplinary differences also exist. Students generally showed positive or moderate attitudes toward IT, often influenced by access to home computers. Science students had more favorable views towards technology due to course demands, while social science students were more positive than those in humanities and sciences. However, gender disparities, unequal access to the internet, digital literacy, technology usage, and IT access contributed to a widening digital divide (Mustafa et al., 2015; Aswathi & Haneefa, 2020). Device preference varies, with books as their top choice followed by laptops for learning, believing technology improves education and prepares them for workforce, while tablets and smartphones are less favored (Andrew et al., 2018). Technology acceptability and self-efficacy were found to have a significant impact on students' attitudes toward technology-based self-directed learning, with learning motivation acting as a major mediator (Pan, 2020). Overall, most students have a positive attitude toward educational technology highlighting the importance of possessing computer skills and owning a computer or laptop which had a beneficial effect (Hoque et al., 2020).

2.9 Synchronous and Asynchronous Online Teaching- Learning

Students generally hold positive views of both synchronous and asynchronous online learning, appreciating their flexibility, comfort, and usefulness and the amount of knowledge that students gained via synchronous and asynchronous learning perceived to be equally comfortable, enjoyable, and fulfilling (Alzahrani et al., 2023). Synchronous learning is often preferred for its real-time interaction, engagement opportunities, considered close association to physical instruction, sense of community, and stronger social presence and greater satisfaction, while asynchronous learning is valued for improving time management but students often feel they are less competent, emphasizing the necessity of lowering technological obstacles, enhancing digital skills for both teachers and students, and improving LMS (Ratan et al., 2022; Alzahrani et al., 2023; Hasan, 2023).

Platforms like Google Meet were considered effective tool in encouraging active involvement and enhanced reading skills through online discussions, students had a favorable opinion of utilizing it for synchronous online reading sessions, but still have to deal with private matters, technological, and environmental difficulties. (Zahro, Ngadiso & Supriyadi, 2022). Students in business schools perceived that synchronous learning was more advantageous and productive than asynchronous learning, suggesting multifaceted curriculum that includes in-person interactions between professors and students to promote openness, trust, and mentoring (Sharifrazi & Stone, 2019). Students from Open University were well-aware of synchronous and asynchronous e-learning and thought it improved their academic performance, with more than half of them believed that in order to increase the effectiveness of e-learning, the National Open University's curriculum needs to be updated (Dada, Alkali & Oyewola, 2019).

The versatility of both synchronous and asynchronous modes was preferred by participants, described them as simple and cozy, but the primary drawbacks of both forms were found to be technological difficulties, cybersecurity concerns, and interaction difficulties (Gazan, 2020). Effective use of learning management systems

(LMS) depends on the satisfaction of pupils, knowledge, skills, and attitude (KSAs), engagement, and interaction, and thereby utilizing a teaching design that integrates synchronous and asynchronous learning modalities to boost KSAs, interaction, and engagement, educators could raise students' well-being (Md Osman, 2022). Both synchronous and asynchronous e-learning are seen positively by students, preferring synchronous learning more, enabling them to communicate with lecturers more effectively, and the study highlights that despite technological developments, students continue to value the lecturer's presence (Friska, 2021).

2.10 Usage of Technology and Teaching-Learning Platforms

In a study of Prabawati et al. (2021) it is found that online resources such as Google Classroom, YouTube, Google Forms, and WhatsApp were widely used by teachers and they had a favourable opinion of these tools, stating that they were effective, efficient, time-saving, made lessons simpler to grasp, offered extra insight, increased student motivation and interest, and made learning more engaging and enjoyable during the spread of COVID-19.

2.11 Problems in Synchronous Online Teaching

Various studies reveal that both teachers and students encounter significant obstacles in integrating ICT and engaging in online learning effectively. Common barriers include sudden power cuts, slow internet, lack of infrastructure, and inadequate training and absence of experience in online instruction, making older faculty less interested in online instruction and students disengaged in online learning (Akram et al., 2022; Gururaja, 2021). Pedagogical issues such as low motivation, internet issues, technical problems, low quality audio, concerns over data privacy, difficulty building rapport, poor communication, and lower student engagement compared to face-to-face classes further reduce learning effectiveness (Almahasees, Mohsen & Amin, 2021; Özüdoğru, 2021). Students frequently report challenges such as difficulty understanding content, low motivation, technical problems, isolation, and reduced learning outcomes, with mathematics often being the most difficult subject to learn online (Erlangga, 2022). Preferences vary, with teachers favoring laptops and students preferring smartphones, while Zoom, Google

Meet, and WhatsApp remain the most commonly used platforms; recorded videos and objective-type assessments are widely preferred by students for tranquillity with majority of teachers considered online exam as unfair and Maths as the most challenging subjects, frequent disruptions by connectivity is prevalent (Lalduhawma et al., 2022). While synchronous and asynchronous learning offer benefits like flexibility and wider access, they still face challenges such as technical issues, connectivity problems, extended screen time, and personal losses like a death in the family, all of which hinder concentration during online classes many students find it stressful due to this (Cahyani et al., 2021; Fernandez, Ramesh & Manivannan, 2022), whereas students' acceptance of synchronous learning depends heavily on teacher traits, technology, and system quality which is shaped by teacher traits, support systems, technology, and trust (Persada et al., 2022). Psychological and health issues are also prevalent, including stress, exam anxiety, depressive symptoms, eye strain, declining interest, decreased productivity and reduced physical activity, screen brightness sensitivity, with female students reporting higher levels of mental fatigue such as stress, depression, anxiety and tensions than their male counterparts (Azmi et al., 2022; Victor et al., 2023). However, regardless of gender, students' physical activity dramatically declined throughout the online learning period, but the school closure had no effect on their mental health (Chu & Li, 2022).

Thus, the most commonly reported barriers include issues such as students attribute to their lecturers where quality of lectures affect the outcome of online learning, unstable internet and internet connectivity problems during online classes affected the trial and made it hard to build rapport and engage in in-depth discussions, technological barriers, poor infrastructure, lack of exposure to online learning, and limited social interaction in synchronous learning environments and adjusting to the learning platform hinders effective delivery of instruction and comprehension (Erickson et al., 2020; Donasari, Tala & Hamidah, 2021; Anastasakis, Triantafyllou & Petridis, 2023). Although online learning offers flexibility and wider access, it is still widely viewed as a temporary measure during COVID-19 and cannot fully replace traditional classroom instruction without

addressing these persistent technical, pedagogical, and psychological challenges (Almahasees, Mohsen & Amin, 2021; Garlinska, Proniewska & Pregowska, 2024).

2.12 Practical Solution Suggested in Studies

Previous studies highlight multiple strategies and considerations for enhancing online and blended learning:

Universities can assess and improve learning outcomes by concentrating on technological pedagogical knowledge (TPK), which helps in comprehending how to use technology to improve teaching strategies, and technological content knowledge (TCK), which focuses on using technology to deliver specific content efficiently (Khazo, 2022). It has also been demonstrated that technology improves motivation, engagement, and teamwork among learners of all ages, including those with special needs. It also helps pupils strengthen their technology abilities and increases their sense of self-confidence (Costley, 2014). Incorporating well-being tools like mindfulness content, enabling peer-to-peer and student-teacher communication, offering a comprehensive introduction, and guaranteeing ongoing technical assistance are all crucial steps in addressing students' mental health issues (Roddy, 2017). To succeed academically in digital learning environments, instructors must prioritize their well-being, integrate modern technological advances, and engage in ongoing professional development (Sato et al., 2024). Teachers that incorporate human-centered features into their lessons (by increasing human connection in the virtual world) improve learning outcomes by personalizing online instruction, which makes students feel less alone and more involved (Chai et al., 2024). The efficacy of online education is enhanced by motivation and strategic online learning. While students should actively participate, encourage peer interaction, and set clear learning objectives, instructors should use a variety of learning methods to create engaging, interactive settings that meet students' content needs (Hongsuchon et al., 2022). Digital resources like blogs, multimedia presentations, and video lectures help culturally diverse students academically, yet they frequently struggle since there is a dearth of multicultural information. Teachers should use culturally appropriate materials to encourage inclusivity and participation (Yeboah et al., 2020). Equity is

hampered by a lack of internet and device availability, inadequate teacher preparation, and low student proficiency in online learning. It is recommended that student support, teacher training, and digital access be improved (Tate & Warschauer, 2022). In comparison to traditional techniques, gamification improves academic performance and retention by increasing motivation, engagement, and satisfaction while meeting basic requirements (Lampropoulos & Sidiropoulos, 2024). Enhancing students' psychological resilience, developing emotional ties, and increasing intrinsic motivation are essential for academic achievement in blended learning (Liu et al., 2024). Online learning presents a number of difficulties, such as inadequate bandwidth, bad infrastructure, a lack of technical expertise, delayed feedback, and problems with evaluation and cheating detection. Teachers should employ difficult, complex questions, engage students, promote involvement, and randomly select exam questions in order to resolve these issues (Goudarzi et al., 2023). The effects of AI on academic integrity, especially plagiarism, should alarm students. Fostering an ethical learning environment requires clear policies, sophisticated plagiarism detection, and creative assessments (William, 2024). Prioritizing ethical integrity and guaranteeing responsibility through well-defined norms are essential for researchers. To improve these guidelines and advance relational ethics, constant discussion is necessary (Costello et al., 2023). Online academic support increases productivity, drive, creativity, and accessibility to assistance. Additionally, it improves pupil retention, digital proficiency, self-efficacy, and offers social advantages (Walsh et al., 2024). Overuse of videoconferencing can lower energy and performance, underscoring the importance of taking students' digital preferences into account. To accommodate different learning styles, educators need to be tech-savvy and able to use tools like social robotics, mixed reality, and video games to increase engagement (Rodríguez et al., 2023). There is a digital divide between teachers in rural and urban areas, with higher-ranking, older instructors being more actively involved. Enhancing digital education requires training for younger teachers and improving ICT infrastructure (Amirova et al., 2023). While asynchronous learning using Universal Design for Learning (UDL) encourages independence, it does not provide the same social interaction as traditional classroom settings. Live interactions in blended learning

environments better support students' intrinsic needs, inclusiveness, and sense of belonging (Ismailov & Chiu, 2022). Most students prefer to learn offline, while underdeveloped nations deal with issues including inadequate infrastructure and limited funding. Such issues can be resolved by improving ICT infrastructure, helping low-income students, increasing social contacts, taking mental well-being into account, and having backup plans for online learning emergencies (Meng et al., 2024). Despite that online and hybrid learning hampers underprivileged students to obtain education, it also advances equity by making learning more flexible and accessible. Students stress the importance of flexibility and support (Ikebuchi, 2023). Future learning models should be created by educators considering the welfare and sense of community of students as top priorities. Fostering relationships between teachers, students, and peers, delivering resources for skill development, and reinforce support can improve students' sense of belonging (Rajan et al., 2024). Educational access is limited by socioeconomic, digital, linguistic, and societal constraints. Some of the alternatives include developing digital skills, increasing financial aid, encouraging cultural inclusivity, establishing encouraging online communities, and offering personalized content (Ersoy, 2023).

Thus, in short, effective online learning depends on strengthening teachers' technological pedagogical and content knowledge (TPK, TCK) to integrate technology, which enhances motivation, engagement, collaboration, self-confidence, and digital skills for all learners, including those with special needs (Khazo, 2022; Costley, 2014). Student and teacher well-being, supported by mindfulness tools, strong communication, technical support, and ongoing professional development, is essential for success (Roddy, 2017; Sato et al., 2024), while human-centered instruction improves engagement and reduces isolation (Chai et al., 2024; Hongsuchon et al., 2022). Inclusivity requires culturally relevant resources, equitable access through ICT investment, and targeted training (Yeboah et al., 2020; Tate & Warschauer, 2022), while gamification, resilience, and emotional connection further enhance outcomes (Lampropoulos & Sidiropoulos, 2024; Liu et al., 2024). Persistent issues such as poor bandwidth, infrastructure gaps, cheating, and AI-related integrity risks can be addressed through robust assessments, plagiarism detection, and

innovative teaching strategies (Goudarzi et al., 2023; William, 2024; Costello et al., 2023). Bridging rural–urban divides (Amirova et al., 2023), balancing asynchronous and blended learning benefits (Ismailov & Chiu, 2022), and prioritizing equity, flexibility, and community (Meng et al., 2024; Ikebuchi, 2023; Rajan et al., 2024; Ersoy, 2023) are key to ensuring inclusive and effective digital education.

2.13 Summary of the Reviewed Studies

It is evident from the review of literature that online learning is perceived effective as traditional mode as it offers easy access, allowed learner to proceed at their own pace, encourage active involvement, engaging and fun, provide opportunity to use technology. However, there are several drawbacks as it is reported that students faced limited access to technology, decreased attendance and interest. Both teachers and students regard online learning as only a temporary solution rather than replacement of in-person learning mode.

Teachers and students generally hold a negative attitude toward online learning, primarily due to their inability to manage technological tools, which stems from a lack of prior experience. Students, in particular, expressed dissatisfaction with online learning because of technical and financial limitations, reduced opportunities for interaction, and a shallow understanding of the subject matter.

In terms of gender-based perception and attitude toward online learning, it is evident that male have more higher perception and attitude towards online learning compared to their female counterparts due to the fact that male have better access to technology and internet while female have higher level of stress in using technology, struggled to learn new software skills and difficulty adjusting to online environment.

With regard to teachers' and students' perception and attitude towards online learning with respect to locale, it is evident that rural teachers and students have lower perception and attitude towards online learning compared to their urban counterparts because rural regions have weaker network connections, scare resources, irregular electric supply which leads to increase stress during tests and

assignments. In contrast, urban regions have more supportive environment and greater access to gadgets.

Teachers and students at Public schools possess a higher perception and attitude towards online learning than their Private school counterparts which is because Public school have more prior experience and more ICT supportive environment and also their pay scale is much higher than Private school teachers.

Regarding Socio-Economic-Status (SES) based perception and attitude towards online learning, it is evident that student from higher SES have higher perception and attitude towards online learning, this is because students from higher SES have more resources that helps them in assisting their learning while students from lower SES have negative perception and attitude due to challenges with internet access, finances and understanding subject-matter, lower access to resources and parental support, lack of financial support leading to digital gap.

In terms of Disciplinarity based perception and attitude towards online learning, it is evident that STEM teachers and students have higher perception and attitude towards online learning than their non-STEM counterparts. However, STEM teachers reported that the internet was not the most effective medium for delivering instruction, especially in science, as it hindered students' ability to apply fundamental skills. The reason STEM teachers and students are in favour of online learning is due to the fact that they have prior experience making them more techno savvy and have deeper comprehension of the benefits and performed better in online tests and assignments due to recorded lessons. This, in turn, enhances their confidence and interest in the learning process.

Attitudes toward ICT use in education vary based on gender, location, type of institution, socioeconomic status (SES), discipline, and access to technology. Some studies found no significant gender differences, while others reported that female teachers had more positive attitudes. School type and location influenced perspectives, with private school teachers and rural students showing more favourable views than their counterparts. Institution type also played a role; teachers in government institutions showed greater openness to ICT. Students' attitudes were

impacted by SES, with higher SES students showing more comfort and skill in using technology, while lower SES students showed reluctance and less engagement, indicating a digital divide. Subject background influenced attitudes as well; science and social science students generally had more positive views than those in the humanities. Access to technology, self-efficacy, and motivation significantly contributed to positive attitudes toward technology-based learning. Despite some challenges, such as dissatisfaction with remote learning tools, most students acknowledged that technology enhances learning and career readiness.

With regard to review from Synchronous and Asynchronous Online Learning, although some studies claimed synchronous and asynchronous online learning comfortable and interesting, several studies found that synchronous online learning as more advantageous, productive, promote openness, simple, cozy, encourage communication with lectures effectively, encourage greater social presence, satisfied than asynchronous online mode. Asynchronous online mode is perceived to be less competent.

The major problems encountered by both teachers and students in Synchronous online learning are sudden power cuts, slow internet, lack of infrastructure, lack of prior experience and training, low motivation, absence of interaction,, technical problems, data privacy concerns, older faculty struggled to get engaged, lack of concept understanding, communication barriers, difficulty building rapport between student and teacher, prolonged screentime exposure, family matters, teachers' incompetency to handle technology, low audio and video quality, practice of unfair means in exams, absence of in-depth discussion, isolation, all contribute to major obstacle in synchronous online learning.

The reviews also propose solutions to these issues, recommending that universities enhance their technological pedagogy to help educators better understand how to use technology effectively for teaching purposes, incorporating mindfulness content (allow students to take mindfulness pauses and rest during long sessions, encourage rest and reset for improved concentration, breathing exercise, etc), encourage peer and student-teacher interaction and communication, providing

technical assistance, suggest teacher to engage in ongoing professional development, incorporating a variety of teaching methods to make students engaged, helping low income students, teacher using culturally appropriate materials to encourage inclusivity.

Thus, the review of literature clearly indicates that few studies have examined perceptions and attitudes toward online learning in relation to factors such as gender, socioeconomic status (SES), and disciplinarity. However, aspects like institutional differences and attitudes toward technology have received comparatively less attention and remained underexplored. Moreover, there appears to be no national or international research specifically focused on online learning in the context of Mizoram up to the year 2022. Therefore, the present study aims to address this gap by exploring the perceptions and attitudes of teachers and students in Mizoram toward online teaching-learning.

CHAPTER-III

Research Methods and Procedure

This chapter outlines the research methods and procedures adopted for the present study. It explains the research design, population and sample, tools used for data collection, and the procedures followed for collecting and analysing the data in a systematic manner.

The research methodology is of great importance as it describes the steps and processes that must be followed while carrying out legal research. It provides guidance, direction, and caution to the researcher in selecting appropriate steps and methods to effectively address the research problem being investigated.

In a research study, once the objectives and hypotheses are established, the next step involves implementing research methods and procedures to gather information using appropriate gathering of data tools and sampling techniques. After that, the data is arranged, into tables, and suitable statistical techniques are applied for analysis. The researcher requires a detailed methodological blueprint in advance to ensure that no critical steps in the research process are overlooked. Thus, this chapter is crucial in determining the direction and outcome of the current study. The chapter covers the following key aspects:

1. Method of Study
2. Sources of Data
3. Population
4. Sample and Sampling Technique
5. Tools and Techniques of Data Collection
6. Procedure of Data Collection
7. Statistical Techniques for Data Analysis

3.1 Method of Study

For the current study, a mixed approach that incorporates both quantitative and qualitative data analysis was employed using a Convergent Parallel Design.

Convergent Parallel Design is a mixed approach-based design in which simultaneously the researcher is interested to gain both quantitative and qualitative data and triangulate it for better insights. As a result, the current study has been characterized as descriptive research. Another way to think about this study is as a status check and to get a clear picture on online teaching-learning at post-graduate level of university in Mizoram with special emphasis on the perception and attitude encountered by post-graduate student and teacher.

3.2 Sources of Data

To obtain precise information for this investigation, only primary data sources were used. The primary sources of data collection for this research are outlined as follows.

Primary Sources: As this study investigates the perception and attitude toward online learning on university teachers and students in Mizoram, the primary sources of data consist of university students and their teachers.

3.3 Population

The current study's researcher's objective is to investigate the perception and attitude of post-graduate teachers and students in the two universities of Mizoram toward online teaching and learning. Consequently, the study focuses on two primary populations for investigation.

Population 1: The first population comprised of all university students studying at Mizoram Central University (MZU) and the Institute of Chartered Financial Analysts of India (ICFAI) a private university in Mizoram.

Population 2: The second group of population comprised of all university teachers teaching at Mizoram University (MZU), a central university and the Institute of Chartered Financial Analysts of India (ICFAI) a non-government university in Mizoram. There is no Master Science stream in ICFAI except for Master of Science (Geography) which is kept under Arts Stream. Hence, students and teachers of this department were categorized under STEM courses for the

purpose of analysis. The students and teachers of the school of Fine Arts, Architecture & Fashion Technology in Mizoram University were kept under STEM courses.

As shown in Table 3.1 and Table 3.2 describes the population size of teachers and students from the two Universities of Mizoram. It is to be noted that only fourth semester students were included in the population as they were the only students who experienced online learning during the year 2020-2021.

Table 3.1

Description of population of teachers and students from Mizoram University (MZU)

Sl. No	School	Department	Teacher	Student
1		Commerce	7	40
2		Economics	6	50
3		Library & Information Science	6	25
4		Management	8	35
5	SEMIS	Mass Communication	6	30
6		Tourism & Hospitality Management	5	20
7	Humanities & Language	English & Cultural Studies	5	40
8		Mizo	5	50
9		Hindi	5	25
10	School of Education	Education	20	65
11	Social Sciences	History & Ethnography	7	45
12		Political Science	6	45
13		Public Administration	6	40
14		Psychology	6	35
15		Sociology	4	30
16		Social Work	6	30
17	ES & NRM (Earth Science & Natural Resource Management)	Environmental Science	7	30
18		Forestry	6	30
19		Geography and Resource	6	30

		Management		
20		Geology	5	30
21		Horticulture, Aromatic & Medicinal Plants	8	30
22		Extension Education & Rural Development	1	NA
23	Physical	Chemistry	6	30
24	Sciences	Physics	7	30
25		Industrial Chemistry	2	20
26		Mathematics & Computer Sciences	6	35
27	Engineering Technology	Information Technology	5	15
28		Electronics & Communication	8	15
29		Engineer Computer Engineering	5	15
30		Electrical Engineering	3	15
31		Civil Engineering	6	15
32		Food Technology	4	15
33	Fine Arts, Architecture & Fashion Technology	Planning & Architecture	8	NA
34	Medical & Paramedical Sciences	Clinical Psychology	3	30
35	Life Sciences	Botany	7	30
36		Zoology	8	30
37		Biotechnology	6	30
Total			225	1110

Table 3.2

Description of population of teachers and students from Institute of Chartered Financial Analysts of India (ICFAI)

Sl. No	Faculty	Department	Teacher	Student
1	Management	MA (Business Administration)	6	11
2		MA (Commerce)	5	21
3		MA(Economics)	4	24
4	Humanities & Social Sciences	MA(Education)	4	27
5		MA (Social Work)	7	39
6		MA (History)	4	7
7		MA (Pol. Sc)	4	50
8		MA(English)	4	23
9		MA (Mizo & Cultural Studies)	4	37
10		M.Sc. (Geography)	4	20
11		MA Sociology	NA	NA
Total			35	259

3.4 Sample and Sampling Technique

Disproportionate Stratified Random Sampling was adopted for the selection of samples, where each department within different disciplines serves as a separate stratum for data collection.

Sample size: As per the latest data of 2021, there are a total of approximately 2200 students in Mizoram University and Master program of PUC, Constituent College, Mizoram University based on admission in the year 2020 & 2021 (Source: Controller of Examination, MZU) and 252 teachers in MZU and 113 teachers in PUC (Source: Academic Cell, MZU); and 450 students and 28 regular and 26 visiting teachers in ICFAI University (Source: Official Data, ICFAI). All together number of teachers' and students' population is 419 and 2650 respectively. As only students of 4th Semester formed the population of the present study, they being the only available batch that experienced online learning. The collected sample of

students was altogether 593 and that of teachers was 62. This counts for 43% of the total population for students and 24% of the total population for teachers.

Tables 3.3 and 3.4 present the samples of both teachers and students drawn from the two universities in Mizoram.

Table 3.3

Description of sample of teachers and students from Mizoram University (MZU)

Sl. No	School	Department	Teacher	Student
1	SEMIS	Commerce	2	28
2		Economics	1	NA
3		Library & Information Science	1	13
4		Management	1	NA
5		Mass Communication	1	12
6		Tourism & Hospitality Management	NA	2
7	Humanities & Language	English & Cultural Studies	NA	NA
8		Mizo	NA	2
9		Hindi	1	3
10	School of Education Social Sciences	Education & M.Ed.	NA	43
11		History & Ethnography	2	15
12		Political Science	3	18
13		Public Administration	1	32
14		Psychology	1	29
15		Sociology	1	28
16		Social Work	2	2
17		Environmental Science	2	9
18		Forestry	1	4
19		Geography and Resource Management	1	22
20	ES & NRM (Earth Science & Natural Resource Management)	Geology	2	13
21		Horticulture,	NA	6

22		Aromatic & Medicinal Plants Extension Education & Rural Development	NA	
23	Physical Sciences	Chemistry	2	20
24		Physics	1	12
25		Industrial Chemistry	1	NA
26		Mathematics & Computer Sciences	2	29
27	Engineering Technology	Information Technology	3	4
28		Electronics & Communication	1	3
29		Computer Engineering	1	17
30		Electrical Engineering	1	2
31		Civil Engineering	3	NA
32		Food Technology	2	3
33	Fine Arts, Architecture & Fashion Technology	Planning & Architecture	3	3
34	Medical & Paramedical Sciences	Clinical Psychology	2	NA
35	Life Sciences	Botany	1	20
36		Zoology	2	5
37		Biotechnology	2	17
Total			50	416

Table 3.4

Description of sample of teachers and students from Institute of Chartered Financial Analysts of India (ICFAI)

Sl. No	Faculty	Department	Teacher	Student
1	Management	MA (Business Administration)	2	8
2		MA (Commerce)	1	19
3		MA(Economics)	1	13
4	Humanities &	MA(Education)	4	16
5	Social Sciences	MA (Social Work)	NA	27
6		MA (History)	NA	3
7		MA (Pol. Sc)	1	29
8		MA(English)	2	19
9		MA (Mizo & Cultural Studies)	1	31
10		M.Sc. (Geography)	NA	12
11		MA (Sociology)	NA	NA
Total			12	177

Sampling Technique: This research aims to analyse the perceptions and attitudes of university teachers and students towards the practice of online teaching and learning in Mizoram. There are two institutions of higher learning in Mizoram, namely Mizoram University (MZU), a central university, and The Institute of Chartered Financial Analysts of India (ICFAI) University, a privately run university. The different PG programmes offered in both the universities were chosen as strata from which students and teachers were randomly chosen in the current research. In the current study, sample collection was carried out through Disproportionate Stratified Random Sampling. It is necessary to acknowledge that the researcher could not get back responses from some departments which are mentioned as Not Available (NA) in the sample description (Table 3.3 and Table 3.4).

With respect to the population, two samples have been considered for the present study:

Sample 1: A total of 593 students enrolled into different discipline PG departments of Mizoram University and PG departments of ICFAI University were chosen in line with the stratified disproportionate random sampling method.

Sample 2: A total of 62 teachers teaching at PG level in various discipline departments of Mizoram University and PG courses in ICFAI University were chosen in line with the stratified disproportionate random sampling method.

3.5 Tools and Techniques of Data Collection

For this study, the following tools and techniques were utilized:

A self-developed perception cum attitude scale to study the perception and attitude of students towards online learning process

1. A self-developed perception cum attitude scale to study the perception and attitude of teachers and students towards online teaching-learning process
2. A self-developed questionnaire to find out the problems faced by teachers and students during synchronous online teaching -learning process and gather suggestions to improve synchronous online teaching-learning.
3. A self-developed semi-structured interview schedule to qualitatively explore the feelings, problems and suggestions of students towards synchronous online teaching-learning process.
4. A standardized Media and Technology Usage and Attitude scale by Rosen et al. (2013) was used to find out students' and teachers' attitude towards technology.
5. Socio-economic Status Scale developed by Lallianzuali Fanai and R.P.Vadhera (Revised, 2022) was adopted for the purpose of collecting students' SES profile.

3.5.1 A self-developed perception cum attitude scale to study the perception and attitude of students towards online learning process

Construction of Perception and Attitude Scale for Students: Researcher herself constructed a perception scale and an attitude scale for determining the perception and attitude of university students pertaining to online learning. Both the scales used 5-point Likert rating scale rated on a range of strongly agree to strongly disagree. These scales were specifically in the context of online learning which were further divided into two heads – synchronous and asynchronous online learning. In light of the experiences acquired during synchronous and asynchronous online learning, students marked how they perceived and felt about online learning process by selecting the best options out of options provided.

The perception scale comprised of both positive and negative statements under the two dimensions synchronous and asynchronous online learning. Positive statements were rated as 5, 4, 3, 2, and 1 for response strongly agree, agree, neutral, disagree, and strongly disagree respectively and scoring goes reverse for negative statements as 1, 2, 3, 4, 5. The tool was validated for its first draft by 25 experts from the field of Education comprising of 50 statements under two dimensions, synchronous and asynchronous online learning. After consulting with the experts, 15 items under each dimension were retained. There are 2 negative statements out of 15 items under the dimension synchronous online learning and no negative items in 15 items under the dimension asynchronous online learning. Then the second draft of the tool was analysed through item analysis procedure (Table 3.5) on a sample of 137 students and all 30 items were retained. Also, it was tried at this stage to find out the measures of internal consistency of the perception scale. Firstly, the Cronbach alpha was estimated on the same initial 137 sample of students for the perception scale and was obtained as 0.952, a very high value indicating the internal consistency of all 30 items. Finally, the split half reliability corrected for Spearman-Brown formula of the perception scale was calculated on 100 randomly selected PG students and it was found to be 0.85, which is considered to be highly reliable. A copy of the student perception scale is provided in Appendix 1.

The attitude scale comprised of both positive and negative statements under the two dimensions synchronous and asynchronous online learning. Positive statements get a score of 5,4,3,2,1 for strongly agree, agree, neutral, disagree, strongly disagree options respectively and scoring is reversed for negative statements as 1, 2, 3, 4, 5. The tool was validated for its first draft by 25 experts from the field of Education comprising of 45 statements under two dimensions, synchronous and asynchronous online learning. After consulting with the experts, 15 items under each dimension were retained. There are 8 negative statements out of 15 items under the dimension synchronous online learning and 7 negative items out of 15 items under asynchronous online learning. Then the second draft of the tool was analysed through item analysis procedure (Table 3.6) on a sample of 137 students and all 30 items were retained. Also, it was tried at this stage to find out the measures of internal consistency of the attitude scale. Firstly, the Cronbach alpha was estimated on the same initial 137 sample of students for the attitude scale and was obtained as 0.911, also a very high value indicating the internal consistency of all 30 items. Finally, the attitude scale's split-half reliability was calculated on 100 randomly selected PG students and it was found to be 0.81, which is considered to be highly reliable. A copy of the attitude scale for students is enclosed vide Appendix 2.

3.5.2 A self-developed perception cum attitude scale to study the perception and attitude of teachers towards online teaching process

Construction of Perception and Attitude Scale for Teachers: Researcher herself constructed a perception scale and an attitude scale for finding out the perception and attitude of university teachers regarding online teaching. Both the scales used 5-point Likert rating scale rated on a range of strongly agree to strongly disagree. These scales were specifically in the context of online teaching which were further divided into two heads – synchronous and asynchronous online teaching. In light of the experiences acquired during synchronous and asynchronous online teaching, teachers marked how they perceived online teaching process by selecting the best options out of options provided.

The perception scale comprised of both positive and negative statements under the two dimensions synchronous and asynchronous online teaching. Positive statements were rated as 5, 4, 3, 2, and 1 for response strongly agree, agree, neutral, disagree, and strongly disagree respectively and scoring goes reverse for negative statements as 1, 2, 3, 4, 5. The tool was validated for its first draft by 25 experts from the field of Education comprising of 39 statements under two dimensions, 20 items for synchronous and 19 items for asynchronous online teaching. After consulting with the experts, all 39 items were content validated. Owing to long length of the tool the initially first sampled teachers expressed their concern to shorten the tool. Hence through thorough consultation with experts 9 items were retained under synchronous dimension and 11 items were retained under asynchronous dimension all together making 20 items. Then the second draft of the tool was analysed through item analysis procedure (Table 3.7) on 55 teachers and all items were retained. Also, it was tried at this stage to find out the measures of internal consistency of the perception scale. Firstly, the Cronbach alpha was estimated on the same initial 55 sample of teachers for the perception scale and was obtained as 0.891, also a very high value indicating the internal consistency of all 20 items. Finally, the perception scales' split half reliability was calculated on sample of 55 teachers and it was found to be 0.85 which is considered to be highly reliable index. There are 5 negative statements out of 9 statements under the dimension synchronous online teaching and 6 negative items out of 11 statements under asynchronous online teaching. A copy of the perception scale for teachers is provided vide Appendix 3.

The attitude scale comprised of both positive and negative statements under the two dimensions synchronous and asynchronous online teaching. Positive statements get a score of 5,4,3,2,1 for strongly agree, agree, neutral, disagree, strongly disagree options respectively and scoring is reversed for negative statements as 1, 2, 3, 4, 5. The tool was validated for its first draft by 25 experts from the field of Education comprising of 40 statements under two dimensions, 20 items for synchronous and 20 items for asynchronous online teaching. After consulting with the experts, all 40 items were content validated. Owing to long length of the tool the initially first sampled teachers expressed their concern to shorten the tool. Hence

through thorough consultation with the experts, 7 items were retained under synchronous dimension and 5 items were retained under asynchronous dimension. Then the second draft of the tool was analysed through item analysis procedure (Table 3.8) on 55 teachers and all items were retained. Also, it was tried at this stage to find out the measures of internal consistency of the attitude scale. Firstly, the Cronbach alpha was estimated on the same initial 5 sample of teachers for the attitude scale and was obtained as 0.907, also a very high value indicating the internal consistency of all 12 items. Finally, the attitude scales' split half reliability was calculated on sample of 55 teachers and it was found to be 0.94 which is considered to be very highly reliable index. There are 6 negative statements out of 7 statements under the dimension synchronous online learning and 4 negative items out of 5 items under asynchronous online teaching. A copy of the attitude scale for teachers is enclosed vide Appendix 4.

3.5.2.1 Procedure of Item Analysis for constructed scales

For item analysis, a small-scale preliminary study on the perception and attitude scale was conducted from December 2022 to February 2023 at Pachhunga University College (PUC) with the principal's permission. Data were obtained from college teachers and students for this purpose. Additionally, the data was distributed via a hard copy for teachers and a Google Form for students, allowing them to respond at their convenience. Some teacher data was also sampled from Government Aizawl College (GAC) with the principal's permission. Altogether a total of 137 students from PUC and 55 teachers were sampled from PUC and GAC. After the Perception and Attitude scales for students and teachers was administered on 137 students and 55 teachers respectively, the responses were ordered in decreasing sequence, and the top and bottom 27% of the sample were chosen for item analysis. A t-test was then performed to assess the discriminative value of all the items i.e. 30 items for students; perception scale, 30 items for students' attitude scale, 20 items for teachers' perception scale and 12 items for teachers' attitude scale respectively. Statements with 't' value greater than 2.65 (df=70) and 2.78 (df=26) respectively for students' and teachers' data, which indicate statistical significance at the 0.01 confidence level, were retained. Following this process all the 30 items of students'

perception scale, 30 items of students' attitude scale, 20 items of teachers' perception scale and 12 items of teachers' attitude scale were retained.

Table 3.5

Result of item analysis of Students' Perception Scale

Item No.	Item Discrimination 't' value	Significance at 0.01 level (t=2.65*), 0.05 level (t=1.99) Significant-S, Non-Significant-NS	Item Status Accepted-A, Rejected-R
1	6.41	S*	A
(Synchronous)			
2	5.27	S*	A
3	7.31	S*	A
4	6.06	S*	A
5	5.82	S*	A
6	7.90	S*	A
7	6.80	S*	A
8	9.49	S*	A
9	8.85	S*	A
10	9.55	S*	A
11	8.88	S*	A
12	6.81	S*	A
13	7.79	S*	A
14	9.39	S*	A
15	10.19	S*	A
16	6.83	S*	A
(Asynchronous)			
17	8.48	S*	A
18	9.60	S*	A
19	10.28	S*	A
20	9.60	S*	A
21	8.36	S*	A
22	9.56	S*	A
23	8.59	S*	A
24	8.16	S*	A
25	7.15	S*	A
26	8.54	S*	A
27	7.66	S*	A
28	7.10	S*	A
29	7.21	S*	A
30	6.82	S*	A

Table 3.6*Result of item analysis of Students' Attitude Scale*

Item No.	Item Discrimination 't' value	Significance at 0.01 level (t=2.65*), 0.05 level (t=1.99) Significant-S, Non-Significant-NS	Item Status Accepted-A, Rejected-R
1 (Synchronous)	4.98	S*	A
2	6.45	S*	A
3	5.90	S*	A
4	6.83	S*	A
5	4.85	S*	A
6	3.70	S*	A
7	7.19	S*	A
8	7.23	S*	A
9	7.29	S*	A
10	6.44	S*	A
11	6.26	S*	A
12	6.59	S*	A
13	3.87	S*	A
14	7.43	S*	A
15	4.81	S*	A
16 (Asynchronous)	3.89	S*	A
17	7.67	S*	A
18	6.59	S*	A
19	8.37	S*	A
20	7.49	S*	A
21	6.81	S*	A
22	6.86	S*	A
23	4.96	S*	A
24	3.79	S*	A
25	4.36	S*	A
26	3.16	S*	A
27	5.85	S*	A
28	6.78	S*	A
29	5.47	S*	A
30	5.93	S*	A

Table 3.7*Result of item analysis of Teachers' Perception Scale*

Item No.	Item Discrimination 't' value	Significance 0.01 (t=2.78*), level (t=2.05) Significant-S, Non-Significant- NS	at level 0.05	Item Status Accepted-A, Rejected-R
1 (Synchronous)	2.06	S		A
2	3.69	S*		A
3	3.83	S*		A
4	3.60	S*		A
5	5.38	S*		A
6	2.26	S		A
7	2.05	S		A
8	5.02	S*		A
9	4.37	S*		A
10 (Asynchronous)	2.07	S		A
11	6.28	S*		A
12	2.09	S		A
13	4.89	S*		A
14	5.30	S*		A
15	8.15	S*		A
16	4.95	S*		A
17	6.10	S*		A
18	2.06	S		A
19	2.06	S		A
20	4.06	S*		A

Table 3.8*Result of item analysis of Teachers' Attitude Scale*

Item No.	Item Discrimination 't' value	Significance at 0.01 level (t=2.78*), 0.05 level (t=2.05) Significant-S*/S, Non-Significant-NS	Item Status Accepted-A, Rejected-R
1 (Synchronous)	3.33	S*	A
2	4.53	S*	A
3	6.40	S*	A
4	4.52	S*	A
5	4.93	S*	A
6	5.25	S*	A
7	3.35	S*	A
8 (Asynchronous)	2.06	S	A
9	2.92	S*	A
10	2.45	S	A
11	2.54	S	A
12	3.76	S*	A

3.5.3 A self-developed questionnaire to find out the problems faced by teachers and students during synchronous online teaching -learning process and gather suggestions to improve synchronous online teaching-learning.

A questionnaire was constructed for the purpose of examining the challenges faced by students in the synchronous online learning process and to gather suggestions to improve synchronous online learning. The first draft of the questionnaire, comprising 45 items, was prepared on the basis of related literature and cantered on online learning experiences during and after the pandemic. A total of 26 items are included in the Structured Questionnaire, requiring responses through ticking against 'rarely', 'sometimes' or 'always' options according to their experience. The questions also consist of 4 items of Contingency Questionnaire to be responded by follow-up questions, 6 items of Close-Ended Questionnaire to be answered in Yes/No, 9 items of Open-Ended Questionnaire to obtain rich and

descriptive data. The tool was validated for its content by 30 teachers from Education. A copy of the questionnaire is enclosed vide Appendix 5.

Another questionnaire was constructed for the purpose of examining the challenges faced by teachers during synchronous online teaching process and gather suggestions to improve synchronous online teaching. The first draft of the questionnaire, comprising 33 items, was prepared on the basis of related literature and centred on online learning experiences during and after the pandemic. A total of 19 items are included in the Structured Questionnaire, requiring responses through ticking against 'rarely', 'sometimes' or 'always' options according to their experience. The questions also consist of 5 items of Close-Ended Questionnaire to be answered in Yes/No, 9 items of Open-Ended Questionnaire to obtained rich and descriptive data. The tool was validated for its content by 30 teachers from Education. A copy of the questionnaire is enclosed vide Appendix 6.

3.5.4 A self-developed semi-structured interview schedule to qualitatively explore the feelings, problems and suggestions of students towards online teaching-learning process.

To qualitatively investigate the feelings, challenges, and suggestions of postgraduate students regarding the online learning process, a semi-structured interview was developed by the researcher. The initial draft of the interview, consisting of 18 items, was created after reviewing relevant literature to ensure a comprehensive exploration of the subject. The tool was validated for its content by 30 teachers from Education. The purpose of the interview of the students is to triangulate the findings. A copy of the semi-structured interview is enclosed vide Appendix 7.

3.5.5 Attitude Towards Technology scale

The standardized scale of Media and Technology Usage and Attitude scale by Rosen et al. (2013) was employed to find out students' and teachers' attitude towards technology which consists of 16 statements providing five-point Likert scale bearing the headings Strongly Agree (SA), Agree (Agree), Undecided (UD), Disagree (D),

Strongly Disagree (SD) against the statement. This Attitude scale has four sub-scales namely – Positive Attitudes Toward Technology (6 items), Anxiety About Being Without Technology or Dependence on Technology (3 items), Negative Attitudes Towards Technology (3 items) and Preference For Task Switching (4 items). Scoring for item 15 is reversed with Strongly Agree=1 and Strongly Disagree=5. Rest all items are scored as Strongly Agree=5 and Strongly Disagree=1. Both the teachers and students filled the options which suits them best with regard to their attitude towards Technology. A copy of the semi-structured interview is enclosed vide Appendix 8.

3.5.6 Socio-economic Status Scale

The socio-economic status scale developed by Lallianzuali Fanai and R.P.Vadhera (Revised, 2022) was adopted for the purpose of collecting students' SES profile. The scale measures a person's social and economic position relative to others in society. With reference to this scale, socio-economic status of the student family is being studied. The scale which has been developed for this purpose is a point scale where the points range between 0 to 8 depending upon the items or variables under assessment. The nature of the scale is comprehensive and multi-dimensional as it encompasses various aspects of a person's social and economic position. The scale is specially constructed in context of the Mizo society. Students were requested to give information related to the questions by putting tick mark in the place-holder provided against them along with which the questions probable answers are given. Students ticked one of the answers which most suits to their family. Detailed tool and scoring key are attached in the Appendix 9.

3.6 Procedure of Data Collection

At the outset, the researcher developed the checklist of important demographic variables and personal information to be collected from students and teachers, a perception cum attitude scale, among the various tools, the questionnaire and semi-structured interview schedule were employed, and their content validity was established through expert review from institution of MZU and IASE, Aizawl. Between October 2021 and March 2022, tools were developed based on the

corresponding objectives by formulating statements pertaining to the perception and attitude toward online teaching and learning in higher education. After careful review and analysis, the tools were developed and submitted to the experts for necessary revisions before being used for final data collection. An expert opinion was sought on September 23, 2022, where objectives 1 and 2 were reviewed by 20 experts at MZU for content validity, while objectives 2 and 3 were examined by 5 experts at IASE for content validity. For item analysis, a small-scale preliminary study on the perception and attitude scale was conducted from December 2022 to February 2023 at Pachhunga University College with the Principal's permission. Information was obtained from both college teachers and students to serve this purpose. Additionally, the data was distributed via a hard copy for teachers and a Google Form for students, allowing them to respond at their convenience. The results of the item analysis were evaluated using the Split-Half reliability method based on the Spearman-Brown formula. Furthermore, Cronbach Alpha was employed to assess internal consistency of the scale. Both Split-Half Reliability and Content Validity, as assessed by experts, were utilized to make necessary modifications to the tools. The following is a detailed description of procedure of data collection:

The initial phase of data collection commenced on 6 April 2023, targeting fourth-semester postgraduate students from ICFAI University and Mizoram University, all of whom had participated in online learning during the COVID-19 pandemic. This first stage, which focused on assessing students' perceptions and attitudes toward online learning, was completed by May 2023.

Subsequently, the second phase of data collection was undertaken in March 2024, involving university teachers from the same institutions. Data gathering from the teacher cohort concluded in April 2024, thereby completing the collection of responses from both primary stakeholder groups.

In the third session, a qualitative telephonic interview series was undertaken to further enrich the dataset on January 2025. A total of ten students were purposively selected from diverse academic disciplines, including Mathematics,

Geology, Botany, Electrical Engineering, Education, Sociology, and History. The Purposive Sampling technique enabled the selection of participants who could provide in-depth insights into varied disciplinary experiences of online learning. To uphold confidentiality and ethical integrity, participants' identities were masked by substituting their names with their respective departmental titles during transcription and analysis. Thus, the entire dataset was finalized and compiled in January 2025.

3.7 Statistical Techniques for Data Analysis

The gathered data were thoroughly arranged and tabulated to facilitate both quantitative and qualitative analysis. The responses obtained from both teachers and students were accurately tabulated and analyzed statistically. Appropriate descriptive statistics, such as percentages and measures of central tendency, as well as inferential statistics, such as the F-test, t-test, ANOVA, and post-hoc test, were used to examine quantitative data. For qualitative data, basic statistical tools such as frequencies, percentages were applied and the open-ended feedback from students and teachers were analyzed through the technique of thematic content analysis.

CHAPTER-IV

Data Analysis and Interpretations

This chapter deals with the analysis and interpretation of the data collected for the study. The data have been systematically organized, analysed using appropriate statistical techniques, and interpreted in line with the research objectives to draw meaningful conclusions.

The current study was conducted to assess the perceptions and attitudes of university teachers and students towards online teaching and learning in Mizoram. The central purpose of the study is, therefore, to analyse the present condition of online teaching-learning with particular focus on perception and attitude towards online learning for post-graduate students in Mizoram University (MZU), a central university and Institute of Chartered Financial Analysts of India (ICFAI) University, a private university. In current state of affairs these two universities are the only two regular mode universities in Mizoram. Sample of the study consists of 593 students (comprising of 246 males, 347 females) enrolled into different Post-Graduate (PG) departments under different disciplines of Mizoram University and ICFAI University chosen in accordance with disproportionate stratified random sampling technique. Also, a total of 62 teachers teaching (comprising of 42 males, 20 females) at PG level in various discipline departments of Mizoram University, PG courses in ICFAI University were determined on the grounds of stratified random sampling method.

The chapter deals chiefly with analyzing and interpreting data related to the perception and attitude of university teachers and students towards online teaching and learning, problems faced by university teachers and students during online teaching-learning processes and to suggest solutions toward problems in online teaching-learning. Furthermore, an attempt was made to compare the perceptions and attitudes of university teachers and students towards online teaching and learning with regard to their gender, locale, institution, disciplinarity and socio-economic status (SES) and how might it impact the online teaching-learning process. Further, teachers' and students' attitude towards technology was also measured. Hence, the chapter has been divided into sub-sections corresponding to the study's objectives.

A. Descriptive Analysis

4.1. Perception of university teachers and students towards online teaching-learning process

This section discusses the findings of objective 1 which is as follows

- To study the perception of university teachers towards online teaching process
- To study the perception of university students towards online learning process

Table 4.1

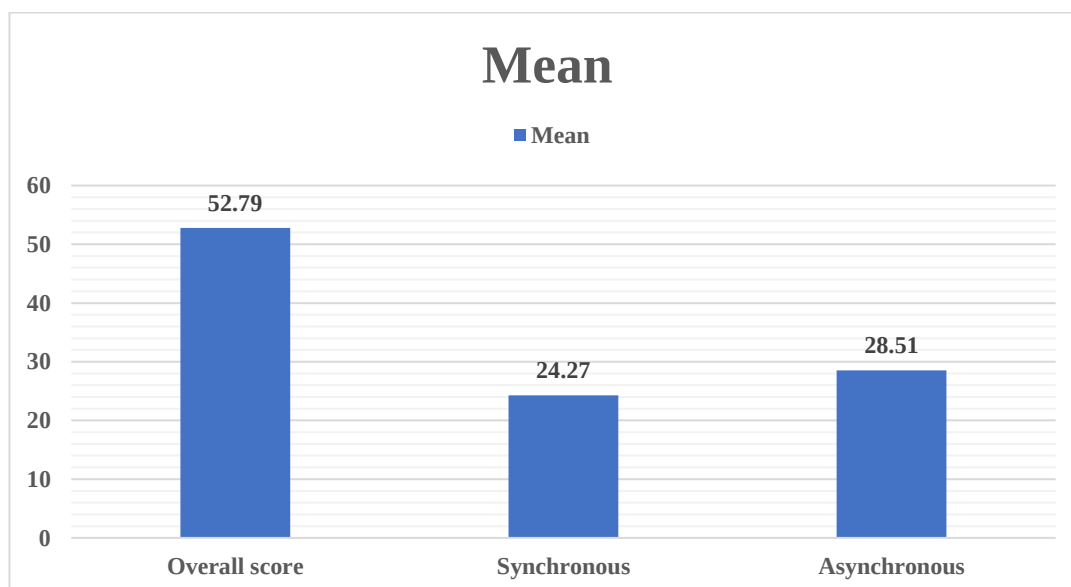
Descriptive Statistics on Perception of University Teachers towards Online Teaching

Modality	Mean	SD	SEM	Minimum	Maximum
Overall Score	52.79	4.77	0.60	43	71
Synchronous	24.27	3.14	0.39	17	35
Asynchronous	28.51	3.21	0.40	21	36

Interpretation of Table 4.1: Table 4.1 provides the description of perception of university teachers towards online teaching. The mean was found to be 52.79 with a standard error of mean to be 0.60 and a standard deviation of 4.77. The maximum score was 71 and the minimum score was 43 respectively. Further it was found that teachers seem to have higher positive perception towards asynchronous modality in comparison to synchronous modality.

Figure 4. 1

Bar Graph illustrating the description of perception of university teachers towards online teaching.



Note: The overall mean score of teachers for online teaching is 52.79. The mean score for Synchronous online teaching is 24.27 while the mean score for Asynchronous online teaching is 28.51 indicating that University Teachers have higher positive perception towards Asynchronous modality in comparison to Synchronous modality.

Table 4.2

Categorization of University Teachers' Perception towards Online Teaching

Categories	Score Interval	Frequency	Percentage
Positive Perception	Above 56 (57 – 71)	12	19.35%
Moderate/Neutral Perception	49 - 56	40	64.52%
Negative Perception	Below 50 (47-43)	10	16.12%
Total		62	

Table 4.2 shows the classification of teachers' perception towards online teaching based on statistical assumption of Mean $\pm$ 1 SD. Based on this computation maximum percentage of 65% teachers falling in score range of 49-56 were found to possess a moderate or neutral perception towards online teaching, and around 19% of teacher possess a positive perception and 16% of them exhibit a negative perception.

Figure 4. 2

Pie Chart illustrating the Percentage of University Teachers' Perception towards Online Teaching

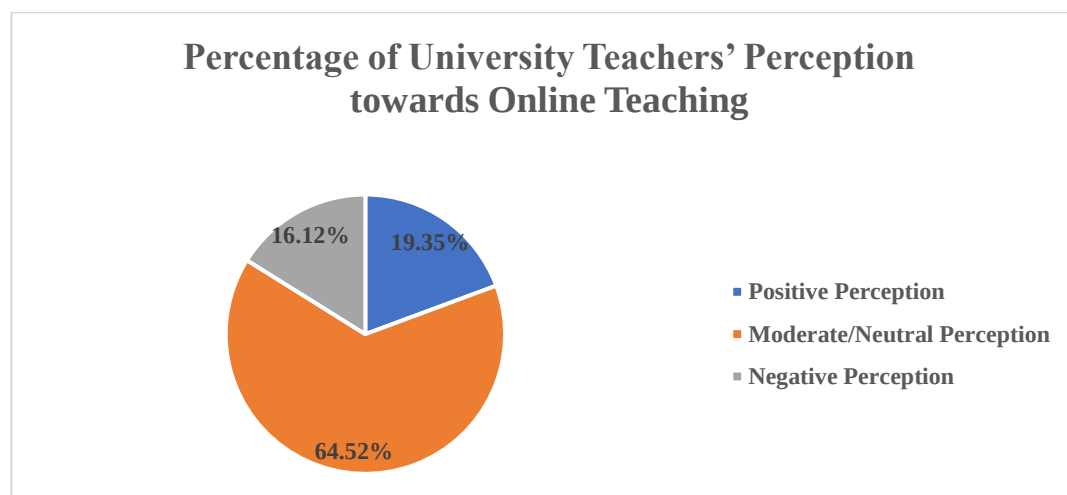


Table 4.3

Descriptive Statistics on Perception of University Students towards Online Learning

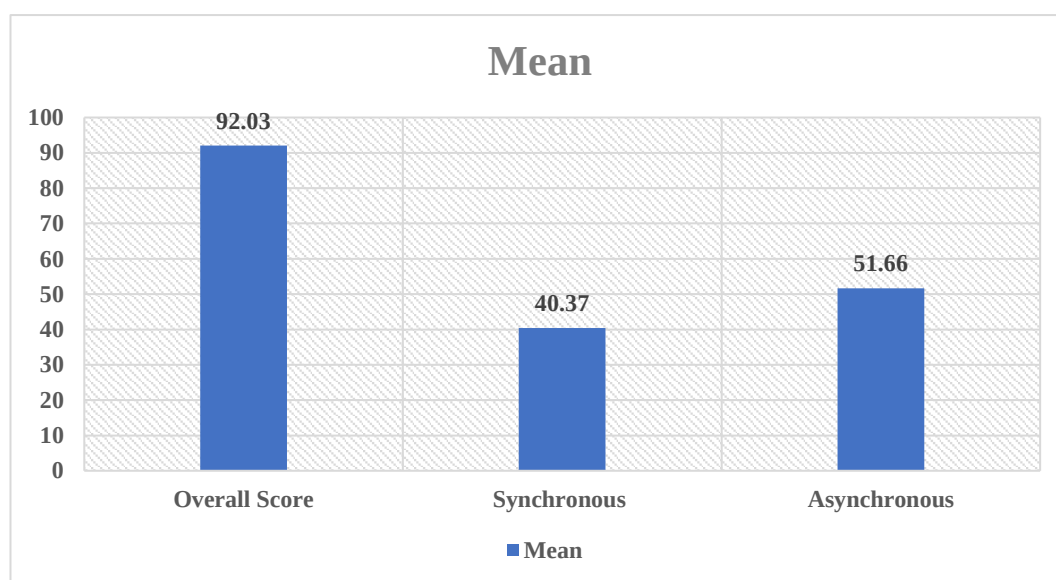
Modality	Mean	SD	SEM	Minimum	Maximum
Overall Score	92.03	12.39	0.50	48	128
Synchronous	40.37	7.59	0.31	15	67
Asynchronous	51.66	7.87	0.32	15	75

Interpretation of Table 4.3: Table 4.3 provides the description of perception of university students towards online learning. The mean was found to be 92.03 with a

standard error of mean to be 0.5 and a standard deviation of 12.39. The maximum score was 128 and the minimum score was 48. Further it was found that students seem to have higher positive perception towards asynchronous modality in comparison to synchronous modality.

Figure 4.3

Bar Graph illustrating the description of perception of university students towards online learning



Note: The overall mean score of students for online learning is 92.03. The mean score for Synchronous online learning is 40.37 while the mean score for Asynchronous online learning is 51.66 indicating that University Students have higher positive perception towards Asynchronous modality in comparison to synchronous modality.

Table 4.4

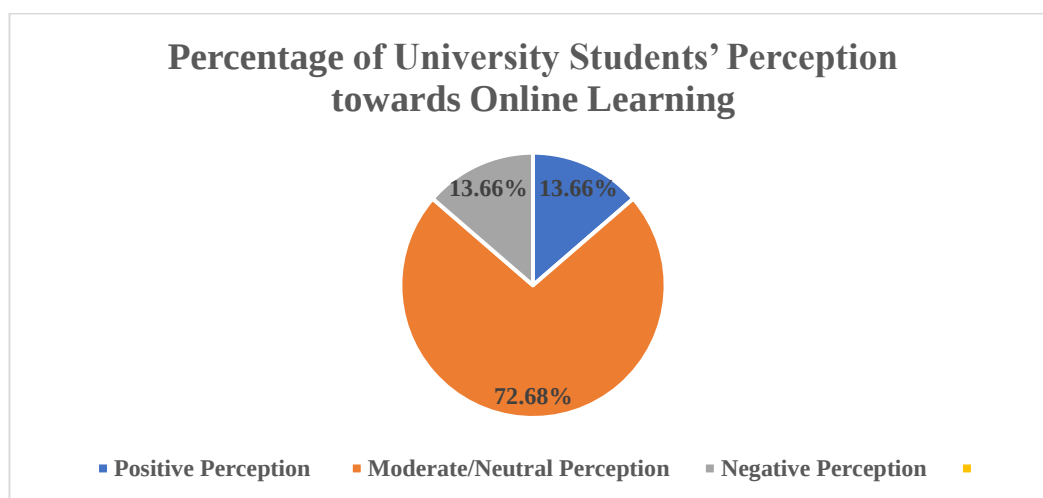
Categorization of University Students' Perception towards Online Learning

Categories	Score Interval	Frequency	Percentage
Positive Perception	Above 104 (128-105)	81	13.66%
Moderate/Neutral Perception	104-80	431	72.68%
Negative Perception	Below 80 (79- 48)	81	13.66%
Total		593	100%

Table 4.4 shows the classification of student's perception towards online learning based on statistical assumption of Mean $\pm$ 1 SD. Based on this computation maximum percentage of 72% students falling in score range of 80 -104 were found to possess a moderate or neutral perception towards online learning, and around 13% of students possess a positive perception and 13% of them exhibit a negative perception.

Figure 4.4

Pie Chart illustrating the Percentage of University Students' Perception towards Online Learning



4.2. Attitude of university teachers and students towards online teaching-learning process.

This section discusses the findings of objective 2 which is as follows

- To study the attitude of university teachers towards online teaching process
- To study the attitude of university students towards online learning process

Table 4.5

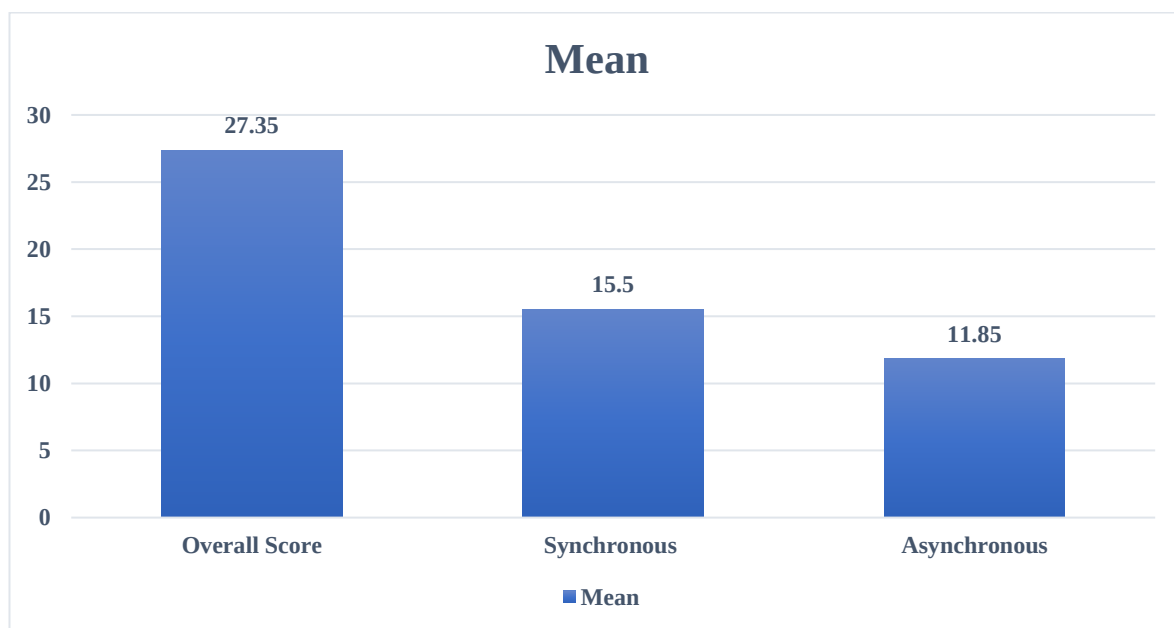
Descriptive Statistics on Attitude of University Teachers towards Online Teaching

Modality	Mean	SD	SEM	Minimum	Maximum
Overall Score	27.35	4.69	0.59	18	38
Synchronous	15.5	3.14	0.39	10	22
Asynchronous	11.85	2.78	0.35	7	21

Interpretation of Table 4.5: Table 4.5 provides the description of attitude of university teachers towards online teaching. The mean was found to be 27.35 with a standard error of mean to be 0.59 and a standard deviation of 4.69. The maximum score was 38 and the minimum score was 18 respectively. Further it was found that teachers seem to have higher positive attitude towards synchronous modality in comparison to asynchronous modality.

Figure 4.5

Bar Graph illustrating the description of attitude of university teachers towards online teaching



Note: The overall mean score of teachers for online teaching is 27.35. The mean score for Synchronous online teaching is 15.5 while the mean score for Asynchronous online teaching is 11.85 indicating that University Teachers have higher positive attitude towards Synchronous modality in comparison to Asynchronous modality.

Table 4.6

Categorization of University Teachers' Attitude towards Online Teaching

Categories	Score Interval	Frequency	Percentage
Positive Attitude	Above 31 (32-38)	13	20.96%
Moderate/Neutral Attitude	23-31	10	62.90%
Negative Attitude	Below 23 (18-22)	39	16.12%
Total		62	

Table 4.6 shows the classification of teachers' attitude towards online teaching based on statistical assumption of $\text{Mean} \pm 1 \text{ SD}$. Based on this computation maximum

percentage of 63% teachers falling in score range of 23-31 were found to possess a moderate or neutral attitude towards online teaching, and around 21% of teacher possess a positive attitude and 16% of them exhibit a negative attitude.

Figure 4.6

Pie Chart illustrating the Percentage of University Teachers' Attitude towards Online Teaching

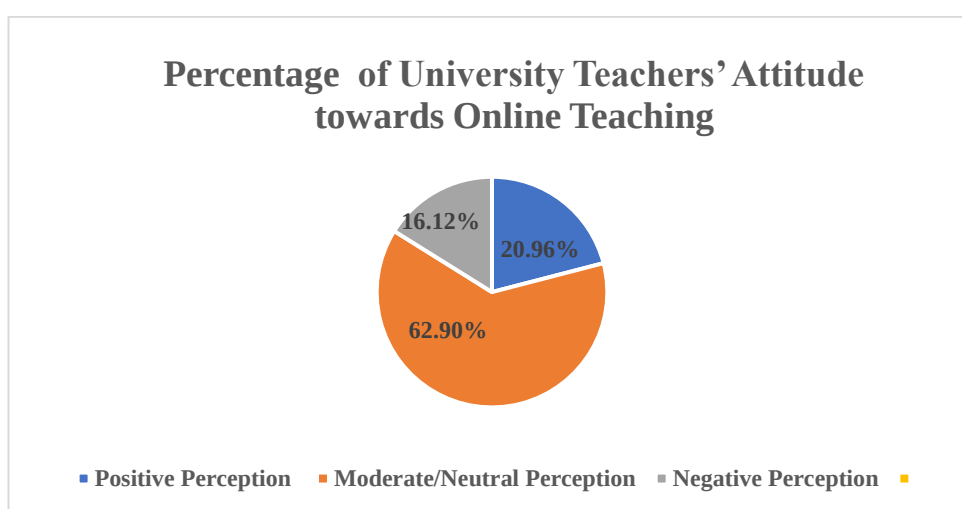


Table 4.7

Descriptive Statistics on Attitude of University Students towards Online Learning

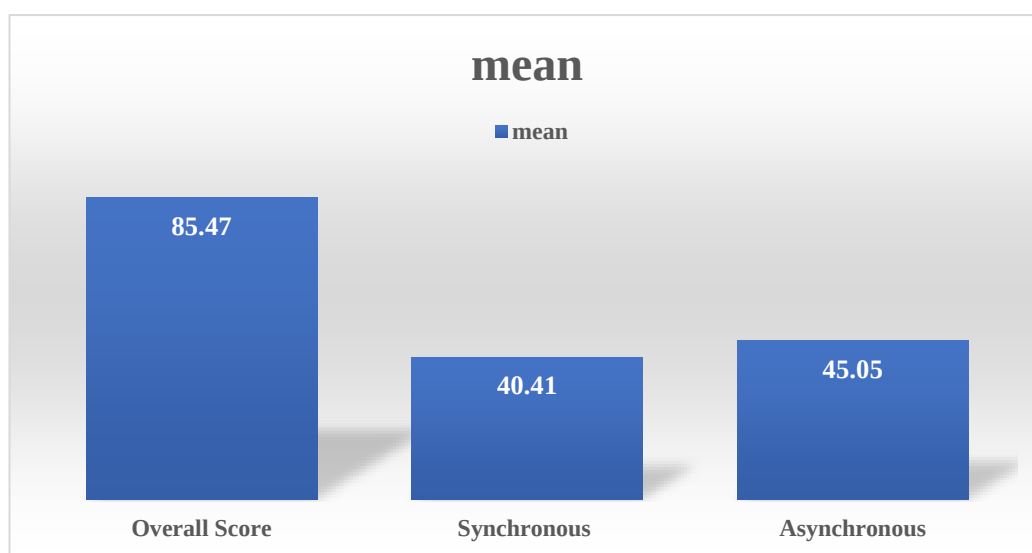
Modality	Mean	SD	SEM	Minimum	Maximum
Overall Score	85.47	10.98	0.45	53	139
Synchronous	40.41	7.47	0.30	18	69
Asynchronous	45.05	5.65	0.23	28	74

Interpretation of Table 4.7: Table 4.7 provides the description of attitude of university students towards online learning. The mean was found to be 85.47 with a standard

error of mean to be 0.45 and a standard deviation of 10.98. The maximum score was 139 and the minimum score was 53. Further it was found that students seem to have higher positive attitude towards asynchronous modality in comparison to synchronous modality.

Figure 4.7

Bar Graph illustrating the description of attitude of university students towards online learning.



Note: The overall mean score of students for attitude towards online learning is 85.47. The mean score for Synchronous online teaching is while 40.41 the mean score for Asynchronous online teaching is 45.05 indicating that University Students have higher positive attitude towards Asynchronous modality in comparison to Synchronous modality.

Table 4.8

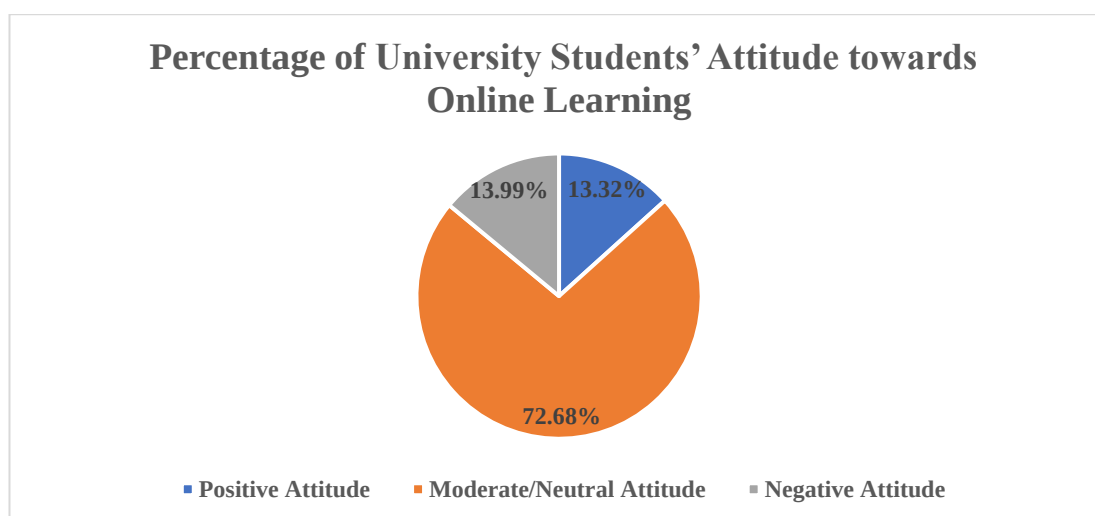
Categorization of University Students' Attitude towards Online Learning

Categories	Score Interval	Frequency	Percentage
Positive Attitude	Above 96 (97-139)	79	13.32%
Moderate/Neutral Attitude	96-75	431	72.68%
Negative Attitude	Below 75 (74-53)	83	13.99%
Total		593	100%

Table 4.8 shows the classification of student's attitude towards online learning based on statistical assumption of $\text{Mean} \pm 1 \text{ SD}$. Based on this computation maximum percentage of 72.68% students falling in score range of 96-75 were found to possess a moderate or neutral attitude towards online learning, and around 13% of students possess a positive attitude and 14% of them exhibit a negative attitude.

Figure 4.8

Pie Chart illustrating the Percentage of University Students' Attitude towards Online Learning



4.3. To find out the university students' and teachers' attitude towards technology

This section discusses the findings of objective 3 which is as follows

- To find out university teachers' attitude towards technology
- To find out university students' attitude towards technology

Table 4.9

Descriptive Analysis on Teachers' Attitude Towards Technology

Mean	SD	SEM	Minimum	Maximum
55.91	6.82	0.81	34	67

Interpretation of Table 4.9: Table 4.9 provides the description of teachers' attitude towards technology. The mean was found to be 55.91 with a standard error of mean to be 0.81 and a standard deviation of 6.82. The maximum score was 67 and the minimum score was 34.

Table 4.10

Categorization of University Teachers' Attitude towards Technology

Categories	Score Interval	Frequency	Percentage
Positive Attitude	Above 61 (62-67)	9	14.52%
Moderate/Neutral Attitude	61-50	43	69.35%
Negative Attitude	Below 50 (48-34)	10	16.12%
Total		62	100%

Table 4.10 shows the classification of teachers' attitude towards technology based on statistical assumption of $\text{Mean} \pm 1 \text{ SD}$. Based on this computation maximum percentage of 69.35% teachers falling in score range of 61-50 were found to possess a moderate or neutral attitude towards technology, and around 15% of teachers possess a positive attitude and 16% of them exhibit a negative attitude.

Figure 4.9

Pie Chart illustrating the Percentage of University Teachers' Attitude towards Technology

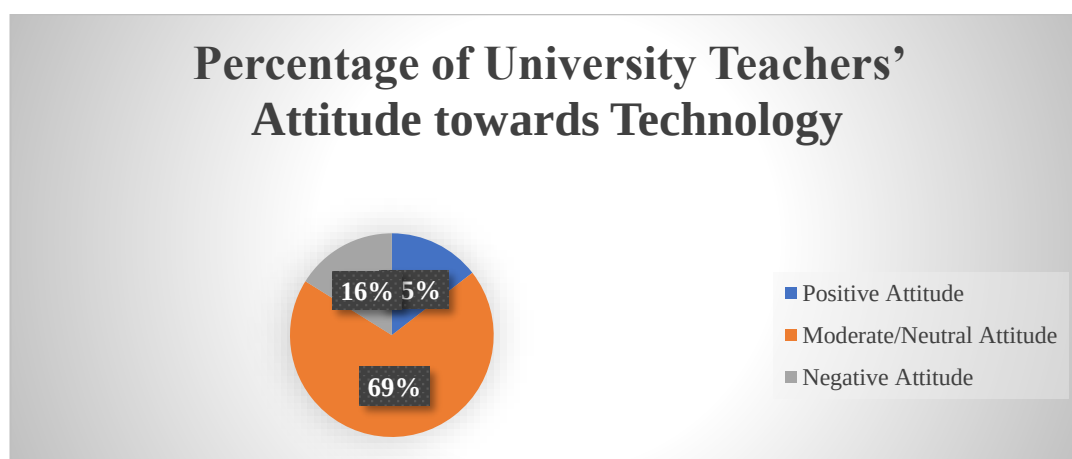


Table 4.11

Descriptive Statistics on Students' Attitude Towards Technology

Mean	SD	SEM	Minimum	Maximum
85.47	10.98	0.45	53	139

Interpretation of Table 4.11: Table 4.11 provides the description of students' attitude towards technology. The mean was found to be 85.47 with a standard error of mean to be 0.45 and a standard deviation value of 10.98. The maximum score was 139 and the minimum score was 53.

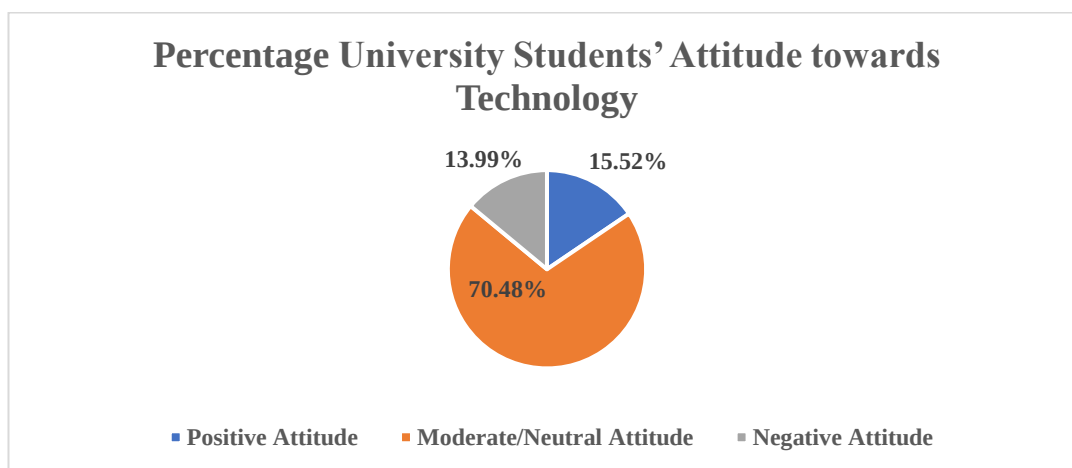
Table 4.12*Categorization of University Students' Attitude towards Technology*

Categories	Score Interval	Frequency	Percentage
Positive Attitude	Above 95 (96-139)	92	15.52%
Moderate/Neutral Attitude	95-75	418	70.48%
Negative Attitude	Below 75 (74-53)	83	13.99%
Total		593	100%

Table 4.12 shows the classification of student's attitude towards online learning based on statistical assumption of $\text{Mean} \pm 1 \text{ SD}$. Based on this computation maximum percentage of 70.48% students falling in score range of 95-75 were found to possess a moderate or neutral attitude towards technology, and around 15% of students possess a positive attitude and 14% of them exhibit a negative attitude.

Figure 4.10

Pie Chart illustrating the Percentage of University Students' Attitude towards Technology



4.4. Exploration of the usage of technology and teaching-learning platforms among university teachers and students of different disciplines.

This section deals with objective 4 which are as following:

- To explore the usage of technology and teaching-learning platforms among university teachers of different disciplines
- To explore the usage of technology and teaching-learning platforms among university students of different disciplines

Table 4.13 describes the devices and teaching-learning platforms used by the University faculty and post graduate learners.

Table 4.13*Usage of Technology and Teaching-Learning Platforms by Teachers and Students*

Respondents	Technology-Devices	Teaching-Learning platforms
Teachers	PC, Laptops, Mobile Phones, Smart TV and Tablets	Google classroom, Zoom Meet, WhatsApp, Google Drive, Google Meet, Webex, Microsoft Teams, Cisco
Students	PC, Laptops, Mobile Phones and Tablets	Google classroom, Zoom Meet, WhatsApp, Google Drive, Google Meet, Webex, Microsoft Teams, Cisco and You-tube

Table 4.13 shows the findings for objective 4. Technology usage by university teachers was limited to use of Personal Computer, Laptops and occasionally Mobile Phones. Some teachers also mentioned of using Smart TV and Tablets for conducting online classes.

Moreover, it is evident from the findings that the most commonly used teaching-learning platforms used by university teachers were – Google classroom, Zoom Meet, WhatsApp, Google Drive, Google Meet. However, some Department like Education mentioned Webex and Telegram, Management mentioned ChatGPT, Social Sciences mentioned Telegram, Webex and Cisco, School of Engineering mentioned Microsoft Teams and Cisco.

It is further evident that the technology usage by post-graduate students is quite optimal. It was found that most students used Mobile Phone and Laptops for attending their online classes. Some students also mentioned of having Personal Computer and very few mentioned about having a Tablet.

Further the findings shows that the most commonly used teaching-learning platforms used by university students were – Google classroom, Zoom Meet, WhatsApp, Google Drive, Google Meet. However, department of Mizo mentioned about Webex and some departments of Engineering also mentioned Microsoft Teams and Cisco. Exceptionally some departments like Commerce and Mass Communication mentioned about You-tube platform.

B. Inferential Analysis:

4.5 Comparison of university students' perception and attitude for online learning with respect to gender, locale, socio-economic status, disciplinarity and type of institution.

This section discusses the findings of objective 5 which is as follows

- To compare the perception of university students with respect to their gender
- To compare the attitude of university students with respect to their gender
- To compare the perception of university students with respect to their locale
- To compare the attitude of university students with respect to their locale
- To compare the perception of university students with respect to their socio-economic status
- To compare the attitude of university students with respect to their socio-economic status
- To compare the perception of university students with respect to their disciplinarity
- To compare the attitude of university students with respect to their disciplinarity
- To compare the perception of university students with respect to type of institution
- To compare the attitude of university students with respect to type of institution

Objective: To compare the perception of university students towards online learning with respect to their gender.

To compare students' perceptions of online learning based on gender, an independent samples t-test assuming equal variances was conducted. The F-ratio was

calculated to compare the variances of the two groups, with females having the higher variance and males the lower. Since the F statistic (0.93) was less than the critical F value (1.26) at $\alpha = 0.025$ for a two-tailed test with degrees of freedom (346, 245), the assumption of equal variances was considered valid.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in students' perception towards online learning with respect to their gender.*

Table 4.14

Significance of Difference between Mean Scores on Students' Perception towards Online Learning with respect to Gender

Gender	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
Male	246	91.26	12.12	0.77	1.29	591	NS	Accepted
Female	347	92.60	12.55	0.67				

Interpretation of Table 4.14: Table 4.14 shows that the calculated t value (1.29) is not significant at the 0.05 level, with 591 degrees of freedom, as the critical t value (1.96) for a two-tailed test is greater than the obtained t value. This indicates that university students' perceptions of online learning do not differ significantly by gender. Therefore, the null hypothesis is retained.

Objective: *To compare the Attitude of university students towards online learning with respect to their gender.*

To compare students' attitude of online learning based on gender, an independent samples t-test assuming equal variances was conducted. The F-ratio was calculated to compare the variances of the two groups, with females having the higher

variance and males the lower. Since the F statistic (0.92) was less than the critical F value (1.26) at $\alpha = 0.025$ for a two-tailed test with degrees of freedom (346, 245), the assumption of equal variances was considered valid.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in university students' attitude towards online learning with respect to their gender.*

Table 4.15

Significance of Difference between Mean Scores on Students' Attitude towards Online Learning with respect to Gender

Gender	Number	Mean	SD	SEM	t-value	Df	Significance of Difference	Decision on Null Hypothesis
Male	246	85.30	10.73	0.68	0.32	591	NS	Accepted
Female	347	85.59	11.17	0.59				

Interpretation of Table 4.15: Table 4.15 shows that the calculated t value (0.32) is not significant at the 0.05 level, with 591 degrees of freedom, as the critical t value (1.96) for a two-tailed test is greater than the obtained t value. This indicates that university students' attitude of online learning does not differ significantly by gender. Therefore, the null hypothesis is retained.

Objective: *To compare the perception of university students towards online learning with respect to their locale.*

To compare students' perception of online learning based on locale, an independent samples t-test assuming equal variances was conducted. The F-ratio was calculated to compare the variances of the two groups, with rural having the higher variance and urban the lower. Since the F statistic (1.08) was less than the critical F value (1.26) at $\alpha = 0.025$ for a two-tailed test with degrees of freedom (270, 321), the assumption of equal variances was considered valid.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in student's perception towards online learning with respect to their locale.*

Table 4.16

Significance of Difference between Mean Scores on Students' Perception towards Online Learning with respect to Locale

Locale	Number	Mean	SD	SEM	t-value	df	Significance of difference	Decision on Null Hypothesis
Rural	271	91.78	12.66	0.77	0.46	591	NS	Accepted
Urban	322	92.26	12.16	0.67				

Interpretation of Table 4.16: Table 14.6 shows that the calculated t value (0.46) is not significant at the 0.05 level, with 591 degrees of freedom, as the critical t value (1.96) for a two-tailed test is greater than the obtained t value. This indicates that university students' perception of online learning does not differ significantly by locale. Therefore, the null hypothesis is retained.

Objective: *To compare the attitude of university students towards online learning with respect to their locale.*

To compare students' attitude of online learning based on locale, an independent samples t-test assuming equal variances was conducted. The F-ratio was calculated to compare the variances of the two groups, with urban having the higher variance and rural the lower. Since the F statistic (0.84) was less than the critical F value (1.25) at $\alpha = 0.025$ for a two-tailed test with degrees of freedom (321,270), the assumption of equal variances was considered valid.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in students' attitude towards online learning with respect to their locale.*

Table 4.17

Significance of Difference between Mean Scores on Students' Attitude towards Online Learning with respect to Locale

Locale	Number	Mean	SD	SEM	t-value	df	Significance of difference	Decision on Null Hypothesis
Rural	271	85.72	10.48	0.63	0.49	591	NS	Accepted
Urban	322	85.27	11.40	0.63				

Interpretation of Table 4.17: Table 4.17 shows that the calculated t value (0.49) is not significant at the 0.05 level, with 591 degrees of freedom, as the critical t value (1.96) for a two-tailed test is greater than the obtained t value. This indicates that university students' attitude of online learning does not differ significantly by locale. Therefore, the null hypothesis is retained.

Objective: To compare the perception of university students towards online learning with respect to their Socio-Economic Status.

To compare students' perception towards online learning further with respect to their SES, statistical test of one-way Analysis of Variance (ANOVA) was conducted dividing students into three groups namely Lower SES, Middle SES and Upper SES. For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in university students' perception towards online learning with respect to their SES.*

Table 4.18

One-way ANOVA of Students' Perception towards Online Learning with respect to Socio-Economic Status (SES)

Source of Variance	df	Sum of Squares (SS)	Mean Square (variance)	F-Value	F-critical	Level of Significance
Between Groups	2	1114.79	557.39			
Within Groups	590	89739.88	152.10	3.66	3.01	0.05
Total	592	90854.68				

Interpretation of Table 14.8: Table 4.18 shows that the calculated F-value of 3.66 is significant at the 0.05 level, with degrees of freedom 2 for the numerator (df1) and 590 for the denominator (df2). The critical F-value of 3.01 is less than the obtained F-value, indicating a significant difference in students' perceptions of online learning based on their socio-economic status. As the ANOVA result is significant, the null hypothesis is rejected.

Hence a post-hoc analysis of independent t-test was performed using Bonferroni correction. Bonferroni corrected post-test t-test indicates that upper SES students' perception is significantly higher than middle SES students' perception, there being a 95% chance of middle SES group students' perception towards online learning different from upper SES group students' perception towards online learning.

Objective: To compare the attitude of university students with respect to their socio-economic status (SES).

To compare students' attitude towards online learning further with respect to their SES, statistical test of one-way Analysis of Variance (ANOVA) was conducted dividing students into three groups namely Lower SES, Middle SES and Upper SES. For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in university student's attitude towards online learning with respect to their SES.*

Table 4.19

One-way ANOVA for Students' Attitude towards Online Learning with respect to Socio-Economic Status

Source of Variance	Df	Sum of Squares (SS)	Mean Square (variance)	F-Value	F-critical	Level of Significance
Between Groups	2	1432.8	716.4			
Within Groups	590	70021.14	118.68	6.04	3.01	0.05
Total	592	71453.94				

Interpretation of Table 4.19: Table 4.19 shows that the calculated F-value of 6.04 is significant at the 0.05 level, with degrees of freedom 2 for the numerator (df1) and 590 for the denominator (df2). The critical F-value of 3.01 is less than the obtained F-value, indicating a significant difference in students' attitudes toward online learning based on their socio-economic status (SES). Therefore, the ANOVA result is significant, and the null hypothesis is rejected.

Hence a post-hoc analysis of independent t-test was performed using Bonferroni correction and a Bonferroni corrected post-test t-test indicates that lower SES students' attitude is significantly positively higher than middle SES students' attitude. There is a 95% chance of middle SES group students' attitude towards online learning different from lower SES group students' attitude.

Objective: *To compare the university students' perception towards online learning with respect to their disciplinary.*

To compare students' perceptions of online learning based on their disciplinary, an independent samples t-test assuming equal variances was conducted. The F-ratio was calculated to compare the variances of the two groups, with non-

STEM students showing the higher variance and STEM students the lower. Since the F statistic (1.13) is less than the critical F value (1.27) at $\alpha = 0.025$ for a two-tailed test with degrees of freedom (391, 200), the assumption of equal variances was considered valid.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in students' perception towards online learning with respect to their disciplinary.*

Table 4.20

Significance of Difference between Students' Mean Scores on Students' Perception towards Online Learning with respect to Disciplinary

Disciplinary	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
Non-STEM	392	92.36	12.63	0.63	0.88	591	NS	Accepted
STEM	201	91.41	11.88	0.83				

Interpretation of Table 4.20: Table 4.20 shows that the calculated t value (0.88) is not significant at the 0.05 level, with 591 degrees of freedom, as the critical t value (1.96) for a two-tailed test is greater than the obtained t value. This indicates that university students' perceptions of online learning do not differ significantly based on their disciplinary background. Therefore, the null hypothesis is retained.

Objective: *To compare the university students' attitude towards online learning with respect to their disciplinary.*

To compare students' attitude of online learning based on their disciplinary, an independent samples t-test assuming equal variances was conducted. The F-ratio was calculated to compare the variances of the two groups, with non-STEM students showing the higher variance and STEM students the lower. Since the F statistic (1.20) is less than the critical F value (1.27) at $\alpha = 0.025$ for a two-tailed test with degrees of freedom (391, 200), the assumption of equal variances was considered valid.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no significant difference in students' attitude towards online learning with respect to their disciplinary.*

Table 4.21

Significance of Difference between Students' Mean Scores on Attitude towards Online Learning with respect to Disciplinary

Disciplinary	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
Non-STEM	392	85.72	11.32	0.57	0.75	591	NS	Accepted
STEM	201	85	10.30	0.72				

Interpretation of Table 4.21: Table 4.21 shows that the calculated t value (0.79) is not significant at the 0.05 level, with 591 degrees of freedom, as the critical t value (1.96) for a two-tailed test is greater than the obtained t value. This indicates that university students' attitude of online learning does not differ significantly based on their disciplinary background. Therefore, the null hypothesis is retained.

Objective: *To compare the perception of university students with respect to their type of institution*

To compare students' perceptions of online learning based on the type of institution, an independent samples t-test (assuming equal variances) was applied. The assumption of equal variances was tested using the F-ratio, calculated between the larger variance (MZU) and the smaller variance (ICFAI). Since the obtained F value (0.79) was less than the critical F value (1.29) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (415,176), the assumption of homogeneity of variance was satisfied.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in students' perception towards online learning with respect to their type of institution.*

Table 4.22

Significance of Difference between Students' Mean Scores on Perception towards Online Learning with respect to Type of Institution

Institution	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
ICFAI	177	93.16	11.39	0.85	1.44	591	NS	Accepted
MZU	416	91.56	12.77	0.62				

Interpretation of Table 4.22: Table 4.22 shows that the calculated t value (1.44) is not significant at the 0.05 level, with 591 degrees of freedom. Since the critical t value (1.96) for a two-tailed test is greater than the obtained t value, it indicates that university students' perceptions of online learning do not differ significantly based on their type of institution. Therefore, the null hypothesis is accepted.

Objective: To compare the attitude of university students with respect to their type of institution

To compare students' attitude of online learning based on the type of institution, an independent samples t-test (assuming equal variances) was applied. The assumption of equal variances was tested using the F-ratio, calculated between the larger variance (ICFAI) and the smaller variance (MZU). Since the obtained F value (1.04) was less than the critical F value (1.29) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (176, 415), the assumption of homogeneity of variance was satisfied. For the purpose of testing a null hypothesis was formulated as follows:

H₀: *There is no statistically significant difference in students' attitude towards online learning with respect to their type of institution.*

Table 4.23

Significance of Difference between Students' Mean Scores on Students' Attitude towards Online Learning with respect to Type of Institution

Institution	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
ICFAI	177	87.74	11.05	0.83	3.30	591	S	Rejected
MZU	416	84.51	10.82	0.53				

Interpretation of Table 4.23: Table 4.23 indicates that the computed t value (3.30) is statistically significant at the 0.05 level with 591 degrees of freedom. Since the obtained t value exceeds the critical t value (1.96) for a two-tailed test, it suggests that university students' attitudes toward online learning differ significantly based on their type of institution. Therefore, the null hypothesis is rejected. ICFAI students were found to possess higher positive attitude towards online learning.

4.6 Comparison of university teachers' perception and attitude for online teaching with respect to gender, disciplinarity and type of institution.

This section discusses the findings of objective 6 which is as follows

- To compare the perception of university teachers with respect to their gender
- To compare the attitude of university teachers with respect to their gender
- To compare the perception of university teachers with respect to their disciplinarity
- To compare the attitude of university teachers with respect to their disciplinarity
- To compare the perception of university teachers with respect to their type of institution
- To compare the attitude of university teachers with respect to their type of institution

Objective: To compare the perception of university teachers towards online teaching with respect to their gender.

To compare teachers' perceptions of online teaching in relation to gender, an independent samples t-test (assuming equal variances) was conducted. The equality of variances was verified using the F-ratio, calculated between the larger variance (males) and the smaller variance (females). Since the obtained F value (1.24) was lower than the critical F value (2.32) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (41, 19), the assumption of homogeneity of variance was confirmed.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in teacher's perception towards online teaching with respect to their gender.*

Table 4.24

Significance of Difference between Mean Scores on Teachers' Perception towards Online Teaching with respect to Gender

Gender	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
Male	42	53.54	4.82	0.74	1.84	60	NS	Accepted
Female	20	51.2	4.33	0.96				

Interpretation of Table 4.24: Table 4.24 shows that the calculated t value (1.84) is not significant at the 0.05 level with 60 degrees of freedom. Since the critical t value (2.0) for a two-tailed test is greater than the obtained t value, it indicates that university teachers' perceptions of online teaching do not differ significantly by gender. Thus, the null hypothesis is retained.

Further owing to the small sample size of groups of university teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test

Table 4.25

Comparison of University Teachers' Perception towards Online Teaching with respect to their Gender

Group	N	Mean Rank	Mann-Whitney U	Asymptotic Significant (2-sided test)	Decision on H_0
Male	42	34.23	305.5	0.08	Accepted
Female	20	25.78			

NS means non-significant

Interpretation of Table 4.25: Table 4.25 shows the comparison of the perception of university teachers towards online teaching on the basis of their gender using a Mann-Whitney U test. The test revealed insignificant differences in the perception towards online teaching between male (Median= 54, N= 42) and female (Median= 52, N= 20) university teachers, U Statistics= 305.5, $z= 1.73$, $p= 0.08 > 0.05$ level of significance, $r=0.21$. Hence the null hypothesis was accepted.

Objective: To compare the attitude of university teachers towards online teaching with respect to their gender.

To compare teachers' attitudes toward online teaching based on gender, an independent samples t-test (assuming equal variances) was carried out. The assumption of equal variances was tested using the F-ratio, computed between the larger variance (males) and the smaller variance (females). As the obtained F value (1.21) was less than the critical F value (2.32) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (41, 19), the condition of homogeneity of variance was satisfied.

For the purpose of testing a null hypothesis was formulated as follows:

H₀: *There is no statistically significant difference in teacher's attitude towards online teaching with respect to their gender.*

Table 4.26

Significance of Difference between Mean Scores on Teachers' Attitude towards Online Teaching with respect to Gender

Gender	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
Male	42	28.09	4.73	0.73	1.83	60	NS	Accepted
Female	20	25.8	4.29	0.96				

Interpretation of Table 4.26: A reference to the Table 4.26 reveals that the obtained t value (1.83) was found to be insignificant at 0.05 level with degrees of freedom 60, 't' critical value (2.0) for 2 tailed analyses being > obtained 't' value. It means that attitude of university teachers towards online teaching does not significantly differ with respect to gender. Hence, the null hypothesis is retained.

Further owing to the small sample size of groups, the investigator decided to conduct a non-parametric equivalent statistic for student t-test

Table 4.27

Comparison of University Teachers' Attitude towards Online Teaching with respect to their Gender

Group	N	Mean Rank	Mann-Whitney U	Asymptotic Significant (2-sided test)	Decision on H ₀
Male	42	34.15	308.5	0.09	Accepted
Female	20	25.93			

NS means non-significant

Interpretation of Table 4.27: Table 4.27 shows the comparison of the attitude of university teachers towards online teaching on the basis of their gender using a Mann-Whitney U test. The test revealed insignificant differences in the attitude towards online teaching between male (Median=27, N= 42) and female (Median=25, N= 20) university teachers, U Statistics= 308.5, $z = 1.68$, $p = 0.09 > 0.05$ level of significance, $r = 0.21$. Hence the null hypothesis was accepted.

Objective: To compare the university teachers' perception towards online teaching with respect to their disciplinarity.

To compare teachers' perceptions of online teaching across disciplinarity, an independent samples t-test (assuming equal variances) was employed. The homogeneity of variances was tested using the F-ratio, computed between the larger variance (STEM) and the smaller variance (non-STEM). Since the obtained F value (0.78) was lower than the critical F value (2.09) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (32,28), the assumption of equal variances was confirmed.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in teachers' perception towards online teaching with respect to their disciplinarity.*

Table 4.28

Significance of Difference between Teachers' Mean Scores on Perception towards Online Teaching with respect to Disciplinarity

Disciplinarity	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
Non-STEM	29	52.93	4.49	0.83	0.21	60	NS	Accepted
STEM	33	52.66	5.06	0.88				

Interpretation of Table 4.28: Table 4.28 shows that the calculated t value (0.21) is not significant at the 0.05 level with 60 degrees of freedom. As the critical t value (2.00) for a two-tailed test is greater than the obtained t value, it indicates that university teachers' perceptions of online teaching do not differ significantly by disciplinarity. Therefore, the null hypothesis is retained.

Further owing to the small sample size groups of university teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test

Table 4.29

Comparison of University Teachers' Perception towards Online Teaching with respect to their Disciplinarity

Group	N	Mean Rank	Mann-Whitney U	Asymptotic Significant (2-sided test)	Decision on H_0
STEM	33	29.86	424.5	0.445	Accepted
Non-STEM	29	33.36			

NS means non-significant

Interpretation of Table 4.29: Table 4.29 shows the comparison of the perception of university teachers towards online teaching on the basis of their disciplinarity using a Mann-Whitney U test. The test revealed insignificant differences in the perception towards online teaching between STEM (Median=52, N= 33) and non-STEM (Median=54, N= 29) university teachers, U Statistics=424.5, $z=0.765$, $p=0.445 > 0.05$ level of significance, $r=0.09$. Hence the null hypothesis was accepted.

Objective: To compare the university teachers' attitude towards online teaching with respect to their disciplinarity.

To compare teachers' attitudes toward online teaching based on disciplinarity, an independent samples t-test (assuming equal variances) was conducted. The equality of variances was assessed using the F-ratio, calculated between the larger variance (STEM) and the smaller variance (non-STEM). Since the obtained F value (0.82) was

less than the critical F value (2.08) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (31, 29), the assumption of homogeneity of variance was met.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in teacher's attitude towards online teaching with respect to their disciplinarity.*

Table 4.30

Significance of Difference between Teachers' Mean Scores on Attitude towards Online Teaching with respect to Disciplinarity

Disciplinarity	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
STEM	32	26.65	4.88	0.81	1.21	60	NS	Accepted
Non-STEM	30	28.1	4.44	0.86				

Interpretation of Table 4.30: Table 4.30 indicates that the obtained t value (1.21) is not significant at the 0.05 level with 60 degrees of freedom. Since the critical t value (2.0) for a two-tailed test is greater than the calculated t value, it suggests that university teachers' attitudes toward online teaching do not differ significantly across disciplinarity. Thus, the null hypothesis is retained.

Further owing to the small sample size of groups, the investigator decided to conduct a non-parametric equivalent statistic for student t-test

Table 4.31

Comparison of University Teachers' Attitude towards Online Teaching with respect to their Disciplinarity

Group	N	Mean Rank	Mann-Whitney U	Asymptotic Significant (2-sided test)	Decision on H_0
STEM	33	28.27	372.0	0.132	Accepted
Non-STEM	29	35.17			

NS means non-significant

Interpretation of Table 4.31: Table 4.31 shows the comparison of the attitude of university teachers towards online teaching on the basis of their disciplinarity using a Mann-Whitney U test. The test revealed insignificant differences in the attitude towards online teaching between STEM (Median=25, N= 33) and non-STEM (Median=27, N= 29) university teachers, U Statistics=372.0, $z=1.507$, $p=0.132 > 0.05$ level of significance, $r=0.191$. Hence the null hypothesis was accepted.

Objective: To compare the perception of university teachers towards online teaching with respect to their type of institution.

To further compare teachers' perceptions of online teaching based on their type of institution (ICFAI and MZU), an independent samples t-test (assuming equal variances) was carried out. The assumption of equal variances was tested using the F-ratio, calculated between the larger variance (MZU) and the smaller variance (ICFAI). Since the obtained F value (0.86) was less than the critical F value (2.26) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (49, 11), the condition of homogeneity of variance was satisfied.

For the purpose of testing a null hypothesis was formulated as follows:

H₀: *There is no statistically significant difference in teachers' perception towards online teaching with respect to their type of institution.*

Table 4.32

Significance of Difference between Mean Scores on Teachers' Perception towards Online Teaching with respect to Type of Institution

Type of Institution	Number	Mean	SD	SEM	t-value	df	Significance of difference	Decision on Null Hypothesis
ICFAI	12	53.58	4.52	1.30	0.63	60	NS	Accepted
MZU	50	52.6	4.85	0.68				

Interpretation of Table 4.32: Although the teachers' sample from ICFAI was only 12 the F-test revealed that the variance across the two sample was equal and t-test of equal variance was used for the current analysis. A reference to the Table 31 reveals that the obtained t value (0.63) was found to be insignificant at 0.05 level with degrees of freedom 60, 't' critical value (2.00) for 2 tailed analysis being > obtained 't' value. It means that perception of university teachers towards online teaching does not significantly differ with respect to their type of institution. Hence, the null hypothesis is retained.

Further owing to the small sample size of ICFAI teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test

Table 4.33

Comparison of University Teachers' Perception towards Online Teaching with respect to their Type of Institution

Group	N	Mean Rank	Mann-Whitney U	Asymptotic Significant (2-sided test)	Decision on H ₀
MZU	50	30.27	361.5	0.272	Accepted
ICFAI	12	36.63			

NS means non-significant

Interpretation of Table 4.33: Table 4.33 shows the comparison of the perception of university teachers towards online teaching on the basis of their institution using a

Mann-Whitney U test. The test revealed insignificant differences in the perception towards online teaching between MZU (Median= 52.50, N= 50) and ICFAI (Median= 55, N= 12) university teachers, U Statistics= 361.5, $z = 1.1$, $p = 0.27 > 0.05$ level of significance, $r = 0.13$. Hence the null hypothesis is accepted.

Objective: To compare the attitude of university teachers towards online teaching with respect to their type of institution.

To further compare teachers' attitudes toward online teaching with respect to their type of institution (ICFAI and MZU), an independent samples t-test (assuming equal variances) was conducted. The homogeneity of variances was examined using the F-ratio, calculated between the larger variance (MZU) and the smaller variance (ICFAI). Since the obtained F value (0.46) was less than the critical F value (2.26) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (11, 49), the assumption of equal variances was confirmed.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in teachers' attitude towards online teaching with respect to their type of institution.*

Table 4.34

Significance of Difference between Mean Scores on Teachers' Attitude towards Online Teaching with respect to Type of Institution

Type of Institution	Number	Mean	SD	SEM	t-value	df	Significance of difference	Decision on Null Hypothesis
ICFAI	12	28.66	3.36	0.97	1.07	60	NS	Accepted
MZU	50	27.04	4.93	0.69				

Interpretation of Table 4.34: Although the teachers' sample from ICFAI was only 12 the F-test revealed that the variance across the two sample was equal and t-test of equal variance was used for the current analysis. A reference to the Table 29 reveals that the obtained t value (1.07) was found to be insignificant at 0.05 level with degrees of freedom 60, 't' critical value (2.00) for 2 tailed analysis being $>$ obtained 't' value. It

means that the attitude of university teachers towards online teaching does not significantly differ with respect to their type of institution. Hence, the null hypothesis is retained.

Further owing to the small sample size of ICFAI teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test.

Table 4.35

Comparison of University Teachers' Attitude towards Online Teaching with respect to their Institution

Group	N	Mean Rank	Mann-Whitney U	Asymptotic Significant (2-sided test)	Decision on H_0
MZU	50	29.85	382.5	0.14	Accepted
ICFAI	12	38.38			

NS means non-significant

Interpretation of Table 4.35: Table 4.35 shows the comparison of the attitude of university teachers towards online teaching on the basis of their institution using a Mann-Whitney U test. The test revealed insignificant differences in the attitude towards online teaching between MZU (Median= 26 N= 50) and ICFAI (Median= 28, N= 12) university teachers, U Statistics= 382.5, $z = 1.47$, $p = 0.14 > 0.05$ level of significance, $r=0.18$. Hence the null hypothesis is accepted.

4.7 Comparison of university students' attitude towards technology with respect to gender, locale, socio-economic status, disciplinarity and type of institution.

This section discusses the findings of objective 7 which is as follows

- To compare the university students' attitude towards technology with respect to their gender

- To compare the university students' attitude towards technology with respect to their locale
- To compare the university students' attitude towards technology with respect to their socio-economic status
- To compare the university students' attitude towards technology with respect to their disciplinarity
- To compare the university students' attitude towards technology with respect to their type of institution

Objective: To compare the university students' attitude towards technology with respect to their gender.

To compare students' attitudes toward technology based on gender, an independent samples t-test (assuming equal variances) was applied. The equality of variances was tested using the F-ratio, computed between the larger variance (males) and the smaller variance (females). Since the obtained F value (0.89) was less than the critical F value (1.26) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (245, 346), the assumption of homogeneity of variance was satisfied.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in student's attitude towards technology with respect to their gender.*

Table 4.36

Significance of Difference between Mean Scores on Student's Attitude Towards Technology with respect to Gender

Gender	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
Male	246	56.04	6.09	0.38	1.16	591	NS	Accepted
Female	347	56.61	5.77	0.30				

Interpretation of Table 4.36: Table 4.36 shows that the calculated t value (1.16) is not significant at the 0.05 level with 591 degrees of freedom. Since the critical t value (1.26) for a two-tailed test is greater than the obtained t value, it indicates that university students' attitudes toward technology do not differ significantly by gender. Therefore, the null hypothesis is retained.

Objective: To compare the university students' attitude towards technology with respect to their locale.

To further compare students' attitude towards technology in relation to their locale, an independent samples t-test assuming equal variances was conducted by computing the F-ratio between the higher (urban) and lower (rural) variances of the two groups. Since the obtained F value (0.74) was less than the critical F value (1.25) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (321, 270), the assumption of equal variances was considered appropriate.

For the purpose of testing a null hypothesis was formulated as follows:

H₀: *There is no significant difference in student's attitude towards technology with respect to their locale.*

Table 4.37

Significance of Difference between Mean Scores on Student's Attitude Towards Technology with respect to Locale

Locale	Number	Mean	SD	SEM	t-value	df	Significance of difference	Decision on Null Hypothesis
Rural	271	56.14	5.42	0.32	0.90	591	NS	Accepted
Urban	322	56.58	6.29	0.35				

Interpretation of Table 4.37: Referring to Table 4.37, the calculated t-value (0.90) was found to be insignificant at the 0.05 level with 591 degrees of freedom, as the critical t-value (1.96) for a two-tailed test is greater than the obtained t value. This indicates that university students' attitude towards technology does not differ significantly based on their locale. Therefore, the null hypothesis is accepted.

Objective: *To compare the university students' attitude towards technology with respect to their socio-economic status.*

Table 4.38

One-way ANOVA on Student's Attitude Towards Technology with respect to Socio-Economic Status

Source of Variance	df	Sum of Squares (SS)	Mean Square (variance)	F-Value	F-critical	Level of Significance
Between Groups	2	48539.42	24269.71			
Within Groups	590	10415.97	17.65	1374.73	3.01	0.05
Total	592	58955.39				

Interpretation of Table 4.38: According to Table 4.38, the obtained F-value of 1374.73 is highly significant at the 0.05 level, with degrees of freedom 2 (numerator, df1) and 590 (denominator, df2). Since the critical F-value of 3.01 is much lower than the obtained F-value, it indicates a significant difference in students' attitudes towards technology based on their socio-economic status. Therefore, the ANOVA result leads to the rejection of the null hypothesis.

Hence a post-hoc analysis of independent t-test was performed using Bonferroni correction. Bonferroni corrected post-test t-test indicates there being a 95% chance of lower, middle and upper SES group students' attitude towards technology being significantly different from each other. It is observed that middle SES students' attitude towards technology is significantly higher than lower SES students' attitude towards technology, and further middle SES students' attitude towards technology is significantly lower than upper SES students' attitude towards technology, and also upper SES students' attitude towards technology is significantly higher than lower SES students' attitude towards technology.

Objective: To compare the university students' attitude towards technology with respect to their disciplinarity.

To compare students' attitudes towards technology based on disciplinaryity, an independent samples t-test (assuming equal variances) was conducted by calculating the F-ratio between the larger variance (non-STEM) and the smaller variance (STEM). Since the calculated F-value (1.12) is less than the critical F-value (1.27) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (392, 201), the assumption of equal variances is considered valid.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no significant difference in students' attitude towards technology with respect to their disciplinaryity.*

Table 4.39

Significance of Difference between Students' Mean Scores on Attitude towards Technology with respect to Disciplinaryity

Disciplinaryity	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
STEM	201	56.59	5.68	0.40	0.64	591	NS	Accepted
Non-STEM	392	56.26	6.02	0.30				

Interpretation of Table 4.39: Table 4.39 shows that the obtained t-value (0.64) is not significant at the 0.05 level with 591 degrees of freedom, since the critical t-value (1.96, two-tailed analysis) is greater than the obtained t value. This indicates that university students' attitudes towards technology do not differ significantly based on their disciplinaryity. Therefore, the null hypothesis is accepted.

Objective: *To compare the university students' attitude towards technology with respect to their type of institution*

To compare students' attitudes towards technology based on the type of institution, an independent samples t-test (assuming equal variances) was carried out

by computing the F-ratio between the larger variance (ICFAI) and the smaller variance (MZU). Since the calculated F-value (0.79) is lower than the critical F-value (0.80) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (176, 415), the assumption of equal variances holds true.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no significant difference in students' attitude towards technology with respect to their type of institution.*

Table 4.40

Significance of Difference between Students' Mean Scores on Attitude towards Technology with respect to Institution

Institution	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
ICFAI	177	93.16	11.39	0.85	1.44	591	NS	Accepted
MZU	416	91.56	12.77	0.62				

Interpretation of Table 4.40: Table 4.40 indicates that the obtained t-value (1.44) is not significant at the 0.05 level with 591 degrees of freedom, as the critical t-value (1.96, two-tailed) is greater than the obtained 't' value. This shows that university students' attitudes towards technology do not differ significantly according to their type of institution. Therefore, the null hypothesis is accepted.

4.8 Comparison of university teachers' attitude towards technology with respect to gender, disciplinarity and type of institution.

This section discusses the findings of objective 8 which is as follows

- To compare the university teachers' attitude towards technology with respect to their gender

- To compare the university teachers' attitude towards technology with respect to their disciplinarity
- To compare the university teachers' attitude towards technology with respect to their type of institution

Objective: To compare the university teachers' attitude towards technology with respect to their gender

To compare teachers' attitudes towards technology based on gender, an independent samples t-test (assuming equal variances) was conducted. The equality of variances was tested using the F-ratio, calculated between the larger variance (males) and the smaller variance (females). Since the obtained F value (2.02) was less than the critical F value (2.32) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (41, 19), the assumption of equal variances was considered valid.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in teacher's attitude towards technology with respect to their gender.*

Table 4.41

Significance of Difference between Mean Scores on Teachers' Attitude Towards Technology with respect to Gender

Gender	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
Male	42	55.66	7.01	0.38	0.44	60	NS	Accepted
Female	20	56.45	4.92	0.30				

Interpretation of Table 4.41: A reference to the Table 4.41 reveals that the obtained t value (0.44) was found to be insignificant at 0.05 level with degrees of freedom 60, 't' critical value (2.00) for 2 tailed analysis being > obtained 't' value. It means that university teachers' attitude towards technology does not significantly differ with respect to gender. Hence, the null hypothesis is retained.

Further owing to the small sample size of university teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test

Table 4.42

Comparison of University Teachers' Attitude towards Technology with respect to their Gender

Group	N	Mean Rank	Mann-Whitney U	Asymptotic Significant (2-sided test)	Decision on H_0
Male	42	31.17	434.0	0.833	Accepted
Female	20	32.20			

NS means non-significant

Interpretation of Table 4.42: Table 4.42 shows the comparison of the attitude towards technology possessed by university teachers on the basis of their gender using a Mann-Whitney U test. The test revealed insignificant differences in the attitude towards technology between male (Median= 57, N= 42) and female (Median= 56, N= 20) university teachers, U Statistics= 434.0, $z = 0.21$, $p = 0.83 > 0.05$ level of significance, $r = 0.026$. Hence the null hypothesis was accepted.

Objective: To compare the university teachers' attitude towards technology with respect to their disciplinarity.

To compare teachers' attitudes towards technology in relation to disciplinarity, an independent samples t-test (assuming equal variances) was applied. The assumption of equal variances was checked using the F-ratio, computed between the larger variance (non-STEM) and the smaller variance (STEM). Since the calculated F value (1.92) was lower than the critical F value (2.05) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (28, 32), the condition of equal variances was satisfied.

For the purpose of testing a null hypothesis was formulated as follows:

H₀: *There is no statistically significant difference in teacher's attitude towards technology with respect to their disciplinarity.*

Table 4.43

Significance of Difference between Teachers' Mean Scores on Attitude towards Technology with respect to Disciplinarity

Disciplinarity	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
Non-STEM	29	55.55	7.44	1.38				
STEM	33	56.24	5.37	0.93	0.42	60	NS	Accepted

Interpretation of Table 4.43: Table 4.43 reveals that the calculated t value (0.42) is not significant at the 0.05 level, with 60 degrees of freedom. Since the critical t value (2.0) for a two-tailed test is greater than the obtained t value, it indicates that university teachers' attitudes towards technology do not differ significantly based on their disciplinarity. Therefore, the null hypothesis is accepted.

Further owing to the small sample size of university teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test

Table 4.44

Comparison of University Teachers' Attitude towards Technology with respect to their Disciplinarity

Group	N	Mean Rank	Mann-Whitney U	Asymptotic Significant (2-sided test)	Decision on H ₀
STEM	33	31.94	464.0	0.838	Accepted
Non-STEM	29	31			

NS means non-significant

Interpretation of Table 4.44: Table 4.44 shows the comparison of the attitude towards technology possessed by university teachers on the basis of their disciplinarity using a Mann-Whitney U test. The test revealed insignificant differences in the attitude towards technology between STEM (Median=57, N= 33) and non-STEM

(Median=57, N= 29) university teachers, U Statistics=464.0, $z=0.205$, $p=0.838 > 0.05$ level of significance, $r=0.026$. Hence the null hypothesis was accepted.

Objective: To compare the university teachers' attitude towards technology with respect to their type of institutions.

To compare teachers' attitudes towards technology based on type of institution (ICFAI and MZU), an independent samples t-test (assuming equal variances) was conducted. The equality of variances was tested using the F-ratio, calculated between the larger variance (MZU) and the smaller variance (ICFAI). Since the obtained F value (0.94) was less than the critical F value (2.26) at $\alpha = 0.025$ (two-tailed) with degrees of freedom (49, 11), the assumption of equal variances was confirmed.

For the purpose of testing a null hypothesis was formulated as follows:

Ho: *There is no statistically significant difference in teachers' attitude towards technology with respect to type of institution.*

Table 4.45

Significance of Difference between Mean Scores on Teachers' Attitude Towards Technology with respect to Type of Institution

Type of Institution	Number	Mean	SD	SEM	t-value	df	Significance of Difference	Decision on Null Hypothesis
ICFAI	12	56.25	6.29	1.81	0.19	60	NS	Accepted
MZU	50	55.84	6.46	0.91				

Interpretation of Table 4.45: Table 4.45 indicates that the calculated t value (0.19) is not significant at the 0.05 level with 60 degrees of freedom. Since the critical t value (2.00) for a two-tailed test is greater than the obtained t value, it shows that university teachers' attitudes towards technology do not differ significantly by type of institution (ICFAI and MZU). Thus, the null hypothesis is upheld.

Further owing to the small sample size of university teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test

Table 4.46

Comparison of University Teachers' Attitude towards Technology with respect to their type of Institution

Group	N	Mean Rank	Mann-Whitney U	Asymptotic Significant (2-sided test)	Decision on H_0
MZU	50	31.51	299.5	0.993	Accepted
ICFAI	12	31.46			

NS means non-significant

Interpretation of 4.46: Table 4.46 shows the comparison of the attitude towards technology possessed by university teachers on the basis of their institution using a Mann-Whitney U test. The test revealed insignificant differences in the attitude towards technology between MZU (Median= 57, N= 50) and ICFAI (Median= 55, N= 12) university teachers, U Statistics= 299.5, $z = .009$, $p = 0.99 > 0.05$ level of significance, $r = 0.001$. Hence the null hypothesis is accepted.

C. Percentage Analysis

4.9 Exploring the problems faced by teachers and students during synchronous online teaching- learning process.

This section discusses the findings of objective 9 which is as follows:

- Problems faced by teachers during synchronous online teaching process
- Problems faced by students during synchronous online learning process

Following is table wise analysis of teachers' response for closed ended items of the questionnaire:

Table 4.47

Do you find it difficult to adapt to different online teaching-learning platforms?

Response	Frequency	Percentage
Rarely	29	46.77%
Sometime	32	51.61%
Always	1	1.61%

Source: Primary data collected from the field

The above table illustrates that approximately 47% of teachers reported that they rarely struggle to adapt to various online teaching and learning platforms, while around 52% occasionally face challenges in adapting. Meanwhile, only 2% consistently find it difficult to adjust to these platforms.

Table 4.48

Do you feel dissatisfied with the limitations of teaching in online classes?

Response	Frequency	Percentage
Rarely	3	4.8%
Sometime	48	77.41%
Always	11	17.74%

Source: Primary data collected from the field

The above table indicates that approximately 5% of teachers claimed they rarely displeased with the constraints of online instruction, 77% of teachers occasionally displeased while around 18% consistently dissatisfied with online instruction.

Table 4.49

Do you think that rural students stay behind urban students in online classes due to lack of internet connectivity?

Response	Frequency	Percentage
Yes	61	98.38%
No	1	1.61%

Source: Primary data collected from the field

The above table illustrate that majority of teachers (98%) claimed that rural students stay behind urban students in online classes due to lack of internet connectivity, only around 2% of teachers disagreed.

Table 4.50

Do you think insufficient supply of electricity is a major hurdle that prevents rural students from attending online classes?

Response	Frequency	Percentage
Rarely	3	4.83%
Sometime	36	58.06%
Always	23	37.09%

Source: Primary data collected from the field

The above table illustrates that approximately 5% of teachers report struggling with inadequate electricity supply as a significant barrier to attending online classes. Meanwhile, 58% of teachers believe that inadequate electricity supply occasionally poses a serious challenge, and 37% consistently consider it a significant obstacle for rural students participating in online learning.

Table 4.51

Do you think digital divide poses stress for students of rural origin?

Response	Frequency	Percentage
Rarely	3	4.83%
Sometime	34	54.83%
Always	25	40.32%

Source: Primary data collected from the field

The above table illustrates that approximately 5% of teachers report digital divide rarely poses stress for students of rural origin, almost 55% of teachers think it occasionally creates stress, while 40% feel the digital divide consistently causes stress for rural students.

Table 4.52

Do you think both urban and rural students face similar internet related problems in online classes?

Response	Frequency	Percentage
Rarely	26	41.93%
Sometime	27	43.54%
Always	9	14.51%

Source: *Primary data collected from the field*

Table 4.53

Are you satisfied with the quality of audio and video during online classes?

Response	Frequency	Percentage
Rarely	9	14.51%
Sometime	46	74.19%
Always	7	11.29%

Source: *Primary data collected from the field*

The above table indicates that most teachers (74%) occasionally satisfied with the audio and video quality during online classes, suggesting inconsistency in the technical experience. A smaller proportion (15%) report being rarely satisfied, reflecting frequent dissatisfaction with the quality. Only 11% of teachers are consistently satisfied, showing that uninterrupted and reliable audio-visual quality is experienced by very few.

Table 4.54

Do you face frequent occurrence of low bandwidth of internet transmission resulting in poor signal strength?

Response	Frequency	Percentage
Yes	50	80.64%
No	12	19.35%

Source: *Primary data collected from the field*

The above table illustrates majority of teachers (approximately 81%) report struggling with frequent low internet bandwidth, leading to poor signal strength, while 19% do not encounter such issues.

Table 4.55

Do you think that most students are not well equipped with a good internet connection that is required for online learning?

Response	Frequency	Percentage
Rarely	4	6.45%
Sometime	33	53.22%
Always	25	40.32%

Source: Primary data collected from the field

The above table illustrates that only a small fraction of teachers (6%) believe students rarely face problems with poor internet connectivity. However, more than half of the teachers (53%) feel that students sometimes struggle with inadequate internet access. Notably, 40% of teachers report that students consistently lack a reliable internet connection, highlighting that unstable connectivity remains a significant barrier to effective online learning.

Table 4.56

Is it okay for you that students keep their cameras off during the online classes?

Response	Frequency	Percentage
Rarely	14	22.58%
Sometime	38	61.29%
Always	10	16.12%

Source: Primary data collected from the field

The above table illustrates that a minority of teachers (23%) are rarely comfortable with students keeping their cameras off during online classes, suggesting a preference for visual engagement. The majority of teachers (61%) are occasionally

comfortable with this practice, indicating a level of flexibility depending on circumstances. A smaller proportion (16%) are consistently comfortable, showing that only a few teachers are fully at ease with students keeping their cameras off throughout online sessions.

Table 4.57

Do you think students may resort to unfair means of passing online tests such as cheating in online mode of examination?

Response	Frequency	Percentage
Rarely	2	3.22%
Sometime	26	41.93%
Always	34	54.83%

Source: *Primary data collected from the field*

The above table illustrates that around 3% of teachers believe students rarely use unfair means, such as cheating, to pass online exams. Nearly 42% think students may occasionally resort to such practices, while about 55% of teachers feel students consistently engage in unfair means during online mode exams. This indicates that concerns about academic integrity are significant in the context of online assessments.

Table 4.58

Do you think that facial expressions and other social cues are missing in online classrooms?

Response	Frequency	Percentage
Rarely	1	1.61%
Sometime	22	35.48%
Always	39	62.90%

Source: *Primary data collected from the field*

The above table illustrates that approximately 2% of teachers believe that facial expressions and other social cues are rarely absent in online classrooms. In

contrast, 35% think they are occasionally missing, while around 63% feel these cues are consistently lacking in online learning environments.

Table 4.59

Do you think adequate training for conducting online classes was provided from your university?

Response	Frequency	Percentage
Yes	31	50%
No	31	50%

Source: Primary data collected from the field

The above table reveals an equal division among teachers regarding online teaching preparedness: 50% indicate that their university provided adequate training for conducting online classes, whereas the remaining 50% report a lack of such training. This suggests a need for more consistent and comprehensive faculty development in online teaching methodologies.

Table 4.60

Do you think you are a computer savvy teacher?

Response	Frequency	Percentage
Yes	43	69.35%
No	19	30.64%

Source: Primary data collected from the field

The above table illustrates that 69% of teachers consider themselves techno-savvy, while approximately 31% do not feel the same way.

Table 4.61

Do you think you lack effective communication skills during online teaching?

Response	Frequency	Percentage
Yes	20	32.25%
No	42	67.74%

Source: Primary data collected from the field

The above table illustrates 32% of teachers feel they lack effective communication skills during online teaching, while nearly 68% do not believe they have this deficiency.

Table 4.62

Do you think diversity of learners and distance make online teaching much more challenging?

Response	Frequency	Percentage
Rarely	5	8.06%
Sometime	42	67.74%
Always	15	24.19%

Source: Primary data collected from the field

The above table illustrates that 8% of teachers believe that learner diversity and distance rarely make online teaching more challenging, while nearly 68% think these factors occasionally present challenges. The remaining 24% of teachers feel that learner diversity and distance consistently make online teaching significantly harder.

Table 4.63

Do you think that male students have an advantage in online learning over female students?

Response	Frequency	Percentage
Rarely	39	62.90%
Sometime	22	35.48%
Always	1	1.61%

Source: Primary data collected from the field

The above table illustrates that majority, 63% of teacher believe that male students rarely have an advantage over female students in online learning meanwhile, 35% think that male students occasionally hold an advantage, and only 2% feel that

male students consistently have an advantage in online learning because of their technological skills.

Table 4.64

Do you think that male and female students do not differ in their attitude towards online learning?

Response	Frequency	Percentage
Rarely	20	32.25%
Sometime	17	27.41%
Always	25	40.32%

Source: Primary data collected from the field

The above table illustrates 32% teachers believe gender differences rarely appear in students' attitude towards online learning. Additionally, 27% think gender differences appear occasionally, while 40% of teachers believe that male and female students always show the same attitude, meaning gender does not influence how they view or engage in online learning.

Table 4.65

Do you think students lack effective communication skills for online learning?

Response	Frequency	Percentage
Rarely	4	6.45%
Sometime	45	72.58%
Always	13	20.96%

Source: Primary data collected from the field

The above table illustrates that approximately 6% of teachers believe that students rarely lack effective communication skills for online learning. Nearly 73% think students occasionally struggle to communicate effectively, while about 21% feel that students consistently lack effective communication skills in an online learning environment.

Table 4.66

Do you think that students do not stay seated during the whole lecture during the online classes?

Response	Frequency	Percentage
Rarely	4	6.45%
Sometime	46	74.19%
Always	12	19.35%

Source: Primary data collected from the field

The above table illustrates that about 6% of teachers assume students rarely remain seated for the entire lecture during online classes. Meanwhile, 74% think that students occasionally fail to stay seated throughout, and 19% feel that students consistently struggle to remain seated during the entire lecture in online classes.

Table 4.67

Have you found students keeping their speakers un-muted and posed interruptions during online lectures?

Response	Frequency	Percentage
Yes	18	29.03%
No	44	70.96%

Source: Primary data collected from the field

The above table illustrates that 29% of teachers observed students leaving their speakers unmuted and causing interruptions during online lectures, while approximately 71% of teachers did not encounter this issue.

Table 4.68

Do students feel shy to use ‘raise hand’ features in online classes in case of questions and answers?

Response	Frequency	Percentage
Rarely	10	16.12%
Sometime	30	48.38%
Always	22	35.48%

Source: *Primary data collected from the field*

The above table illustrates that 16% of teachers stated that students rarely feel shy about using the ‘raise hand’ feature in online classes during question-and-answer sessions. Meanwhile, 48% believe students occasionally feel shy using this feature, and 35% think students consistently hesitate to use it.

Table 4.69

Do students fail to give immediate feedback upon their understanding in online classes?

Response	Frequency	Percentage
Rarely	8	12.90%
Sometime	36	58.06%
Always	18	29.03%

Source: *Primary data collected from the field*

The above table illustrates that nearly 13% of teachers believe that students rarely fail to provide immediate feedback on their understanding during online classes. In comparison, 58% think students occasionally struggle to give prompt feedback, while 29% feel that students consistently fail to do so.

Table 4.70

Do you suffer from ailments like headaches, back-pain, neck-pain, wrist pain and eye strain due to prolonged usage of mobile phones/ laptops/tablets/PC for online classes?

Response	Frequency	Percentage
Rarely	13	20.96%
Sometime	32	51.61%
Always	17	27.41%

Source: Primary data collected from the field

The above table illustrates that around 21% of teachers rarely experience ailments such as headaches, back pain, neck pain, wrist pain, and eye strain from prolonged use of mobile phones, laptops, tablets, or PCs for online classes. Nearly 52% occasionally face these issues, while 27% consistently suffer from such ailments due to extended screen time.

Following is table wise analysis of students' response for closed-ended items of the questionnaire:

Table 4.71

Do you feel nervous when it comes to study in an online classroom?

Response	Frequency	Percentage
Rarely	260	43.84%
Sometime	318	53.62%
Always	45	7.58%

Source: Primary data collected from the field

The above table illustrates that around 44% of students reported they rarely feel nervous about studying in an online classroom, approximately 54% occasionally experience nervousness, and the remaining 8% consistently feel nervous in an online learning environment.

Table 4.72*Are you insecure about your computer/electronic device skills?*

Response	Frequency	Percentage
Rarely	245	41.31%
Sometime	306	51.60%
Always	42	7.08%

Source: Primary data collected from the field

The above table shows that approximately 41% of students rarely feel insecure about their computer or electronic device skills, around 52% occasionally feel insecure, and the remaining 7% consistently feel unsure about their technological abilities.

Table 4.73*Are you scared of being misinterpreted while communicating in online classrooms?*

Response	Frequency	Percentage
Rarely	123	20.74%
Sometime	381	64.24%
Always	89	15.00%

Source: Primary data collected from the field

The above table indicates that around 21% of students rarely feel scared of being misunderstood when communicating in an online classroom, a significant 64% sometimes fear being misinterpreted, and the remaining 15% always experience this fear during online communication.

Table 4.74

Do you own personal devices and stable internet connection at your home for online classes?

Response	Frequency	Percentage
Yes	476	80.26%
No	117	19.73%

Source: *Primary data collected from the field*

The above table shows that the majority of students (80%) reported owning personal devices and having a stable internet connection at home for online classes, while the remaining 20% do not have their own devices or a reliable internet connection at home for online learning.

Table 4.75

Did you face data pack insufficiency while attending the online classes?

Response	Frequency	Percentage
Rarely	185	31.19%
Sometime	336	56.66%
Always	72	12.14%

Source: *Primary data collected from the field*

The above table indicates that 31% of students reported rarely having sufficient data to attend online classes, about 57% occasionally face issues with insufficient data, and the remaining 12% consistently struggle with inadequate data for attending online classes.

Table 4.76

Do you think online classes consume large amount of data which pose problems to a lot of students?

Response	Frequency	Percentage
Yes	477	80.43%
No	116	19.56%

Source: Primary data collected from the field

The above table displays that majority of the students (80%) claimed that online classes have consumed large amount of data which often posed problems to them, but the remaining 20% do not encounter such sort of problems.

Table 4.77

Does your internet supply often get interrupted making it difficult to learn in online classes?

Response	Frequency	Percentage
Rarely	87	14.67%
Sometime	424	71.50%
Always	82	13.82%

Source: Primary data collected from the field

The above table exposes that approximately 15% of students reported rarely experiencing internet interruptions during online classes, while the majority (72%) occasionally face connectivity issues, and the remaining 14% consistently deal with interrupted internet supply during their online classes.

Table 4.78

Did you face problems with audio quality while attending online classes?

Response	Frequency	Percentage
Rarely	57	9.61%
Sometime	472	79.59%
Always	64	1.79%

Source: Primary data collected from the field

The above table shows that almost 10% of students claimed they rarely encountered issues with audio quality during online classes, while majority of the students (80%) occasionally encounter such problems, and the remaining of 2% always encounter problems with audio quality during online classes.

Table 4.79

Did you have the problem of poor video quality during video conferencing session in online classes?

Response	Frequency	Percentage
Rarely	85	14.33%
Sometime	443	74.70%
Always	65	10.96%

Source: Primary data collected from the field

The above table presents that 14% of students barely encounter problems related to poor video quality during video conferencing session in online classes, while nearly 75% of students occasionally faced such problems, and the remaining of nearly 11% of students encounter them persistently.

Table 4.80

Have you ever struggled while downloading assignments or uploading completed work due to internet failure?

Response	Frequency	Percentage
Rarely	137	23.10%
Sometime	412	69.47%
Always	44	7.41%

Source: Primary data collected from the field

The above table shows that 23% of students stated they rarely have difficulties in downloading and uploading assignments due to internet issue, majority of the students (69%) occasionally encounter this type of problems, while the remaining 7% of students always have such sort of problems.

Table 4.81

Do you think that synchronous online learning platforms consume more internet data than asynchronous platforms?

Response	Frequency	Percentage
Yes	461	77.74%
No	132	22.25%

Source: Primary data collected from the field

The above table presents that majority of the students (78%) declares synchronous online learning platforms consume more internet data than asynchronous platforms, while 22% of students disagree with the statement.

Table 4.82

Do you face problem while logging into live classes, communicating with teacher and friends and creating and submitting work through online learning platforms?

Response	Frequency	Percentage
Rarely	91	15.34%
Sometime	474	79.93%
Always	28	4.72%

Source: Primary data collected from the field

The above table displays that around 15% of students reported rarely facing difficulties with logging into live classes, interacting with teachers and peers, and creating or submitting assignments on online learning platforms. The majority (80%) occasionally face such issues, while approximately 5% consistently encounter these challenges during the online learning process.

Table 4.83

Do you face difficulty in learning where online class videos could not be recorded or watched later?

Response	Frequency	Percentage
Rarely	116	19.56%
Sometime	404	68.12%
Always	73	12.31%

Source: Primary data collected from the field

The above table indicates that about 20% of students report rarely struggling with learning when online class videos cannot be recorded or revisited later, 68% of students occasionally faced such types of problems, and the remaining 12% of students consistently experience challenges in these situations.

Table 4.84

Did you face your device incompatibility problem with the learning platforms used during online classes?

Response	Frequency	Percentage
Rarely	174	29.34%
Sometime	407	68.63%
Always	11	1.85%

Source: Primary data collected from the field

The above table shows that 29% of students convey they rarely faced difficulties with device incompatibility that comes with learning platforms used, almost 69% of students stated occasionally facing such type of problems, and the remaining of about 2% of students consistently facing problems with such type of conditions.

Table 4.85

Did you face problems in learning from home during online classes?

Response	Frequency	Percentage
Rarely	133	22.42%
Sometime	424	71.50%
Always	36	6.07%

Source: *Primary data collected from the field*

The above table presents that almost 22% of students claimed rarely facing problems in learning from home during online classes, while a lot of students (72%) occasionally facing such type of circumstances, and the remaining 6% consistently facing such type of situations.

Table 4.86

Is your home environment suitable for learning and attending online classes?

Response	Frequency	Percentage
Yes	441	74.36%
No	152	25.63%

Source: *Primary data collected from the field*

The above table presents that majority of the students (74%) report that their home environment is suitable for learning and attending online classes, while 26% of students disagree stating home environment is not suitable for learning conditions.

Table 4.87

Did you have a proper seating area at your home to attend online classes?

Response	Frequency	Percentage
Yes	456	76.89%
No	137	23.10%

Source: *Primary data collected from the field*

The above table shows that majority of students (77%) owned a dedicated seating area at home for attending online classes, while 23% of students do not.

Table 4.88

Did the noise and disturbances from home prevent you from learning in online classes?

Response	Frequency	Percentage
Rarely	169	28.49%
Sometime	374	63.09%
Always	50	8.43%

Source: *Primary data collected from the field*

The above table displays that 28% of students claimed noise and disturbances from home rarely hinder them from productive learning in online classes, 63% of students intermittently faced such problems, while 8% of students continuously struggled with such conditions.

Table 4.89

Do you think lack of a real peer group interaction prevented you from doing collaborative activities in online classes?

Response	Frequency	Percentage
Rarely	90	15.17%
Sometime	413	69.64%
Always	89	15.00%

Source: *Primary data collected from the field*

The above table indicates that 15% of student report that the absence of genuine peer interaction rarely hindered their ability to participate in collaborative activities during online classes, nearly 70% of students occasionally experienced such problems, while 15% consistently struggled with such kind of problems.

Table 4.90

Is it hard for you to find quiet locations during online classes?

Response	Frequency	Percentage
Rarely	221	37.26%
Sometime	307	51.77%
Always	65	10.96%

Source: *Primary data collected from the field*

The above table show that 37% of students rarely struggled to find a quiet location which is free from noise pollution to attend online classes, 51% of students occasionally encounter such problems, while 10% of students consistently struggled with such type of circumstances.

Table 4.91

Do you feel that there is boredom in online classes due to repetition of lecture-based teaching?

Response	Frequency	Percentage
Rarely	62	10.45%
Sometime	425	71.66%
Always	106	17.87%

Source: *Primary data collected from the field*

The table indicates that 10% of students reported that boredom in online classes is rarely caused by the repetitive nature of lecture-based teaching. Nearly 72% of students believe boredom occasionally arises from monotonous teaching, while the remaining 18% consistently experience boredom due to repetitive instruction.

Table 4.92

Do you feel you were given personalized guidance by your teacher for improving and identifying your weakness during online classes?

Response	Frequency	Percentage
Rarely	73	12.31%
Sometime	372	62.73%
Always	148	24.95%

Source: *Primary data collected from the field*

The table shows that around 25% of students reported that their teacher consistently provided personalized guidance to help them identify and address their weaknesses during online classes. Approximately 63% stated that their teacher occasionally offered such guidance, while the remaining 12% rarely received personalized support from their teacher.

Table 4.93

Do you find it difficult to complete your assignments due to communication barriers in online classrooms?

Response	Frequency	Percentage
Rarely	225	37.94%
Sometime	340	57.33%
Always	28	4.72%

Source: *Primary data collected from the field*

The above table reveals that about 38% of students rarely struggle to complete their assignments due to communication barriers in online classrooms. Around 57% occasionally face difficulties for the same reason, while the remaining 5% consistently find it challenging to complete their assignments due to communication issues.

Table 4.94

Do you face difficulty in concentration due to the harmful radiations from device used for online classes?

Response	Frequency	Percentage
Rarely	379	63.91%
Sometime	285	48.06%
Always	29	4.89%

Source: *Primary data collected from the field*

The table indicates that around 64% of students rarely experienced concentration difficulties caused by harmful radiation from devices used for online classes. About 48% of students occasionally faced such struggles, while the remaining 5% consistently had trouble concentrating due to device-related radiation. In this context, harmful radiation generally refers to screen-related discomfort, including eye strain, dry eyes, burning sensations, and blurred vision.

Table 4.95

Do you suffer from ailments like headaches, back-pain, neck-pain, wrist pain and eye strain due to prolonged usage of mobile phones/ laptops/tablets/PC for online classes?

Response	Frequency	Percentage
Rarely	69	11.63%
Sometime	339	57.16%
Always	185	31.19%

Source: *Primary data collected from the field*

The above table shows that approximately 12% of students rarely experience ailments such as headaches, back pain, neck pain, wrist pain, and eye strain due to prolonged use of mobile phones, laptops, tablets, or PCs for online classes. Around 57% occasionally face these issues, while the remaining 31% consistently suffer from such ailments.

Table 4.96

Do you feel sleepy after prolonged exposure to the blue light from mobile phones and computers?

Response	Frequency	Percentage
Rarely	48	8.09%
Sometime	313	52.78%
Always	232	39.12%

Source: *Primary data collected from the field*

The above table indicates that about 8% of students rarely feel sleepy after extended exposure to blue light from mobile phones and computers. Approximately 53% occasionally experience sleepiness, while the remaining 39% consistently feel sleepy due to prolonged exposure to blue light from these devices.

Table 4.97

Is it difficult for you to join online class on time?

Response	Frequency	Percentage
Yes	261	44.01%
No	332	55.98%

Source: *Primary data collected from the field*

The above table indicates that 44% of students claimed having difficulty joining online classes on time, while 56% of students disagreed.

Table 4.98

Did you face the problem of missing out a lecture while changing from one online class to another?

Response	Frequency	Percentage
Rarely	195	32.88%
Sometime	384	64.75%
Always	14	2.36%

Source: *Primary data collected from the field*

The above table reveals that approximately 33% of students rarely encounter the issue of missing a lecture while transitioning from one online class to another. Nearly 65% occasionally face this problem, while the remaining 2% consistently experience it.

Table 4.99

Do you usually finish your online assignment in time?

Response	Frequency	Percentage
Rarely	24	4.04%
Sometime	166	27.99%
Always	403	67.95%

Source: Primary data collected from the field

The above table shows that about 33% of students rarely complete their online assignments on time, around 30% occasionally meet the deadline, while the remaining 68% consistently submit their assignments on time.

Table 4.100

Do you feel lack of interest and enthusiasm in learning through online classes?

Response	Frequency	Percentage
Rarely	64	10.79%
Sometime	418	70.48%
Always	111	18.71%

Source: Primary data collected from the field

The above table indicates that approximately 11% of students rarely show a lack of interest and enthusiasm in learning through online classes, 70% occasionally experience such a lack, and around 19% consistently lack interest and enthusiasm in online learning.

Table 4.101

Do you feel unmotivated to visit the online learning portal due to endless oceans of texts, quizzes, and frequent learning assignments?

Response	Frequency	Percentage
Rarely	111	18.71%
Sometime	410	69.13%
Always	72	12.14%

Source: *Primary data collected from the field*

The table reveals that around 19% of students rarely feel unmotivated to access the online learning portal due to overwhelming amounts of text, quizzes, and frequent assignments. About 69% occasionally experience this lack of motivation, while the remaining 12% consistently feel unmotivated for the same reasons.

Table 4.102

Do you think that your concentration is diverted during online classes?

Response	Frequency	Percentage
Rarely	52	8.78%
Sometime	391	65.93%
Always	150	25.29%

Source: *Primary data collected from the field*

The above table shows that approximately 9% of students reported that their concentration is rarely diverted during online classes, about 66% occasionally experience distractions, and the remaining 25% consistently feel their concentration is diverted during online classes.

D. Qualitative Analysis

Following is the analysis of teachers' response for open ended items of the questionnaire:

1. What is that one thing that you dislike about online teaching?

Teachers dislike several aspects of online teaching which were - internet issues on both sides (teacher and student) and difficulties in ensuring students' attention due to connectivity problems. Teacher struggle to gauge students' understanding and manage their behaviour effectively due to lack of physical interaction which limits eye contact and classroom control. When students turn off their cameras, teachers cannot observe their reactions, making it harder to assess engagement. Rapid feedback is challenging, and body language cues are lost, making it difficult to determine if students truly comprehend the material. Student participation is often minimal, with many remaining idle and insincere. Online teaching tends to be one-way communication, as students do not engage actively. Distractions from family members further hinder focus, making lessons feel monotonous. Communication barriers affect learning, making online teaching resemble distance education with minimal student interaction, ultimately reducing its effectiveness.

2. What is that one major problem you faced with students from rural origin?

Teachers face several challenges when working with students from rural areas which include frequent power cuts and internet connectivity issues on the students' end, as well as limited access to essential resources such as high-end mobile phones, Wi-Fi, laptops, and stable internet connections. Rural students often experience more network disruptions during online classes, leading to difficulties in learning. Additionally, there is a noticeable disparity in digital literacy, with some students lacking the necessary training and familiarity with online platforms. A lack of interest in online learning further compounds the issue. Moreover, language barriers arise as some students struggle with English, which could have been clarified in their local language in a physical classroom setting.

3. What are the easiest to handle online teaching-learning platforms used by you?

The most user-friendly online teaching-learning platforms reported by teachers include Google Meet, which allows easy access to upload study materials where students can download based on their internet availability, WhatsApp is convenient for clarifications and discussions and Zoom is ideal for teaching. Other widely used platforms include Google Classroom, Google Drive, Zoom for teaching, and Telegram.

4. Mention one major problem you encounter due to only virtual presence of students in classes?

Teachers face several challenges due to the virtual presence of students in online classes. These include internet issues, minimal interaction causing students to feel shy or hesitant to ask questions, and difficulty in assessing students' understanding. Building personal connections is nearly impossible, and teachers cannot verify if students are genuinely attending. The absence of facial expressions and body language reduces engagement, making it hard to gauge attentiveness. Identifying students is difficult, and many lack motivation, concentration, and classroom etiquette. Power cuts, background noise, multitasking during lessons, insincerity, and widespread cheating in online assessments further hinder effective teaching. Additionally, online teaching lacks the dynamic, interactive nature of traditional classrooms.

5. What is one major challenge in teaching online classes?

Major challenge in teaching online classes reported by teachers are as follows - difficulty in capturing students' attention, lack of technical equipment, and frequent connectivity disruptions. Limited student-teacher communication and insufficient student responses make engagement challenging, often resulting in one-way teaching. Teachers struggle to assess student attentiveness, as many are unwilling to participate. Unfamiliarity with technology reduces student interest, and unequal internet access creates learning disparities. Interactive sessions are often missing, and delivering practical knowledge requires more effort than offline teaching. Additional issues include lack of study materials, inadequate online infrastructure, power cuts, and exhaustion from prolonged screen time. Teachers also find it difficult to address individual student needs.

However, some educators have adapted to the system by adopting a more motivational approach.

6. What is the major lack in student's performance as a result of online learning?

Major lack in student's performance as a result of online learning reported by teachers are as follows - Connectivity issues hinder focus, and students struggle with in-depth understanding, especially in technical subjects like programming. Online exams are taken less seriously and are often ineffective. Student interaction has declined, with many unwilling to engage with teachers or respond to questions. Poor time management, lack of resources, and ethical concerns in academic performance further impact learning. Creativity and manners are lacking, along with issues like late attendance and reduced self-motivation. Many students neglect acquiring knowledge, affecting their dedication and seriousness. Shy and introverted students struggle to clarify doubts, leading to superficial learning. Additionally, sincere students often go unrecognized, while less dedicated learners pass easily.

7. Who do you think is more engaged in online learning activities male students, female students or both?

Majority of the teachers assumed that gender does not influence the attentiveness of students during online classes. However, exceptionally few teachers felt that female students are more engaged than their counterparts during online classes.

8. What is the most essential online etiquette to be followed by the student in online learning according to you?

The most essential online etiquette to be followed by the student in online learning as reported by teachers are as follows - students should always respond to questions or discussions initiated by teachers, even with a simple answer like "yes" or "no," as it contributes to engagement. Knowing when to participate and when to listen is crucial, along with maintaining active involvement in discussions. To minimize disruptions, students should keep their cameras on, face the screen as much as possible, and mute their microphones during lectures and attend classes in a quiet, vacant room. Students should prepare themselves in advance on the topic to be covered enhances comprehension.

Prompt responses or feedback when asked by the teacher are essential. Silent attendance is expected, as unintentional activation of audio or video can disrupt the class. Punctuality is important, and students should avoid interrupting or disturbing the teacher while they are delivering the lecture. Maintaining classroom decorum, focusing on key concepts, and staying attentive are vital. Additionally, students should dress appropriately, and ensure a stable internet connection for uninterrupted participation.

9. If you have suffered with any health issues while teaching in online classes please specify it and do you have any suggestion to overcome it in online classes?

Teachers face various health issues while conducting online classes, including throat irritation, headaches, migraines, back and neck pain, wrist pain, and eye strain due to prolonged screen exposure. Continuous sitting for long hours also leads to backaches and tailbone pain. Teaching for extended periods, often exceeding six hours a day, results in mental exhaustion and fatigue.

To mitigate these issues, teachers suggest keeping sufficient water to relieve throat irritation, taking short breaks during classes, and informing students about health concerns. Breaking sessions into smaller intervals can also help reduce strain and improve overall well-being.

Following is the analysis of students' response for open ended items of the questionnaire:

1. What are the necessary things that may help to cope your anxiety in online learning?

To help students cope with anxiety in online learning, several factors are essential: a stable internet connection, reliable power supply, and increased student-teacher interaction to build rapport. Teachers should be open and approachable so students feel comfortable seeking help and clarifying doubts. Short breaks between classes, adequate learning materials, and the option to turn off mics and cameras during sessions contribute to a better experience. Teachers should also improve their technological skills for smoother lectures. A quiet learning environment, clear and precise explanations in fluent English,

opportunities for students to express their ideas, support for mental well-being, and access to recorded lessons are also crucial.

2. If you feel anxious in online classes specify the reasons for your anxiousness by ticking the options provided:

Nearly one-third (31%) of students mentioned their lack of adequate training for attending online classes as a major reason of their anxiousness, whereas the second most cited reason (23%) was the fear of being tested for online skills (such as anxiety about using online platforms, fear of making technical mistakes during classes or exams, and worry about uploading files or navigating digital tools). Around 19% of students mentioned the absence of two-way communication as a crucial reason for them to become anxious during online classes. The remaining students were mentioning reasons like artificial mechanical setting (14%) as a major a reason for triggering anxiety and monotonous and dull experience (13%) as a key factor that heightens their anxiety.

Other factors that contribute to student anxiety include teachers delivering lectures in the same manner as in offline classes, making them monotonous and outdated. Network issues during tests or examinations create stress, while students may also feel anxious over minor questions they have asked. Unstable internet connections lead to missing crucial parts of lectures, and the inability to attend practical classes adds to their worries.

3. If you are from rural origin, what is your main problem in learning in online mode?

Students from rural areas face several challenges in online learning, including low bandwidth, unstable internet, and high data consumption, making it difficult to attend classes. Irregular power supply, especially during monsoons, further disrupts learning. Lack of privacy at home adds to the struggle. Many rural students must participate in jhuming and household chores, making it difficult to balance studies. When teachers do not hold regular classes, it wastes students' time, as they are expected to stay home for lessons. Since most rural

families work during the day, students staying home for classes may be perceived as lazy. Poor internet connectivity prevents downloading study materials, and teachers conducting classes at their convenience disrupts students' daily routines. Additionally, phone batteries drain quickly due to frequent power cuts, and many students lack access to proper devices.

4. If you are from urban origin, what is your main problem in learning in online mode?

Urban students face several challenges in online learning, including unstable power supply, internet issues, and noise pollution from traffic and construction. Managing time effectively is difficult, as household chores and social media distractions interfere with studies. Limited student-teacher interaction, technical glitches, and poor connectivity on the teacher's side further disrupt learning. Family and neighboring disturbances make concentration difficult, while some students lack proper devices or sufficient data due to high platform consumption. Unfair grading, minimal class breaks, and excessive stress—such as pressure to turn on cameras—add to the struggle. Low-bandwidth internet, especially at night, and conflicting activities during class hours are also major concerns.

5. Did household chores distract you from attending online classes? If yes, what type of problem do you mostly faced?

29% of students faced distractions from various household responsibilities, including housekeeping, laundry, babysitting, disposing of garbage, handling gas, storing water during supply, and cooking. Housekeeping students struggled with surprise visitors, especially when alone at home, and occasional visits from friends and family. Long afternoon classes left little time for chores. Students from business-owning families found it difficult to balance online classes and household duties. Female students, particularly eldest daughters, faced additional responsibilities that made it challenging to keep up with lessons. Rural students engaged in jhum cultivation struggled with attendance, as their parents often did not understand the concept of online classes. During

a short lunch break that lasted only 30 minutes, some students had to cook meals for their entire family, which resulted in them missing the first class after the break. Parents also sent students for grocery shopping, further disrupting studies. Additional challenges included noise pollution, night classes conflicting with dinner time, lack of proper seating, and absence of private study space.

6. If you faced problem in learning from home specify what was the biggest hurdle?

The biggest challenges of learning from home include Wi-Fi issues, managing surprise visitors when home alone, and various household chores. Many students struggle with an unsuitable home environment, difficulty concentrating, and an inability to download study materials due to poor internet. Long class durations make it hard to balance studies with helping at family-run stores. Families often misunderstand online classes, assuming students are free since they are not physically attending school. The artificial learning environment leads to laziness and lack of seriousness. Sudden power cuts, neighborhood noise, unexpected visitors, and community responsibilities further disrupt learning. Privacy is limited, discussions are lacking, and students' presence at home results in added household expectations. Some families perceive attending classes as an excuse to avoid chores. Additionally, night classes create inconsistency in student engagement.

7. Can you specify some specific barrier to communication in online classes?

Barriers to communication in online classes include low-quality audio, network issues, lack of transparency and trust, unseriousness, and miscommunication due to unstable connections. Unfamiliarity with technology, unapproachable teachers, limited interaction, and technical glitches further hinder learning. The synchronous mode poses challenges as some students struggle to engage despite teachers' efforts. Insufficient learning materials and teachers merely reading from texts make lessons monotonous. The unavailability of recorded lessons adds to difficulties. Teachers should use

alternative methods like uploading videos, meet-ups, and interactive sessions. Delays and irregular scheduling disrupt learning. Discussions, age-relevant examples, and more visual lectures, such as PPT-based lessons, enhance engagement. Teachers must prepare in advance, manage time efficiently, and conclude topics within 30 minutes to maintain interest. Non-Mizo teachers' accents create comprehension difficulties, and some fail to show their faces or use PPTs, making classes dull. Overly long or poorly designed PPTs are unproductive. Teachers often lack sincerity in online teaching, and students should turn on cameras for better engagement. Lastly, teachers must adhere to class timings.

8. If you are dissatisfied with teaching methods and practices, then state what is your ideal expectation in online classes regarding teaching methods?

Teachers should adapt their teaching methods to ensure students can effectively follow along. If students struggle to keep up, alternative approaches such as uploading recorded videos, arranging meet-ups, or providing supplementary materials should be considered. One challenge in online learning is communication difficulties with non-Mizo teachers due to accents. Students expect teachers to manage their time effectively, punctuality and sincerity in teaching are also crucial, as overly relaxed teaching attitudes can hinder student progress. To improve the learning experience, teachers should enhance their technological proficiency and made recorded lectures available for students to review. Students desire more personal interaction with teachers and clear, high-quality audio during online classes. Lessons should be concise and engaging, avoiding excessive repetition of basic concepts, which can lead to boredom. Providing study materials and lecture recordings immediately after class would be beneficial, along with fair and transparent evaluation methods.

Long classes exceeding 2 hours often cause confusion, making it harder for students to retain information. Some subjects have overly lengthy and unengaging PowerPoint presentations, which can reduce student interest. In science disciplines, excessive slides can lead to boredom, so presentations should be concise and to the point. Teaching can be made more effective by

incorporating real-life examples and using a digital whiteboard for explanations. In contrast, in arts disciplines, relying solely on lectures may not be as effective; instead, incorporating PPTs with clear diagrams can enhance attention and improve comprehension. Additionally, teachers should avoid merely reading from the slides and instead engage students with interactive discussions and explanations and strive to be approachable.

Classes should follow a regular schedule rather than being conducted based on the teacher's convenience, as irregular timing disrupts students' daily routines. Ideally, lectures should be wrapped up within 30 minutes to maintain engagement. For fields requiring practical work, especially in engineering, hands-on learning should be prioritized. Before finalizing schedules, student preferences should be considered. Implementing a *flipped classroom approach*, where materials are shared beforehand and discussed in the next class, can encourage deeper understanding and active participation.

Online classes often fail to provide satisfactory teaching, making offline classes a preferable option for better understanding. Offline learning allows for more discussions, easier access to learning materials, and greater student participation through activities like presentations. The monotonous nature of online classes makes it difficult to concentrate, so encouraging active student engagement is essential. A blended approach, where materials are distributed asynchronously while doubts are addressed in synchronous sessions, can enhance learning. Traditional lecture methods can become dull, but incorporating interactive activities can make lessons more engaging. A hybrid model combining both online and offline learning proves to be more effective, especially when reinforced with positive encouragement.

9. Do you think you are productive in online class than traditional class? If no, why?

Around 65% of students believe they are less productive in online classes compared to traditional ones. While some find productivity equal in both modes, many feel traditional classes foster a stronger learning environment due to better teacher guidance. Online learning is hindered by difficulties in paying

attention, poor internet connection, and numerous home distractions. Although not needing to travel saves time, the lack of face-to-face interaction leads to boredom and reduced focus. Many students feel unproductive, often turning off their video and engaging in other activities instead of listening. Issues such as migraines, noise pollution, and social media distractions further impact attentiveness. Online classes lack the immersive experience of traditional classrooms and limit creativity due to the inability to express oneself freely. The open-book exam system reduces seriousness, while limited personal interaction with teachers and peers creates ambiguity and makes clearing doubts difficult. A diminished sense of responsibility and increased procrastination arise as teachers cannot directly supervise students. Many students feel like they are merely watching videos rather than actively attending live classes due to the artificial learning environment, and some teachers lack sincerity. Overall, traditional classes are seen as better for maintaining focus, engagement, and a sense of belonging.

10. If you have suffered with any health issues while learning in online classes, please specify it and do you have any suggestion to overcome it in online classes?

Students experience various health issues during online learning, including headaches, lower back pain, eye strain, dizziness, migraines, and drowsiness due to prolonged screen exposure. Excessive screen time affects mental well-being, and students wearing spectacles risk worsening eyesight. Long class hours (4-6 hours) cause body aches, nausea, and even issues like piles due to prolonged sitting. Limited interaction leads to boredom and reduced productivity.

To overcome these problems, students should wear protective glasses, sit in a comfortable position (avoiding the bed), and maintain a proper distance from screens. Shortening class duration to under 40 minutes, incorporating 10-15 minutes break, and allowing students to turn off their cameras when needed can help. Teachers should be mindful of students' needs, provide longer gaps between classes, and limit sessions to three classes per day is desirable.

Stretching and real-time classroom interaction, such as lab work, can also improve engagement and reduce physical strain.

11. Do you frequently respond when the teacher asks a question in online classes? If no, why?

About 58% of students rarely respond when teachers ask questions in online classes due to several factors. These include difficulties toggling the voice button, connectivity issues, teachers' voices being inaudible due to poor internet, distractions from household chores and students tend to engage in other activities as they are invisible, social anxiety, and hesitation to give short responses like "yes" or "no." Additionally, students experience a sense of withdrawal, fear of answering incorrectly, malfunctioning microphones, lack of understanding of the topic, inattentiveness, reliance on classmates to respond, lack of confidence, and being invisible on the screen reduces engagement and focus. Voice breakages, technical glitches and poor connectivity often cause students to miss the questions asked.

12. If you feel that you are not able to follow ideal behaviour in online classes, can you suggest the basic reason for doing so?

Several factors contribute to students' inability to maintain ideal behavior in online classes. The dull and unengaging nature of lessons often leads to a lack of motivation and discipline. Students struggle to maintain a classroom mindset in a virtual setting, resulting in issues like poor punctuality and minimal participation. Limited teacher-student interaction further reduces engagement. When online classes are lengthy, maintaining full concentration becomes difficult, and students may doze off due to the absence of a proper seating arrangement. The awareness of teachers' limited capacity to monitor behavior encourages some students to take advantage of the situation. Boring lectures, monotonous settings, and short attention spans lead to inattentiveness and engagement in other activities. The lack of visibility to teachers makes student negligible of their actions, while distractions from family members, poor sitting posture, and unstable power supply, particularly in rural areas, further

hinder focus. Additionally, prolonged class durations, and the tendency for distractions to increase when cameras are off contributed significantly to inattentiveness. An undesirable online environment fosters mental challenges such as procrastination and ADHD.

13. According to you what can motivate you instantly to join online classes? Factors that motivate students to join online classes include - attendance requirements, an enthusiastic and punctual teacher, an approachable instructor who encourages communication, teachers who share life experiences as examples and have strong subject knowledge make lessons more engaging. Students are also driven by the opportunity to enhance technological skills, gain knowledge, accessibility and cost-effective education. While online learning is seen as beneficial in the short term, it is considered less effective for long-term education. Academic goals play a key role, and introverted students appreciate the ability to participate via voice without showing their faces. Additional motivators include access to study materials, the flexibility of multitasking, shorter class durations, self-paced learning, not needing to dress up, interactive quizzes, discussions, and the availability of stable internet and power supply. Fear of missing out (FOMO) encourages active participation, engaging PowerPoint presentations enhance students' ability to visualize and understand their learning more effectively, and the convenience of not rushing to the institution also contribute to student participation. Further to the strengthen the finding a semi-structured interview was performed with some selected students from different disciplines to further triangulate the findings.

Following is the responses of some students categorized discipline wise.

1. What paper do you find most challenging in online learning?

"I find Mathematics the most challenging subject in online learning because it requires significant interaction between students and teachers. Mere explanations do not help students grasp the concepts, and self-study alone is

often insufficient. This highlights the critical role of teachers and the necessity of active interaction for effective online learning.”

- Mathematics

“The course is entirely focused on pure mathematics, emphasizing theorems, particularly in combinatorics and topology. It involves calculations within an abstract, imaginary framework, making it applicable mainly within the realm of mathematics rather than real-world scenarios. Due to its complexity, understanding the material is challenging through both online and offline explanations.”

- Mathematics

“I find Statistics the most difficult subject in online learning because, as someone who struggles with math and calculations, I find it hard to grasp the concepts on my own. While theoretical topics can be navigated through reading, understanding calculations requires explanations from teachers to fully comprehend the concepts.”

- Sociology

“Research methodology is one of the most challenging subjects to learn through online methods, as certain topics cannot be fully grasped through explanations alone.”

- Sociology

“I find theory papers challenging because theory forms the foundation of all knowledge and concepts. Online learning alone makes it difficult for me to fully grasp the material, as it's hard to concentrate in that format.”

- Sociology

“I personally found Maths to be the most challenging subject in online classes due to its calculations, which are harder to comprehend compared to theory-based subjects.”

- Geology

“I don't experience particular issues in online learning; overall, it's good.”

- Botany

“In Electrical Engineering, the Signals and Systems course is the most challenging to learn online due to its extensive calculations. Grasping the

concepts becomes particularly difficult, especially when internet bandwidth is low.”

- Electrical Engineering

“I find it very difficult to learn theory in online mode, partly due to the environment, which is quite different from a physical classroom. There are many distractions and noise pollution that make it harder to focus.”

- Education

“In online learning, delivering lectures solely through PPT is not effective, as it fails to maintain concentration when accompanied only by narration. This is a major concern, especially for subject-specific challenges.”

- History

2. How was your experience of learning your subject through online mode?

“Taking lessons through online classes is not ideal, as it can be challenging and ineffective. Long classes, lasting one or two hours, often become monotonous and induce sleepiness. I frequently find myself getting distracted and doing other things, resulting in minimal overall benefit from online learning.”

- Mathematics

“Online learning has enhanced my technological skills. Since I live in another district, I prefer the flexibility of studying from home. Even if the lectures do not meet expectations, I can learn independently through reading and have greatly benefited from recorded lessons.”

- Mathematics

“In my undergraduate studies where I pursued my undergraduate degree outside Mizoram, recorded lessons and learning materials were uploaded to the portal, making them easily accessible which reflect more formality. However, at MZU, most activities are conducted via Google Meet, while notes and learning materials are shared on WhatsApp. The approach is flexible, with assignments completed offline. I found this system more effective since we had more time to work without classroom interactions causing delays, allowing us to finish assignments quickly and efficiently.”

Internet issues posed significant challenges. During exams, we were required to keep our cameras on throughout, which drained our device batteries. This became particularly stressful when there was no electricity for consecutive days, forcing us to rush to relatives' or neighbours' houses to complete exams. The urban-rural divide also played a role, as data consumption was high, adding to the tension and stress. Nevertheless, the flexibility allowed me to attend classes even while sleeping on buses or traveling, which I appreciated."

- Sociology

"Online learning is much easier to manage, but our excessive comfort with it can lead to boredom and create an artificial learning environment."

- Sociology

"My experience with online learning has both positive and negative aspects. On the positive side, it has helped improve my technological skills. Since we switched to online learning during my undergraduate studies, I've learned to use Google Meet and email for educational purposes, rather than just for social media. On the negative side, the online environment can be monotonous, which reduces concentration, especially in theory-based subjects. We often turn off our microphones, which leads to boredom. Internet issues also create problems, causing glitches in the middle of lectures. To resolve these, we often need to leave the online platform, and by the time we rejoin, the teacher has moved on to another topic, creating a knowledge gap. This makes it hard to stay engaged."

- Sociology

"Online classes offer the flexibility to be attended while multitasking, which is an advantage over offline classes. I find both modes of learning highly effective. However, teachers should provide quality learning materials and effective guidance."

- Geology

"In Botany subjects, the dissection paper related to plant anatomy is very challenging to learn online. It relies on practical learning, but the main issue is that most classes focus on theory instead of hands-on practice."

- Botany

“On the positive side, online learning offers flexibility. However, on the downside, staying attentive is challenging since we are not in a physical classroom. Additionally, family members often do not recognize this mode of learning and expect us to do household chores.”

- Electrical Engineering

“On the positive side, online learning is very flexible, allowing me to attend classes while working and multitasking, which is why I prefer it. However, on the negative side, I don't attend classes regularly and often miss them. Discussions in online classes are not smooth or fluid due to low bandwidth, creating significant communication barriers, as internet strength varies across locations.”

- Education

“On the downside, online learning reduces concentration as it is too comfortable, causing us to gradually lose our seriousness. Even teachers cannot give their full effort since we remain invisible to them. Additionally, our grades tend to drop significantly in online mode compared to offline learning. Overall, I do not prefer online learning.”

- History

3. What is your major benefit of online classes during pandemic?

“YouTube has helped me a lot, apart from zoom and google meet apps, I benefitted much from PDF lessons, recorded videos and recorded lessons uploaded in the internet.”

- Mathematics

“Online learning has enabled me to excel in my class, as I remain dedicated and serious throughout, while most of my classmates do not put in their full effort. My perseverance while learning through online mode has allowed me to stand out.”

- Mathematics

“Online learning demands a significant amount of self-study. During the quarantine period, we had the opportunity to utilize our time effectively by exploring and reading extensively, as our schedules permits us.”

- Sociology

“It saves money on fuel while enhancing my technological skills, such as creating PDFs, converting notes, and using various apps. In this way, online learning has been beneficial to me.”

- Sociology

“In online learning, pre-recorded lessons are available for review and can be accessed later, especially useful as exams approach. This is something I personally benefit from, which isn't possible in a physical classroom.”

- Sociology

“At MZU, postgraduate classes are held in physical classrooms since they start later, whereas undergraduate classes follow an offline mode. During my BA, we attended classes in online mode, which allowed me to help my parents. Additionally, as a member of the College Students' Council, I had more time to support other students.”

- Geology

“Online classes have benefited me by allowing me to create my own notes and explore various websites that support my educational needs.”

- Botany

“Receiving learning materials in PDF format via WhatsApp in a timely manner is highly beneficial for me, which is not the case in offline classes. In offline learning, we have to create our own notes, whereas in online mode, teachers not only explain concepts during class but also provide adequate learning materials, making the process more effective.”

- Electrical Engineering

“It has helped me improve my technical skills, such as the ability to use online learning platforms, along with many other improvements.”

- Education

“I do not have any kind of benefit from online mode learning.”

- History

4. What was your experience with examination in online mode?

“Online mode of exam is not effective, there is lack of seriousness among the student, its feels similar to Open Book exams, it leads to unfair exams with lot of cheating as teacher were not strict enough.”

- Mathematics

“Online exams have encouraged widespread cheating, with only a few students maintaining their integrity.”

- Mathematics

“During my undergraduate studies, online exams were conducted in an open-book format, lasting 9 hours. In this format, teachers provided essay-type questions worth 20 marks, and we could search for answers online using articles and other resources.

However, at MZU, the exam process is much stricter. We are required to keep our faces and answer sheets visible on camera throughout the exam. The laptop position must be adjusted perfectly for teachers to monitor us, which poses significant challenges for those without adequate space. The limited time for the exams forces us to read and understand questions quickly, often leading to misinterpretation. Keeping the video on during the exam adds to the pressure and anxiety, which has caused me to lose as many as 16 marks on occasion. The constant monitoring by teachers creates additional stress, making this format far more intense compared to open-book exams.”

- Sociology

“Online exams often lack fairness, as teachers cannot monitor students effectively. In standardized exams like UGC NET, cheating is nearly impossible due to strict measures, but this is not the case with our postgraduate online exams. The exam pattern fails to ensure fairness, with some students even copying entire exams by keeping study materials in front of them, out of the teacher’s view.”

- Sociology

“I strongly disagree with online exams, as they don't effectively showcase our potential or bring out the best in us. We are required to remain visible on screen throughout the entire exam, and once, due to internet issues, I accidentally left

the exam platform without realizing it. This was very exhausting and stressful, making the experience terrible.”

- Sociology

“I prefer offline mode exam over online mode as there is less pressure and less tension.”

- Geology

“Online exams feel highly artificial, and I dislike taking them because they also encourage a lot of cheating.”

- Botany

“Online exams are not fair and encourage a lot of cheating. During that period, despite the lockdown, as permission was granted by the Task Force to move around, we used to take exams together with a group of friends at home. During online exams, I often fear that my answer sheet might not be delivered via email. On one occasion, my answer paper was not sent successfully, but the issue was later resolved by the teacher. Teachers were also very approachable and highly understanding toward students.”

- Electrical Engineering

“Online exams are not fair, as they encourage a lot of cheating, which highlights the varying levels of integrity among individuals. Just because someone turns on their screen doesn't necessarily mean they have integrity. Overall, I do not prefer online exams, as I believe they are not effective.”

- Education

“I have faced no issues with online exams during my postgraduate studies. However, during my undergraduate years, I encountered several challenges, primarily because the exams were open-book. Having access to learning materials gave the impression that studying was unnecessary. Moreover, open-book exams tend to have higher difficulty levels, often forcing us to take risks with our answers, leading to lower marks. Ultimately, open-book exams make us even lazier.”

- History

5. Which kind of online learning platforms are you most comfortable with?
Why?

“Google Meet is most preferable because it is easy to handle.”

- Mathematics

“I prefer Google Meet the most as it is easy to be handled by both the teacher and student.”

- Mathematics

“I prefer using Zoom the most at MZU. However, on Google Meet, the links are created hastily and in a disorganized manner by our Class Representative, making the process quite chaotic.

During my undergraduate BA studies, we used an online model that was well-structured, carefully planned by the Institution, and not chaotic, making it an enjoyable experience.

Table 4.103

Institutional Differences in Conducting Online Classes During the COVID-19 Pandemic

**TATA INSTITUTE OF MIZORAM UNIVERSITY (MZU)
SOCIAL SCIENCES, (TISS,
Guwahati off campus)**

<i>Class Management:</i> Online classes were conducted via Zoom. Students received class links daily through Gmail, which the administration prepared. The schedule was fixed, and links were valid only during the class time. For instance, if a class was scheduled from 11:00 AM to 1:00	<i>Class Management:</i> Classes were conducted using Google Meet. Links were prepared by Class Representatives (CRs) and shared in advance. Students had to request permission to join the class.

PM, students could join anytime before 1:00 PM.

Study Materials: All study materials were made available on a special website (TISS-SMS). Assignments, articles, submitted PowerPoint presentations, and video lectures were uploaded here. Students were required to tick a checkbox after completing materials to track their progress. Assignments were submitted through the same platform, with deadlines strictly enforced. If students missed the deadline, they had to email their professors with an explanation. Classes were also conducted in chat mode on the website, where teachers posted discussion topics, and students participated via comments. This system was formal and structured compared to platforms like WhatsApp.

Exams: TISS conducted open-book exams. Students were given nine hours to complete an 80-mark paper. Answers were typed in Word, converted to PDF, and uploaded to the TISS-SMS

Exams: Exams were held on Google Meet. Students had to turn on their video cameras, showing their faces, hands, and answer sheets. After the exam, they reported the number of pages they wrote in the Google Meet chat. Answer sheets

platform before the deadline. If the deadline was missed, students had to contact their professors. Recognizing the challenges faced by students without proper technology, the administration provided laptops and data packages. Laptops were returned after exams and dissertation submission.

were then scanned and emailed to the department within 5-10 minutes. If there were technical issues, students had to inform their professors immediately.

Table 4.104

Comparison Table: TISS vs. MZU

Aspect	TISS	MZU
Platform for Zoom Classes	(links sent by Google Meet (links created by administration via Gmail)	Class Representatives)
Study Material Management	Uploaded to TISS-SMS; assignments submitted on the platform with strict deadlines.	Shared in WhatsApp group chats; assignments submitted via WhatsApp or email.
Discussion Mode	Conducted in a dedicated website chat mode, ensuring structured academic discussions.	Discussions held in informal WhatsApp chats.

Aspect	TISS	MZU
Examination Format	Open-book exam; answers typed, converted to PDF, and uploaded.	Proctored exam on Google Meet; handwritten answers scanned and emailed after completion.
Support for Technology	for Laptops and data provided to No students who needed them.	special technological support provided.

This comparison highlights the differences in structure and formality, with TISS following a more systematic approach compared to MZU's relatively informal system."

- Sociology

"Zoom meetings are enjoyable to use because creating links is simple, while Google Meet is more convenient, especially since it operates smoothly without technological glitches. It allows for scheduling classes at regular intervals and ensures students receive timely notifications about class timings. WhatsApp is the best app for sending and receiving PDF learning materials."

- Sociology

"I enjoy employing Google Meet as it is easily accessible with minimum problem."

- Sociology

"I prefer Zoom meeting as it is easy to handle."

- Geology

“I prefer Google Meet the most because it is simple and easy to use. It doesn’t require creating a new email to join a class; we can log in directly with our Gmail account.”

- Botany

“I prefer Google Meet because it is simple and easy to handle.”

- Electrical Engineering

“I prefer the platform created by Microsoft, and aside from that, Zoom meetings are good as they have minimal issues. Specifically, I feel Microsoft is better for teachers because it is much simpler to use.”

- Education

“I prefer Google Meet the most because I am most familiar with this app.”

- History

6. Did you have any difficulties in the use of online learning method?

“Grasping conceptual knowledge is difficult because classroom lectures and video lectures are vastly different. Attending online classes from the comfort of home often makes me feel dull and lethargic. I struggle to give my full attention and concentration due to the lack of proper seating arrangements at home. Effective online learning requires a separate, quiet room free from noise and distractions from family members. The lack of privacy creates numerous challenges during online classes.”

- Mathematics

“The primary issue is network instability, and in online learning, it is challenging to establish a strong rapport between students and teachers due to limited interaction. Older teachers, in particular, struggle to manage online

learning platforms, making the experience more difficult for them than for students.”

- Mathematics

“The major challenges include technical issues, high internet data consumption, lack of Wi-Fi access, and frequent Wi-Fi disruptions. Additionally, there is limited interaction, insufficient space for attending classes, difficulty getting into a learning mindset, and classes that often lead to sluggishness as I often attend classes on bed. There’s also a lack of a sense of belonging to the class and difficulty maintaining concentration, which are significant issues faced during online learning.”

- Sociology

“I do not encounter much problem while learning in online mode.”

- Sociology

“Yes, internet issues and power supply problems were a challenge. During that time, my father was seriously ill, and I had to care for him, which affected my concentration during online classes. On one occasion, a doctor unexpectedly visited while I was in class, and another time, I had to deal with water supply issues while attending class. It felt like my hands were very full.”

- Sociology

“Connectivity issues are a major challenge, especially for those in rural areas. Additionally, being at home means attending to family needs, as they may not fully understand the concept of online classes. It is also easy to lose track of class timings, making it difficult to keep up.”

- Geology

“Internet issues are the main challenge in online learning, making it very difficult to stay attentive.”

- Botany

“Being a technical field, online learning cannot provide the same level of understanding as offline learning, especially for subjects requiring practical work. We often have to revisit the material beyond class lectures. While the 2nd to 6th semesters were conducted online, the 7th and 8th semesters were held offline.”

- Electrical Engineering

“Network issues are a major problem due to location constraints, and there are also many environmental distractions.”

- Education

“My main problem in the use of online learning method is lack of concentration.”

- History

7. Is it easy to follow online etiquettes? Yes/No? Why?

“Following online etiquette is challenging due to connectivity issues. At that time, every student was required to have two mobile devices to monitor themselves during classes, which created numerous problems. Owning two devices was impossible for most students, and even having just one device was a struggle for many. Additionally, we attended online classes in casual attire rather than formal dress.”

- Mathematics

“The online etiquette we follow includes muting our microphones during classes, keeping our cameras off most of the time, and refraining from asking queries randomly during lectures.”

- Mathematics

“I respect the teachers' presence which makes me keep my camera on during classes. I don't usually have any questions during the sessions, but since the

classes are held without in-person contact, following proper online etiquette becomes challenging. I typically attend online classes in casual home attire.

Another problem with online learning is that it's simple to become sidetracked and engage in other activities. We don't have proper class breaks, and it often leaves us feeling hungry. At MZU, teachers and HODs conduct classes at their own pace and convenience, without taking students' opinions into account. Although we share our concerns and express our preferences, they are often ignored, and teachers are not flexible in adapting to our needs."

- Sociology

"Online etiquette varies depending on the teacher's preferences. While we typically avoid attending classes shirtless or in tank tops, we often attend in casual home attire. Some teachers allow both the camera and microphone to remain off, leading to laziness, distractions, or even sleeping during class. However, other teachers require the camera and microphone to be on and actively engage us with questions, keeping us attentive. This highlights the crucial role teachers play in shaping and managing the online learning environment."

- Sociology

"In terms of online etiquette, I make sure to be punctual and use respectful language when typing queries. I keep my mic muted during classes, only unmuting it if the teacher asks. I rarely turn on my camera unless instructed, but in HOD classes, turning on the camera is required. I typically attend classes in casual home attire."

- Sociology

"There is little etiquette observed, as we use video calls only for exams due to frequent signal issues. Occasionally, teachers requested our cameras on while taking attendance."

- Geology

"We usually attend class in our home casual attire."

- Botany

“The online etiquette we follow includes keeping the mic muted and unmuting only when answering questions, as well as keeping the camera on throughout class lectures. I usually attend classes wearing a decent top above the waist, as the lower body remains unseen.”

- Electrical Engineering

“The online etiquette we follow includes keeping the mic muted as well as keeping the camera on throughout class lectures. I usually attend online class in my casual dress.”

- Education

“We generally adhere to online etiquette, but when it comes to turning on the camera, we usually keep it off.”

- History

8. Before each class, did the teacher remind you to obey guideline of online etiquettes?

“No, the teachers don't remind us to follow online etiquette guidelines because it's also their first time using the online model, and they're unsure how to manage it. Additionally, many teachers, especially older ones, struggle with handling the online learning platform. They lack the knowledge to operate gadgets and are unable to create PowerPoint presentations or slides, which highlights the challenges teachers face in online learning.”

- Mathematics

“No, it depends on our common sense.”

- Mathematics

“Yes, teachers allow us to edit our email usernames to more formal ones. For example, if a student's email ID is something like Jungkook 123 or Babygirl456, they let us change it to names like Ignes Ralte or Charlotte Hnamte. Similarly, if someone's username is "Dave," they let it change it to "David." This is done to make it easier for teachers to identify and address students by name, especially if the video is turned off, so they can quickly recognize who the student is and understand why the video was turned off.

Sitting through online classes can be challenging, especially when we need to use the restroom. It's also difficult to request permission to leave during class, as we're the ones making the request. When we're not in our seats, teachers tend to call out our names. Additionally, family members often invade our privacy due to a lack of personal space, and distractions arise when doing tasks like laundry, housekeeping, etc."

- Sociology

"No, just the HOD requires students to turn on their cameras during classes."

- Sociology

"No, teachers do not tell us to obey online etiquettes."

- Sociology

"We don't use LMS, we use WhatsApp for sending Assignments."

- Sociology

"No, there is no such things."

- Geology

"Yes, teachers sometimes ask us to turn on our cameras to prevent us from sleeping during class."

- Botany

"The majority of teachers are very strict about online etiquette, requiring us to keep our cameras on throughout class lectures, while only a few do not expect us to do so."

- Electrical Engineering

"Mic muted and turning our camera on."

- Education

"None of the teachers strictly enforce online etiquette."

- History

9. Did you find LMS (Learning Management System) useful in uploading assignments?

“We do not use LMS, we use WhatsApp for uploading Assignment.”

- Mathematics

“We do not use LMS, we use WhatsApp to send assignment.”

- Mathematics

“We do not use LMS, we sent assignment privately in WhatsApp.”

- Sociology

“No, we don’t use it, email and WhatsApp are used.”

- Sociology

“We do not use LMS, we sent assignment through WhatsApp.”

-Sociology

“We do not use LMS, for assignment submission we use Google Classroom.”

- Geology

“Yes, we occasionally used LMS to send notes and assignments for a short period, but later, we primarily used Google Classroom for sharing notes and submitting assignments more frequently.”

- Botany

“We do not use LMS, we convert our assignment into PDF format and sent it to teachers via mail.”

- Electrical Engineering

“We use the LMS only occasionally, but mostly rely on email to submit assignments.”

- Education

“We do not use LMS, we use mail for uploading assignment.”

- History

10. Is your overall expectation the same as or different from tradition class?

“Online learning doesn't always meet expectations, but at present, everyone is adapting, and the online mode has the potential to improve. The online environment can feel artificial and sometimes seem like a hyperreality, so developing the skills to manage it effectively is crucial. However, online learning has made many things easier, particularly for those in rural areas, as it offers them a great deal of convenience.”

- Mathematics

“I view offline and online learning as equally balanced (50/50), each with its own advantages and disadvantages. However, online learning often falls short of expectations.”

- Mathematics

“Online learning doesn't fully meet expectations, but while it's not the ideal method, it serves as a decent substitute for traditional learning.”

- Sociology

“Online learning is entirely different from traditional learning, as physical classes provide a sense of belonging and a real classroom environment. Paying attention in online learning is quite challenging, and it becomes difficult to make requests or ask questions to teachers, as they often miss our messages in apps like Zoom. When we turn on our microphones, voices tend to overlap, causing confusion. Exams and results are also negatively impacted by online learning due to cheating, leading to significant variations in marks, with cheaters often scoring higher. For these reasons, I strongly prefer physical classes over online learning.”

- Sociology

“Online learning isn't as effective as physical classrooms, but it serves as a decent substitute when needed.”

- Sociology

“The main difference between online and physical classrooms lies in online exams, which come with a lot of pressure and consume time quickly. Staying attentive in online classes is challenging, and there is often a lack of seriousness. However, physical classrooms help save money, while online mode is less exhausting. It is also more suitable for females, as they are often responsible for household chores, which add to their fatigue.”

- Geology

“Online learning is quite decent, but overall, offline is better as it helps us stay more attentive.”

- Botany

“Online learning has significantly weakened our education system, and I strongly disagree with it. While it may be beneficial for students with perseverance, determination, and integrity, for most students lacking these qualities, offline learning is preferable as it fosters a sense of competition.”

- Electrical Engineering

“Our experience with online learning is new, making it difficult to set clear expectations. Generally, it does not match the standard of physical classes due to a lack of discipline. However, I believe that with time, we can adapt and make better use of it compared to the past few years.”

- Education

“Online learning does not meet expectations due to the irregularity of classes, especially at the undergraduate level. However, it is slightly more regular in postgraduate studies, as teachers at MZU tend to be more sincere.”

- History

11. Are Webinars helpful for growing your knowledge? Yes? No? Why?

“No, it's very hard to stay attentive during webinars. In fact, I don't even absorb more than 20% of the knowledge on the topic.”

- Mathematics

“Webinars are not beneficial for us, as most topics are designed for scholars and are difficult to comprehend. Individual interests vary significantly, and the content is often too advanced for most students to understand.”

- Mathematics

“I don't gain much from webinars; we usually attend them just for the sake and to mark our attendance.”

- Sociology

“No, I don't benefit much, we usually attend webinars only for the sake of attendance.”

- Sociology

“I don't usually attend Webinars and it doesn't help me at all.”

- Sociology

“It depends on the webinar topic. I benefit from webinars that align with my interests, but if the topic doesn't interest me, I don't gain much. Additionally, they aren't considered mandatory, so we don't usually take them seriously.”

- Geology

“Yes, webinars are very helpful, as the shared information is valuable. For instance, webinars help us to acknowledge PhD-related topics which are not common, also they provide insights into the areas we may pursue in our higher studies, offering me more knowledge.”

- Botany

“We do not attend Webinar.”

- Electrical Engineering

“I believe webinars are generally valuable and beneficial as they provide exposure to new experiences.”

- Education

“I do not find Webinar useful at all.”

- History

12. How do you provide feedback to teachers?

“I usually provide feedback and clarify my doubts privately through phone calls or WhatsApp, as asking questions during Zoom classes is difficult.”

- Mathematics

“We provide feedback through phone call and WhatsApp.”

- Mathematics

“I usually gave feedback through WhatsApp, if not, teachers gave us 10 minutes to clarify our doubts at the end of the class, we ask them.”

- Sociology

“I use Phone call and WhatsApp for feedback and assignments.”

- Sociology

"I use WhatsApp and Phone call to give feedback."

- Sociology

"We use phone call and WhatsApp for giving feedback to teachers."

- Geology

"In a physical classroom, we usually give feedback directly, but when it's not in-person, we rely on WhatsApp and phone calls to share feedback."

- Botany

"We give feedback through WhatsApp."

- Electrical Engineering

"I typically use WhatsApp to provide feedback, but I rarely encounter issues since I do not attend online classes regularly."

- Education

"I give feedback through WhatsApp after class session is over."

- History

13. Is feedback helpful to you?

"Yes, feedback helps me a lot as I can clarify my doubts and I prefer that and I benefitted personally."

- Mathematics

"Ye, it is very helpful."

- Mathematics

“I don't typically give feedback to teachers; I mainly use it to clarify doubts and inquire about assignment deadlines.”

- Sociology

“Yes, I benefit very much.”

- Sociology

“Feedback is very helpful to me, as the teachers are supportive and approachable. We create schedules that work for both sides, and they clear up any doubts through calls or WhatsApp.”

- Sociology

“Yes, feedback is useful, but we don't usually have complain regarding that, it depends on us.”

- Geology

“Yes, feedback is very helpful.”

- Botany

“Yes, feedback is helpful.”

- Electrical Engineering

“I do not usually have any complain.”

- Education

“Yes, I benefit from feedback.”

- History

14. What is kind online learning model that you would like to see continued?

“I prefer hybrid learning where I can choose between online and in-person.”

- Mathematics

“I prefer synchronous online learning because its time-bound structure instills a sense of obligation, encouraging sincerity and regular attendance.”

- Mathematics

“My preferences for the type of online learning are based on age group. For K-12, I prefer synchronous learning, as time constraints can create a sense of obligation. Asynchronous learning is more suitable for competitive formats, self-paced learning is ideal for job preparation and expanding knowledge.”

- Sociology

“I am not in favor of online learning, but if circumstances require it, I prefer synchronous online learning. Having fixed timings creates a sense of obligation and commitment to our studies.”

- Sociology

“Blended learning and asynchronous online learning are the most preferred methods to meet learners' needs and provide access to recorded lessons.”

- Sociology

“I prefer asynchronous mode as I can look back to recorded lessons when exam is coming”

- Geology

“I prefer asynchronous online learning because it includes recorded lessons that we can review when exams are approaching or when we don't have time to attend live classes.”

- Botany

“I prefer hybrid learning, where we can choose between online or offline modes, as it also encourages self-paced learning.”

- Electrical Engineering

“I prefer asynchronous online learning the most.”

- Education

“I consider both synchronous and asynchronous online learning very effective because synchronous helps us adhere to a fixed class schedule whereas asynchronous provide us with recorded lesson which is highly helpful when exam is approaching.”

- History

15. What is challenging about online learning model that you would like to suggest improved?

“Subjects that involve practical and laboratory work, such as computer programming, are very challenging to manage in an online format.”

“To improve online learning, I suggest enhancing the clarity and organization of class videos. Instead of relying solely on PowerPoint slides, incorporating a digital whiteboard with a digital pen for explanations would make the teaching process more engaging and effective. Using the whiteboard to explain concepts, provide examples, and solve problems, particularly in the case of theorems can greatly enhance understanding. Relying only on slides can make the learning experience monotonous, while a more interactive approach with a digital whiteboard can bring lessons to life.”

- Mathematics

“Teachers' inability to adopt technology has caused numerous issues. Instead, teachers should use tablets for conducting online classes and integrate digital whiteboards with pens, as this would be highly effective. Additionally, teachers should create questions based on the class lectures, ensuring better engagement. Unfortunately, many teachers are negligent in the online format.”

Internal tests and exams should be taken more seriously, with exam questions designed to prevent cheating. This could be achieved by setting 4 or 5 carefully crafted questions that make cheating difficult.”

- Mathematics

“Improving technology and software within the institution would be the best suggestion. A large institution like MZU likely has sufficient funds to adopt better practices, and I believe they should focus on that. This could include implementing simple, easy-to-follow rules, supporting financially challenged students by providing them with necessary tools and devices, and setting up a return policy for those tools and devices after use.”

- Sociology

“I prefer slide to make lesson more effective, only lecture by the teacher alone is not effective and very meaningless, their voice also become glitches due to unstable internet , instead of giving us notes by let us writing down and expect us to give them feedback, the best possible solution might be thorough explanation through appropriate Slides will make us more effective and make learning meaningful, without even turning our camera on, slide makes us attentive and making note is very easy with the help of readymade slide.”

- Sociology

To reduce the monotony of the online environment, teachers should create a lively classroom atmosphere that feels more like a real classroom. Additionally, teachers should enhance their technological skills to better create an environment that mimics the dynamics of in-person classes.”

- Sociology

“In the science discipline, lectures with diagrams, illustrations, and animations should be emphasized over slides with text. This visual approach would be more effective and improve our comprehension, as it goes beyond learning from text alone.”

- Geology

“Internet issues create many problems, especially in practical work. Pre-recorded lessons for practical classes would be very effective, and it's helpful if the teacher can address any queries in the next class. As for PPTs, slides with too many pages, like 50, are not ideal, as they can make students hesitant to attend the class and eventually make the lecture boring. Instead, creating PPTs with fewer slides, around 10 pages, is much more recommended. This way, students don't feel overwhelmed by reading slides, and if more lectures and examples can be provided, it will make the learning experience more effective.”

- Botany

“Practical work requires hands-on experience, and if it's not done in a laboratory, it often demands many tools and a significant amount of money. To address this, in order to understand our lessons better through online mode, teachers should make themselves visible while explaining practical work and use a whiteboard with a digital pen, offering explanations with appropriate examples, similar to what we see on YouTube.”

- Electrical Engineering

“In online classes, teachers should adopt a stricter approach and promote more interactive discussions rather than one-way communication. To achieve this, the flipped classroom model should be encouraged, where teachers assign topics for students to study at home and then discuss with them in the next class. This approach would allow all students to participate actively and enhance two-way communication.”

- Education

“Class lectures should prioritize diagrams and visual presentations. For instance, in a history subject, if the topic is related to World War, the PPT should include images such as a leader delivering a speech during the war. Incorporating visual elements that aid in visualization should be encouraged in class lectures.”

- History

CHAPTER-V

MAJOR FINDINGS, DISCUSSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

This chapter presents the major findings derived from the analysis of data and discusses them in relation to the objectives of the study and existing literature. Based on these findings, suitable recommendations are offered, followed by suggestions for further research to extend the scope of the present study.

5.1 Major Findings

5.1.1 Findings related to the Perception and Attitude of university teachers towards online teaching

The study found that 65% of teachers had a moderate or neutral perception of online learning, while 19% held a positive perception and 16% had a negative perception. With regard to teachers' attitude towards online teaching, the study found that most of the teachers of about 63% had a moderate or neutral attitude of online teaching, while 21% held a positive attitude and 16% had a negative attitude.

a) Influence of gender of teachers on their perception and attitude towards online teaching process

The study found no significant difference in university teachers' perception or attitude toward online teaching based on gender, leading to the retention of the null hypothesis.

b) Influence of type of institution of teacher on their perception and attitude towards online teaching process

The study found no significant difference in university teachers' perception or attitude toward online teaching based on their type of institution (ICFAI and MZU), leading to the retention of the null hypothesis.

c) Influence of disciplinarity (non-STEM & STEM) of teachers on their perception and attitude towards online teaching process

The study found no significant difference in university teachers' perception or attitude toward online teaching based on their discipline-specific (Non-Science and Science) influence, leading to the retention of the null hypothesis.

5.1.2 Findings related to the Perception and Attitude of university students towards online learning

From the findings of the study, it is found that majority of the students (73%) possess a neutral perception towards online learning, while 13% of students exhibit a positive perception and in contrast 13% of students perceive it negatively. With regard to the attitude, the majority of the students (73%) possess a neutral attitude towards online learning, while 13% of students exhibit a positive attitude and in contrast 14% of students exhibit a negative attitude.

a) Influence of socio-economic status of students on their perception and attitude towards online learning process

Comparison of the Perception of university students with respect to their Socio-Economic Status: The study found a significant difference in students' perceptions of online learning based on socio-economic status (SES), leading to the rejection of the null hypothesis. A post-hoc t-test with Bonferroni correction revealed that upper SES students had a significantly higher perception of online learning than middle SES students, with a 95% confidence level.

Comparison of the Attitude of university students with respect to their socio-economic status (SES): The study found a significant difference in students' attitude of online learning based on socio-economic status (SES), leading to the rejection of the null hypothesis. A post-hoc t-test with Bonferroni correction showed that lower SES students had a significantly more positive attitude toward online learning than middle SES students, with a 95% confidence level.

b) Influence of gender of students on their perception and attitude towards online learning process

The analysis of the study found no significant difference in university students' perceptions and attitude toward online learning based on gender, leading to the retention of the null hypothesis. Both genders possess neutral perception and attitude towards online learning.

c) Influence of locale of students on their perception and attitude towards online learning process

The analysis of the study found no significant difference in university students' perceptions and attitude toward online learning based on locale, leading to the retention of the null hypothesis.

d) Influence of disciplinarity (non-STEM & STEM) on students' perception and attitude towards online learning process

The analysis found no significant difference in university students' perceptions or attitudes toward online learning based on discipline (*non-STEM & STEM*), leading to the retention of the null hypothesis.

e) Influence of institution of students on their perception and attitude towards online learning process

The analysis found no significant difference in university students' perceptions toward online learning with regard to their institutional belonging retaining the null hypothesis, however significant difference was observed in university students' attitude toward online learning rejecting the null hypothesis. It was found that ICFAI university students had higher positive attitude in comparison to Mizoram university students.

5.1.3 Attitude towards Technology

69% teachers were found to possess a moderate or neutral attitude towards technology, and around 15% of teachers possess a positive attitude and 16% of them exhibit a negative attitude.

70 % students were found to possess a moderate or neutral attitude towards technology, and around 16% of students possess a positive attitude and 14% of them exhibit a negative attitude.

The study found no significant difference in university teachers' Attitude toward Technology based on gender, type of institution (ICFAI & MZU), or discipline (Non-Science & Science), leading to the retention of the null hypothesis.

The analysis also found no significant difference in university students' Attitudes toward Technology based on gender, locale, disciplinarity and type of institution leading to the retention of the null hypothesis. However, a significant difference was observed on socio-economic status (SES), resulting in the rejection of the null hypothesis. Post-hoc analysis with Bonferroni correction confirmed that attitudes toward technology differed significantly across SES groups, with middle SES students scoring higher than lower SES students but lower than upper SES students.

5.1.4 Usage of technology and teaching-learning platforms among university students and teachers of different disciplines

Technology usage by university teachers was limited to use of Personal Computer, Laptops and occasionally Mobile Phones. Some teachers also mentioned of using Smart TV and Tablets for conducting online classes.

Moreover, it is evident from the findings that the most commonly used teaching-learning platforms used by university teachers were – Google classroom, Zoom Meet, WhatsApp, Google Drive, Google Meet. However, some Department like Education mentioned Webex and Telegram, Management mentioned ChatGPT, Social Sciences mentioned Telegram, Webex and Cisco, School of Engineering mentioned Microsoft Teams and Cisco.

As far as devices used by students are concerned most students mentioned using Personal Laptops, Computers, Mobiles, Tablets and exceptionally few students mentioned Smart TV.

It is evident from the findings that the most commonly used teaching-learning platforms used by university students were – Google classroom, Zoom Meet, WhatsApp, Google Drive, Google Meet. However, some Department like Mizo mentioned about Webex and some departments of Engineering also mentioned Microsoft Teams and Cisco.

5.2 Major Findings from Open Ended Responses

5.2.1 Major Findings from Teachers' Response

Following are the main challenges highlighted by teachers through open-ended responses:

1. Internet issues: Teachers expressed that internet issues on both sides, low bandwidth, difficulties in ensuring students' attention due to connectivity problems and unequal internet access creates learning disparities.
2. Lack of physical interaction: Teachers reported that due to minimal physical interaction absence of eye contact, students were unwilling to engage with lessons and hesitant to respond due to shyness, they can't manage and monitor classroom and control student behaviour effectively.
3. Students turn off their cameras: Teachers stated that when students keep their cameras off, they are unable to observe body language and reactions, students tend to be hesitant in providing immediate feedback, making it difficult to assess engagement and determine whether students understand the lessons. To enhance learning, teachers recommended students to turn on their cameras during class while also keeping their microphones muted.
4. One-way communication: Teachers argued that online learning often feels like one-way communication, as they deliver lectures without receiving feedback or participation from students, who are reluctant to engage in class. Furthermore, it has

been reported that online learning closely resembles distance education, which reduces its effectiveness.

5. Distractions from family members: Distractions caused by family members further disrupt focus, divert students' attention, and reduce their level of seriousness due to household movements and noise.
6. Frequent power cuts: Irregular power supply during delivery of instruction greatly hinders effective teaching. Frequent power cuts are reported to be common during monsoons seasons.
7. Limited access to essential resources: Essential and vital resources such as unequal internet access and devices such as mobile phone, Wi-Fi and laptops are not readily accessible to some students which impact online learning.
8. Disparity in digital literacy: There is a significant gap in digital literacy, as some students lack the necessary skills and experience to navigate online platforms effectively.
9. Language barriers: Language barriers pose a challenge specifically to some students who struggle with English, whereas in a physical classroom, teachers could clarify concepts in the local language. This lack of support in online learning makes comprehension more difficult.
10. Background noise: Background noises which arise from household noise, environmental and technical glitches pose problems and diverts students' attention and concentration during learning session.
11. Multitasking during lessons: It is reported that students tend to multitask with personal preferences and household activities during lessons which hampers effective learning.
12. Cheating in online assessments: It is evident that online exams enable students to commit unfair means since there are no direct supervision, invigilation and control from teachers.
13. Unfamiliarity with technology: Experiencing virtual learning for the first time proved to be challenging for students, as unfamiliarity with technology diminishes student engagement and interest.
14. Lack of study materials: Lack of study materials such as recorded lessons, PDFs and limited access to materials poses problems in students' learning process.

15. Inability to address individual student needs: Teachers' inability to cater to individual learning needs in online education blocks individualized support and guidance received by students.
16. Students struggle with in-depth understanding: Teachers claimed that students struggled with in-depth understanding and neglect acquiring knowledge, especially in technical subjects like programming which further affect their dedication and seriousness in online learning.
17. Poor time management: Poor time management due to negligence of online classes and lack of self-discipline of students hampers effective delivery of lessons and classes.
18. Ethical concerns: Ethical concerns in online class such as students log in to online classes but remain inactive, pretending to be present, digital divide and unequal access to learning devices and better internet are the primary unfair academic performance which further impact learning.
19. Hesitation due to shyness: Due to minimal interaction in online learning, shy and introverted students tend to feel shy or hesitant to ask questions and struggle to clarify doubts which make it difficult to assess their understanding.
20. Neglecting sincere students: In online classes, the anonymity of students often results in sincere learners going unnoticed, while those who are less dedicated manage to progress effortlessly.
21. Gender impact: It is evident from the study that gender do not have influence on the attentiveness of students during online classes, which means that both male and female students actively engaged and demonstrate proficiency in handling learning devices.
22. Online etiquette: Teachers consider turning on the camera, muting speakers, attending class quietly, responding when asked questions, and maintaining punctuality as the key aspects of online etiquette expected from students.
23. Health issues: It is evident that teachers experienced several health problems, fatigue and mental exhaustion due to due to prolonged screen exposure and continuous sitting for long hours.

5.2.2 Major Findings from Students' Response

Following are the main challenges highlighted by students through open-ended responses:

1. Technology Anxiety: Students reported that lack of adequate training for attending online classes, the fear of being tested for online skills, the absence of two-way communication, the artificial setting and a monotonous and dull experience as a major a reason for triggering anxiety. Additionally, hesitation to clarify doubts due to shyness, network issues during tests or examinations create stress, tensions and pressure, and the inability to attend practical classes adds to their worries.
2. Monotony of online learning environment: In online learning, essential elements of co-curricular activities such as sports, games, and artistic competitions such as dance, poetry, debates, quiz, essay competition, cultural events and other several co-curricular activities, which breaks the monotony of traditional mode learning is utterly absent. Students are overburdened and overwhelmed with workload and merely factual delivery of information through lectures. The opportunity for physical movement, exercise, exhibiting students' potential and skills and engage in various type of learning activity which can help students' holistic development is missed out in online curriculum which negatively affects the overall quality of learning.
3. Low bandwidth: Internet connectivity issues specifically low internet bandwidth has significantly disrupted and hinders effective classes as it causes technical glitches, breaking voice, and lesson gap. Additionally, it is reported that low bandwidth during night time greatly conflict activities during class hours.
4. Unapproachable teachers: Unapproachable teachers is also a part of obstacle that hinders effective online learning reported by students. Students expected teachers to be open and approachable so that they can feel comfortable seeking their help and clarifying doubts. Moreover, they suggested teachers to make time and opportunities for them to express their ideas which in turn can support mental well-being of students.
5. High data consumption: Insufficient data due to high platform consumption during online class sessions pose an obstacle for students, specifically for students who do not own WIFI connection.

6. Irregular power supply: Students experienced sudden power cut or irregular power supply particularly during Monsoon or rainy seasons and their phone batteries drained quickly which disrupts effective delivery of lessons.
7. Lack of Privacy at home: Distraction by family members, household chores, noise pollution, inadequate learning environment, lack of seating area and attending online classes from bed arises due to lack of privacy at home which further affect the students' seriousness, inattentiveness and laziness among the students which further affect the overall effectiveness of online classes.
8. Household chores: Students reported that all types of household responsibilities such as - housekeeping, laundry, babysitting, disposing garbage, handling gas, grocery shopping, storing water during supply, cooking, managing and welcoming unexpected visitors/surprised visitors from locality, friends and family relatives, multitasking online classes with several family responsibilities contributed to distractions from online learning and unable the students to manage time effectively.
9. Online classes as excuse to avoid Jhum cultivation for rural students - Rural students reported that since their economic activities are linked to jhum cultivation, they had to participate actively, making it difficult to attend online classes regularly. Their parents and community often did not grasp the concept of online education, misinterpret it as an excuse to avoid duties. Rural society perceived them as lazy for attending classes during the day, many assumed that students were using online learning as an excuse to avoid their responsibilities in jhum cultivation.
10. Misinterpretation of online classes by family: Students reported that their families often misunderstand online classes, assuming students are free since they are not physically attending school. Some families perceive attending classes as an excuse to avoid chores which add tensions and hesitation among the students.
11. Delays and irregular scheduling disrupt learning: Teachers often schedule classes at their convenience, disrupting students' schedules and disregarding their regular routines. Students recommend classes to follow a regular schedule rather than being conducted based on the teacher's convenience, as irregular timing disrupts students' daily routines.

12. Noise pollution: Noise pollution from traffic and construction, sound from family and neighbouring disturbances hampers students' concentration.
13. Social media distraction: Students are often distracted by social media notification from certain apps and games making the students to frequently checked their devices. This disrupts students' concentration and unable to managed time effectively makes it difficult for them to remain engaged during learning sessions.
14. Lack of interaction: Students expressed that they do not favour online classes over offline class because of limited student-teacher interaction, which hinders the development of rapport. The lack of interaction also leads to one-way communication and a monotonous learning experience, ultimately diminishing their interest and motivation.
15. Preferences on offline over online learning: Offline learning facilitates more discussions, provides easier access to learning materials, and encourages greater student participation through activities like presentations. In contrast, many students feel unproductive in online classes, often turning off their cameras and engaging in other tasks instead of paying attention. The artificial learning environment makes them feel as if they are merely watching videos rather than actively participating in live sessions, and some teachers also lack sincerity in their approach.
16. Short breaks between classes: Students recommend longer breaks between each class as during a short 30-minute lunch, some students were responsible to prepare meals for the whole family, causing them to miss the first session after lunch.
17. Long class duration: Student reported that long duration classes which exceeds 2 hours unable them to balance studies with family-run business and managing household activities. So, they expect and recommend teachers to strictly follow class timings. Moreover, students suggest teachers to prepare in advance, manage time effectively, and complete topics within 30 minutes to sustain students' interest. Classes exceeding two hours often lead to confusion, making it difficult to retain information. Ideally, lectures should be concise, lasting no more than 30-40 minutes, with a 10–15-minute breaks as the possible solution to keep students engaged.

18. Surprise visitors: Housekeeping students struggled with surprise visitors and occasional visits from friends and family, especially when alone at home. Student stresses that managing and welcoming unexpected/surprised visitors from locality, friends and family relatives is one of a big hurdle during online classes.

19. Absence of proper seating area: Due to the lack of sufficient seating space and absence of private study space, students often attend online classes from their beds or in a reclining position, which leads to laziness, drowsiness, and a decline in interest and concentration.

20. The artificial learning environment: Due to the artificial learning environment many students perceive online learning as if they are merely watching videos rather than actively attending live classes. Additionally, students feel that online learning resembles distance education, as it closely mirrors many aspects of distance learning.

21. Night classes: Students reported that night classes overlapping with dinner time cause disruptions, leading to inconsistency in student engagement.

22. Communication barriers: Communication barriers and comprehension difficulties in online classes is caused by several factors such as internet issues, low-quality audio, technical glitches and lecture delivered through non-vernacular language by non-Mizo professor and their accent, one-way communication and limited student-teacher communication.

23. Insufficient learning materials: The lack of learning and supplementary materials combined with poor internet connectivity, inconvenient access to recorded lessons in online learning leads to ineffective online learning. Therefore, students recommend providing study materials and lecture recordings immediately after class, along with fair and transparent evaluation methods, for a better learning experience.

24. Implementing a *flipped classroom approach*: Student proposes to *implement* a flipped classroom approach, where materials are shared beforehand and discussed in the next class as it can encourage deeper understanding and active participation from both the teacher and student.

25. A *blended approach*: Students recommend adopting a blended approach, where study materials are provided asynchronously, while doubts are clarified in synchronous sessions, to enhance learning.

26. A hybrid model: Students suggest implementing a hybrid model that combines both online and offline learning, as it proves more effective, especially when supported by positive reinforcement.
27. Physical and mental health issues: Online learning and its environment have led to both physical and mental health concerns among students. Extended class durations (4-6 hours) result in body aches, nausea, and even conditions like piles due to prolonged sitting. Excessive screen exposure impacts mental well-being, while students who wear spectacles face the risk of deteriorating eyesight. Additionally, mental challenges such as procrastination, FOMO, and ADHD are becoming more prevalent.
28. Open-book exam system: Student reported that the open-book exam system reduces seriousness, affecting long-term retention and discipline. The open-book exam system allows students to refer to textbooks, notes, or other resources while answering questions. However, unlike traditional closed-book exams, it focuses on testing comprehension, application, and critical thinking rather than memorization.
29. Preference for shorter and engaging PPTs over long PPTs: It is evident that overly long or poorly designed PPTs are unproductive. Student propose teachers to prepare in advance, manage time efficiently, and conclude topics within 30 minutes to maintain interest. Moreover, some subjects have overly lengthy and unengaging PowerPoint presentations, which reduce interest. In science disciplines, presentations should be concise and brief, as excessive slides can lead to boredom. While in Arts discipline, it is recommended to use meaningful slides with relevant examples rather than relying solely on explanations without PPTs. Bottomline, student propose lectures to be wrapped up within 30 minutes to maintain engagement.
30. Hands-on-learning: Students highlight that for fields requiring practical work, especially in STEM discipline, hands-on learning should be prioritized in order to gain in-dept knowledge of the subject matter.

5.3 Problems faced by teachers and students during synchronous online teaching-learning process.

5.3.1 Problems faced by Teachers

Following are the primary problems faced by teachers during synchronous teaching process:

1. **Inability to handle learning platform effectively:** More than half of the teachers reported that they struggle to adapt to various online teaching and learning platforms, this issue may arise due to several reasons such as difficulty in capturing students' attention, lack of technical equipment, frequent connectivity disruptions, one-way teaching, unfamiliarity with technology, inadequate online infrastructure, power cuts, and exhaustion from prolonged screen time.
2. **Constraints in online education:** 85% of teachers reported that they disliked the constraints and limitations of online instruction due to several reasons such as internet issues affecting both teachers and students, difficulties in maintaining students' attention and behaviour due to connectivity problems, and the inability to observe students' reactions when cameras were turned off, making it harder to gauge engagement, one-way nature of online teaching limited active student participation, while distractions in the home environment and communication barriers further diminished its effectiveness.
3. **Struggles of Rural Students:** Majority of teachers (98%) claimed that rural students stay behind urban students in online classes due to lack of internet connectivity. Teachers reported that rural students often experience more network disruptions during online classes, lack of essential learning devices, there is also a noticeable disparity in digital literacy, some students lacked the necessary training and familiarity with online platforms, language barriers arise as some rural students struggle with English, which a physical classroom could clarify in their local language.
4. **Power Cuts:** 95% of teachers state that unstable electric supply is a major barrier to attend online classes as sudden power cuts and unstable electric supply hampers effective teaching. Also, the most common issues encounter by both rural

and urban students consists of low bandwidth internet connectivity and inconsistent power supply.

5. Digital Divide: 95% of teachers agreed that digital divide poses stress for students of rural origin due to limited access to essential resources like mobile phones, Wi-Fi, laptops, and stable internet connections, a noticeable disparity in digital literacy, and language barrier such as English.

6. Low quality audio and video: About 15% of teachers mentioned that they are dissatisfied with the audio and video quality during online classes. They reported difficulty in monitoring student behaviours when cameras are turned off, as the lack of body language cues makes it challenging to assess students' understanding. Additionally, poor audio quality due to low bandwidth, technical issues, and background noise negatively impacts the overall teaching experience.

7. Low bandwidth internet: Majority of teachers (about 81%) report they struggled with frequent low internet bandwidth which led to poor signal strength, and this internet issues on both teacher and student sides block the teacher to monitor and control students' attention.

8. Absence of stable internet connections: 93% of teachers assume that most students are not well equipped with a high internet connection that is required for online learning, due to lack of digital literacy, lack of technical equipment and limited access to essential learning devices.

9. Effects of Keeping the Camera Off: Approximately 77% of teachers believe that students turn off their cameras during online classes, which they find undesirable. Similarly, 98% of teachers assume that facial expressions and other social cues are missing in online classrooms. This prevents teachers from monitoring and managing student behaviour, making it difficult to assess their understanding due to the absence of body language cues. As a result, it can lead to inattentiveness, lack of concentration, and a diminished sense of seriousness.

10. Increase cheating in online mode: 97% of teachers assume that students resort to unfair means of passing online tests such as cheating in online mode of examination. Teachers reported that online exams are taken less seriously and widespread cheating in online assessments further hinder effective teaching.

11. Lack of training: Half of the teachers report that their university do not provide adequate training for conducting online classes. Moreover, about 31% of teachers do not consider themselves technologically-proficient. This issue makes the teachers unable to adapt themselves to new educational technologies. As a result, teacher' lack of confidence in technology. Without adequate training, teachers struggle to effectively manage and engage students, and this gap in training adversely impacts the overall quality of online learning and student outcomes.

12. Communication barrier: 32% of teachers feel they lack effective communication skills during online teaching due to - unintentional activation of unmuted audio or video creating background noise, students turning off camera which prevents teachers from observing their body language and behavior. Moreover, a vast majority of the teachers (94%) believe that students lack effective communication skills for online learning mainly due to connectivity issues, digital illiteracy, unfamiliarity with online platform and environment which further lead to lack of concentration, insincerity and inattentiveness. Additionally, language barriers arise when some students struggle to understand English. The teacher stated that the communication barrier in online teaching frequently resembles that of distance education, causing minimal student interaction, ultimately diminishing its effectiveness.

13. Technology gaps: 92% of teachers believe that learner diversity in terms of students' background and access to technology as well as physical distance make online teaching more challenging. Access gap, skill gap and infrastructure gap are the major factors contributing to technology gap.

14. Gender influence on online mode: More than half of the teachers assume that gender do not differ in shaping students' attitude towards online learning. Moreover, less than half of the teacher assume that male students have an advantage over female students in online learning while an exceptionally few teachers of only about 2% assume male students to be more technology proficient than their female counterparts.

15. Inconsistent Student Attendance Throughout Online Lectures: 94% of teachers claimed that students failed to be seated for the entire lecture during online classes, the primary reasons for this are due to students tend to engage in other

activities doing multitasking with household chores and personal preferences, distraction caused by noise and family members, absence of proper seating area, lack of privacy and attending classes from bed and due to poor posture.

16. Physical and Mental health problems: About 79% of teachers reported that they experience ailments such as headaches, back-pain, neck-pain, wrist pain and eye strain due to prolonged usage of mobile phones/ laptops/tablets/PC for online classes. Teachers further reported that they face various health issues while conducting online classes primarily due to prolonged screen exposure, continuous sitting for long hours, teaching for extended periods which exceeds six hours a day, all contributed to mental exhaustion and fatigue.

5.3.2 Problems faced by Students

Following are the main problems encountered by students during synchronous online learning process:

1. Lack of technological skills: The study reported that more than half of the students struggle with technological skills, problem arises due to unfamiliarity with online mode learning, unable to handle online learning platform effectively, causing them to feel uneasy when handling devices either occasionally or consistently.
2. Communication Barriers in Online Classrooms: The study found that majority of students faced communication barriers in online learning, leading to a fear of being misunderstood in online classrooms. Barrier arises from low internet bandwidth, technical glitches, non-Mizo teachers' accent create comprehension difficulties, overly long or poorly designed PPTs, teachers' insincerity, low-quality audio, noise pollution, and many students feel like they are merely watching videos rather than actively attending live classes due to the artificial learning environment.
3. Lack of availability of devices: It is found that some students, around 20% of students, lack personal devices or a reliable internet connection for online learning, while the majority have access to these resources at home for attending online classes. Some student reported that they were required to have two mobile devices to monitor themselves during classes, which created numerous problems. Owning two

devices was impossible for most students, and even having just one device was a struggle for many.

4. Unstable internet connection: The majority of students experience connectivity issues due to an unstable internet supply such as poor audio and video quality, that leads to blurred visuals, glitched screens, and difficulty in following lectures.

5. Issues with accessing materials: The study reported that majority of students faced difficulties in downloading assignments or uploading their completed work due to internet failures. Frequent connectivity issues disrupted their ability to access study materials on time and submit tasks efficiently.

6. Higher Data Consumption in Synchronous Online Learning Compared to Asynchronous Platforms: Majority of the students reported that synchronous online learning platforms consume more internet data than asynchronous platforms which occurs primarily due to live video-streaming, real-time interaction, and continuous data transmission. In contrast asynchronous learning relies on pre-recorded content and downloadable materials, which consume less data.

7. Learning Challenges Due to Lack of Recorded Online Classes: Many students struggle with learning when online class videos cannot be recorded or revisited, as they lose the chance to review concepts, clarify doubts, and catch up on missed content.

8. Device Incompatibility Issues in Online Learning: Many students face device incompatibility problem with the learning platforms used during online classes, leading to difficulties in accessing features, attending classes, or submitting assignments. These problems may arise due to outdated software, unsupported operating systems, or hardware limitations, affecting their overall learning experience. For instance, older computers or smartphones may not support the latest versions of applications like Zoom or Google Meet, causing lag, crashes, or missing features. Similarly, some platforms work best on specific browsers, and students using unsupported ones may face glitches or limited functionality.

9. Lack of Peer Interaction: Most students report that the absence of genuine peer interaction hindered their ability to participate in collaborative activities during online classes.

10. Repetitive Lecture: The majority of students stated that there is boredom in online classes that stemmed from the repetitive nature of lecture-based teaching.
11. Effects of Prolonged Screen Exposure: About half of the students reported that they experienced concentration difficulties caused by harmful radiation from devices used for online classes such as eye strain, headaches, and mental fatigue, making it harder for students to stay focused during lessons.
12. Health Issues from Prolonged Use of Digital Devices: Majority of students reported that they suffer from ailments like headaches, back-pain, neck-pain, wrist pain and eye strain due to prolonged usage of mobile phones/ laptops/tablets/PC for online classes. Poor posture, prolonged screen exposure, and repetitive hand movements contribute to these issues, affecting concentration, productivity, and overall well-being.
13. Prolonged Blue Light Exposure on Student Sleepiness: 92% of students reported that they feel sleepy after prolonged exposure to the blue light from mobile phones and computers. Prolonged exposure to blue light from mobile phones and computers disrupts the circadian rhythm by suppressing melatonin production, leading to drowsiness. It also causes digital eye strain, mental fatigue, and postural exhaustion, making students feel sleepy.
14. Difficulty in maintaining Punctuality: 44% of students claimed they struggle with punctuality in online classes due to household responsibilities, low bandwidth, unstable internet, and classes that lack a fixed or irregular class schedule which are arranged based on the teacher's convenience greatly disrupt students' daily routines and hinder their ability to attend sessions on time.
15. Missing out on lectures: 67% of students reported that they face the problem of missing out a lecture while changing from one online class to another, which is caused by low-bandwidth internet connection which further led to glitches in the online platform, forcing students to leave and rejoin the class. However, by the time they reconnect, the teacher has already moved on to a new topic, leading to a knowledge gap and making it difficult to stay engaged.
16. Declining Interest and Motivation in Online Learning: 80% of students claimed that they lack interest and enthusiasm in learning through online classes. This decline in engagement is largely due to classes extending beyond 40 minutes

and having more than three sessions per day, making it difficult for students to stay focused and motivated.

17. Lack of concentration: Majority of students (91%) reported that their concentration is diverted during online classes. This is caused by long duration of classes, short breaks between classes, distraction from home, noise pollution, lack of seating space, lack of privacy, lack of interaction and discussion, teacher's inability to monitor students led to negligibility, inconsistency of teacher to hold regular classes, artificial classroom, network issues, physical problems caused by prolonged exposure to screen, all of these decreases students' concentration which negatively affects the overall effectiveness of the online learning.

5.4 Major Finding of Students' Interview

1. Most challenging paper in online learning: The study finds that students struggled to cope with subjects which require calculations, abstract concepts and subjects which cannot be grasp by explanation alone such as mathematics, research, theoretical subjects like philosophy, and technical disciplines. It is further reported that while theoretical topics can be understood through reading, mastering calculations requires guidance from teachers to fully comprehend the concepts.

2. Experience of learning subjects through online mode: From the findings of the study, it is revealed that online learning has both pros and cons on students. On the positive side students believe that online learning has improved their technological skills enabling them to navigate various learning applications such as the ability to use online learning platform and Gmail for educational purposes. Students living outside Aizawl district find online learning more beneficial as it offers flexibility for independent learning through recorded lessons and also reduce expenses related to living and transportation costs. It also enables multitasking, provides additional time to complete assignments on schedule, and makes time management more convenient.

On the downside, students find online learning less effective. Long class durations lead to monotony and drowsiness as distractions are more frequent. Online exams drain device batteries quickly, and high data consumption causes stress and tension. Frequent power outages create additional challenges, and excessive comfort fosters laziness, reducing focus and concentration. Technical glitches from internet issues result in learning gaps and communication barriers. Many classes prioritize theory over practical application, and family members often misinterpret online classes as mere excuses. Additionally, the lack of visibility and minimal teacher effort diminishes students' seriousness and decreases discipline.

3. Major benefit of online classes during pandemic: The most prominent benefits of online learning reported by student is that dedicated students tend to excel their fellow students through their perseverance and diligence. Recorded lessons increase accessibility and helpful especially when exams are approaching. It also offers an opportunity to utilize time efficiently due to its flexibility, improves technological skills, and allows students to assist their families with household chores while also supporting fellow students in need.

4. Students' experience with online mode exam: Students strongly dislike online mode exam as they regarded ineffective primarily due to widespread cheating and absence of fairness with only few students maintaining their integrity. The limited duration of exams forces students to read and complete answers rapidly which further lead to misinterpretation and loss of marks. The constant observation and doubt from teachers cause tensions making it more stressful compared to open book exams. Additionally, it is further stated that online mode exams do not showcase students' potential and internet issues during exams which make the experiences more terrible. Additionally, students worry about whether their answer sheets will be submitted on time. In contrast, exceptionally few students find online exams advantageous due to their flexibility, which helps them reduce stress and pressure. One student who completed undergraduate courses in Tata Institute of Social Sciences, (TISS, Guwahati off campus) further informed that teacher identify and acknowledges the challenges faced by students who lacks proper technology, so to

solve this, the administration provided laptops and additional data packages. Laptops were then returned after exams and dissertation submission. This shows some institution greatly caters to the needs of students in needs through appropriate Lending Policy whereas no special technological assistance is provided in MZU and ICFAI.

5. Most Preferred online learning platforms used by students: Google Meet, Zoom Meeting, and WhatsApp are preferred for their simplicity, ease of access with minimal issues, and the convenience of creating links effortlessly.

6. Primary Issues with Online Mode Learning: Students struggled to grasp conceptual knowledge in online mode, lack of proper seating area and lack of privacy made students lethargic and lose focus, network instability create knowledge gap, absence of rapport between student and teacher leads to a sense of disconnection, and older teacher unable to handle technology efficiently make learning experiences more complicated. Moreover, managing surprise visitors greatly disrupts online classes. Furthermore, rural students were expected to assist their families during class hours and faced difficulties maintaining attendance due to chores and jhum cultivation. Technical students further stated that online learning cannot offer the same level of understanding as offline learning.

7. Students' perception regarding online etiquettes: Not to mention, following online etiquette is challenging for students due to unstable internet. Some discipline required students to possess two devices to attend online class which is impossible for most students particularly those from lower socio economic. Normally students attend online classes with casual attire. Additionally, the most followed online etiquette by students includes muting speakers, turning off camera, avoiding queries randomly, punctuality, asking queries with appropriate language. Students further mentioned that while most of them adhere to online etiquette, it is the teachers who often fail to do so. Teachers often fail to maintain punctuality causing class breaks much shorter resulting in missing their lunch during daytime. Classes are scheduled based on teachers' convenience rather than following structured routine. Although concerns have been raised in this matter, students' preferences were dismissed.

8. Teacher's Reminders on Online Etiquette Before Class: Teachers do not usually remind etiquette before classes because a lot of teacher particularly older ones struggled to handle platforms efficiently due to first-time encountering online classes and also due to lack of familiarity. However, some teachers adhere to etiquette such as letting students changing their silly user ID into formal ones. This is done to make it easier for teachers to identify and address students by name, especially if the video is turned off.
9. Most used platform for assignments: Students reported that the most used platform for uploading assignments by students are WhatsApp and Mail.
10. Students' preferences between online and traditional class: Most students prefer traditional class over online class because physical classes provide a sense of belonging and real classroom environment. In physical classroom, clarifying doubts and making queries is much more feasible than online mode and exams are conducted with greater fairness. Students, however, stated that at present, both students and teacher continue to adapt, so, online mode has the potential to improve.
11. Students' perception on Webinars: It is evident that webinars have little impact on students because individual interests vary significantly, and the content is often too advanced for most students to grasp. Students often do not take it seriously and attend only to fulfil attendance requirements.
12. Feedback to teachers: Students typically employ WhatsApp and private call to provide feedback to teachers to clarify their doubts and queries and students find it quite helpful particularly when teachers are open and approachable.
13. Preferred online learning model to continue: The learning methods that students wish to see enhanced and sustained over time include – hybrid mode which favoured for its flexibility, allowing students to choose between online and offline learning. The synchronous mode is also preferred as it fosters a sense of responsibility, promoting sincerity and consistent attendance, making it especially suitable for K–12 students. Asynchronous mode is suitable for adolescence and grown up and very helpful when exam is approaching. Blended mode is suitable methods to address learners' needs and provide easy access to recorded lessons.
14. Suggestions for improvement based on challenges students encountered during online learning: Students from Science discipline suggest to incorporate a

digital whiteboard with a digital pen for explanations to enhance clarity and students' interest as relying only on slides can make the learning process dull and ineffective. It is also reported that older teachers struggled with using technology and online learning platforms, often showing negligence. Students recommend online examinations to be taken more seriously. Incorporating visual effects in lectures such as diagrams, illustrations, and animations should be emphasized over slides with text as it enhances comprehension and retention. Furthermore, overly long PPTs with around 50 slides can discourage students and make lectures dull, using shorter presentations with about 10 slides with more explanation from real-life examples is recommended.

Students from Arts discipline recommended improving the institution's technology and software as the most effective action, providing financial assistance to those in needs by providing them with tools and devices, and setting up a return policy for those tools and devices after use. Students from Arts discipline further prefer PPT with Slides over lecture alone. Teachers are expected to improve their technological skills to create better learning environment. A flipped classroom model which encourages interactive discussion that enhances two-way communication is suggested. In addition, prioritizing diagrams and visual presentations through PPT is highly recommended. In addition, Students from Technology discipline suggest teacher to prioritize practical work, making themselves visible on screen, use digital whiteboards, and deliver lessons with clear examples like YouTube tutorials.

5.4.1 Item Wise Analysis

The researcher triangulated the findings obtained from both the Qualitative and Quantitative analysis.

Table 5.1
Table of item wise analysis between quantitative item and qualitative item

QUESTION (QUANTITATIVE ITEM)	Quantitative Result	QUESTION (QUALITATIVE ITEM)	Qualitative Result	Result
Learning online seems better than face-to-face mode	71% of students disagreed with the statement while 13% of students agreed.	Do you think you are productive in online than traditional class? (Open Ended Response)	65% of students think they are less productive in online classes compared to traditional ones due to connectivity problems, poor concentration and numerous home distraction.	Strong agreement: Both data show that students do not prefer online learning. They feel it is less effective.
It is not easy for me to use computer, tablet, video calls, online learning platform applications in online classes.	28% of students agreed with the statement while 53% of students disagreed.	If you feel anxious in online classes specify the reasons for your anxiousness by ticking the options provided: (Open Ended Response)	Students said they felt uncomfortable and anxious in online classes because they lacked experience, had limited skills, and faced communication problems.	Partial disagreement: Although more than half of the students said it is easy to use technology, many still feel anxious due to lack of experience and confidence in using online tools. The qualitative data reveals underlying difficulties that the quantitative result alone does not show.
Network failure is the biggest barrier in learning in online classes.	85% of students agreed with the statement while only 9% of students disagreed.	If you feel anxious in online classes specify the reasons for your anxiousness by ticking the options provided: (Open Ended Response)	Students report unstable internet connections let them missed crucial lectures, network issues/low bandwidth particularly	Strong agreement: Both quantitative and qualitative data clearly show that network problems are a major obstacle in online

			during tests or exams increase tensions and stress.	learning. Students experience stress and learning gaps due to poor internet, especially during important academic tasks.
I don't feel productive when learning through online classes.	69% of students agreed with the statement while 16% of students disagreed.	Do you think you are productive in online than traditional class? (Open Ended Response)	65% of students think they are less productive in online classes compared to traditional ones due to connectivity problems, poor concentration and numerous home distraction.	Strong agreement: Both quantitative and qualitative data clearly show that students feel less productive in online classes. Technical problems and distractions at home reduce their ability to focus and learn effectively.
It seems lesson can be re-learned by revisiting the online resources as many times in asynchronous platforms. & It is easy to study from recorded lectures over synchronous platforms. & I am benefitted by teachers' recorded lectures in my learning. & I rewatched recorded sessions for reviewing my lessons before my	66% of students agreed that asynchronous mode allowed them to re-learned and re-visit resources. & 63% of students agreed that recorded lessons are easy to learn and access than synchronous online platform. & 63% of students agreed that teachers' recorded lessons are beneficial. &	What is your major benefit of online classes during pandemic? (Interview response)	Students reported pre-recorded lessons which can be revisited anytime are beneficial in times of exams approach, where such option is not available in physical classroom.	Strong Agreement: Both quantitative and qualitative data clearly indicate that students significantly benefited from pre-recorded lessons because they could access them at any time, they find it beneficial particularly when exams are approaching and to catches up with class they missed.

final exams. & I can learn through online recorded lectures if I miss them due to illness or other emergent condition	66% of students claimed they rewatched recorded sessions before exams. & 75% of students utilize recorded lectures to catches up on class they missed.			
Do you think online classes consume large amount of data which pose problems to a lot of students?	80% of students agreed that online classes consume large amount of data.	Do you have any difficulties in the use of online learning method? (Interview response)	Students reported high internet consumption during online classes is one of the significant issues faced during online learning.	Strong Agreement: Both quantitative and qualitative data clearly indicate that students encounter serious problems which is caused due to high consumption of data during online learning.
Network failure is the biggest barrier in learning in online classes. & I am annoyed when a lecture is disrupted in mid of class due to network failure. & I am disrupted by network failure which cause misunderstanding in online classes.	85% of students agreed that network failure is the biggest barrier in learning in online classes. & 78% of students claimed they feel frustrated when a lecture is interrupted midway because of network issues. & 63% of students claimed network failure cause	Do you have any difficulties in the use of online learning method? (Interview response)	Students reported connectivity issues or network failure are a major challenge encountered during online learning, particularly to those from rural areas.	Strong Agreement: Both quantitative and qualitative data clearly indicate that connectivity issues as the major hurdle encountered during online learning.

It is burdensome for me to stay focused on my work in online classes. & I lack concentration while learning through online classes.	misunderstanding in online classes. 67% of students find it difficult to stay focused during online classes. & 71% of students lack concentration while learning through online classes.	Do you have any difficulties in the use of online learning method? (Interview response) Is your overall expectation the same as or different from traditional class? (Interview response)	Students found it difficult to understand conceptual knowledge, which left them feeling disengaged and made it hard to maintain full attention and concentration. They struggled to remain focused and faced significant challenges in staying attentive.	Strong Agreement: Both quantitative and qualitative data clearly indicate that student struggled to remain focused and faced significant challenges in staying attentive in online classes which makes them unable to grasp conceptual knowledge.
Do you own personal devices and stable internet connection at your home for online classes?	20% of students stated that they do not have access to both personal devices and a stable internet connection at home to attend online classes while 80% of students disagreed.	Is it easy to follow online etiquettes? Yes/No? Why? (Interview response)	Science students reported following online etiquette is challenging due to connectivity issues. Additionally, they were expected to have two mobile devices to monitor themselves during online sessions. Owning two devices was impossible for most students, and even one device was a struggle for many.	There is a clear link between not having personal devices and internet and the difficulty in following online etiquette. Because many students lacked the necessary technology, it was hard for them to participate properly and stay engaged in online classes.
Do you think that	40% of teachers	Who do you think	Gender do not	Strong

male students have an advantage in online learning over female students as they are more techno-savvy?	believe that male and female students always show the same attitude, meaning gender does not influence how they view or engage in online learning.	is more engaged in online learning activities male students, female students or both?	have influence on the attentiveness of students during online classes, which means that both male and female students actively engaged and demonstrate proficiency in handling learning devices.	agreement: Both data indicates that gender does not influence students' engagement or attitude toward online learning. The quantitative results show no gender-based advantage. Similarly, the qualitative responses reveal online learning engagement is not determined by gender.
& Do you think that male and female students do not differ in their attitude towards online learning?				

Interpretation of Table 5.1: Table 5.1 clearly reveal a high degree of consistency and triangulation between the quantitative and qualitative data analysis, thereby strengthening the validity of the results. Overall, students do not prefer online learning and view it as less effective than traditional classes. While many students reported that using technology is manageable, a considerable number still experienced anxiety due to limited skills and lack of confidence.

Both sets of data strongly indicate that network issues are the most serious barrier, creating stress, learning gaps, and difficulties in crucial academic tasks. Students also consistently reported feeling less productive in online classes because of technical challenges and home distractions, which made it difficult to focus and understand concepts.

Despite these challenges, students recognized the clear benefits of pre-recorded lessons, as they could revisit them anytime, especially before exams or to catch up on missed classes. However, high data consumption, unstable internet, lack of personal devices, and difficulty in following online etiquette further limited the effectiveness of online learning.

In conclusion, the triangulated evidence shows that although recorded lectures were highly beneficial, the majority of students struggled with online learning due to poor connectivity, technical barriers, lack of focus, and reduced engagement, making it largely ineffective compared to traditional learning. According to the data, it is very clear that asynchronous modality of teaching-learning processes is preferred more over synchronous modality both by students and teachers.

5.5. Discussions

Teachers' Perception and Attitude

The study found that 65% of teachers had a moderate or neutral perception of online learning, while 19% held a positive perception and 16% had a negative perception. This suggests that most teachers hold a balanced view, neither strongly negative nor positive. The recent study which is supported by the previous findings of Almahasees, Mohsen & Amin (2021) who stated that online learning is only a temporary solution and could not replace traditional learning while the recent finding is in contrast with those of Yau, Yeung & Lee (2022) who claims that teachers have a negative view about online mode, and also Akram et.al (2022) indicating teachers have a positive view about online mode regarding it as engaging and interactive.

With regard to teachers' attitude towards online learning, the study found that most of the teachers of about 63% had a moderate or neutral attitude of online learning, while 21% held a positive attitude and 16% had a negative attitude. This indicates that most teachers hold a balanced view, neither strongly negative nor positive. The recent study contradicts the previous studies of Gururaja (2021) and Kar (2020) who reported that teachers were unsupportive and dissatisfied of online mode instruction due to lack of e-learning skills, absence of prior experience and discomfort.

The study found no significant difference in university teachers' perception toward online learning based on gender which is supported by the previous study of Islam & Mehmood (2024). The study found no significant difference in university teachers' perception or attitude toward online learning based on gender, which is contrasts with the previous study of Odual (2019); Gururaja (2021); Kar (2020) who states that male educators having more positive perceptions towards online learning.

The study found no significant difference in university teachers' perception toward online learning based on their type of institution ICFAI (private institution) and MZU (public institution), the recent study contradicts with the previous study of Kizza (2021) who reported that private universities perceived online instruction more positively than public universities due to their prior exposure to technology.

The study found no significant difference in university teachers' attitude toward online learning based on their type of institution (ICFAI and MZU) the recent study is contradicted with the previous study of Gururaja (2021) stating that teachers at government schools have a more favorable attitude toward online instruction than teachers at private likely due to their higher wages.

The study found no significant difference in university teachers' perception toward online learning based on disciplined-specific (non-STEM and STEM) background, but the present findings contradicted the previous study of Sajidan (2021) who argued that STEM teachers perceived online instruction as ineffective due to communication barriers and teachers fail to apply basic skills and knowledge.

The study found no significant difference in university teachers' attitude toward online learning based on disciplined-specific (non-STEM and STEM) background, but the findings is in contrast with the previous study of Jiang (2023) indicating that STEM teachers were more in favor of online instruction than non-STEM teachers.

As a whole all the demographic variables of gender, disciplinarity and institution did not affect the perception and attitude of university teachers towards online teaching.

Students' Perception and Attitude

The study's first objective revealed that majority of the university postgraduate students in Mizoram which is about 73% possess a moderate perception towards online learning, while 13% of students respectively exhibit a positive perception and in contrast 13% of students respectively perceive it negatively. This suggests that most students hold a balanced view, neither strongly negative nor positive. The results align with previous studies by Avila et al. (2021) as students found distance learning essential but faced limited access to devices rating their university

assistance as moderate. However, the findings contrast with those of Abassi et al. (2020) and Ramirez et al (2021) as students unfavoured and less optimistic towards online mode because students perceive it as degrading the overall effectiveness of academic progress. Furthermore, 13% of students who held a positive perception aligns with the study of Bali & Liu (2018), Akuratiya & Meddage (2020) and Agarwal & Kaushik (2020) where students perceive online mode positively, interesting and engaging to meet learning goals, finding it just as effective as traditional methods, while also providing them with a more practical opportunity to make use of technology.

Further, majority of the postgraduate students of about 73% in Mizoram possess a neutral attitude towards online learning, while 13% of students exhibit a positive attitude and in contrast 14% of students exhibit a negative attitude. Although the findings suggest that while many students typically maintain a neutral stance, neither strongly for nor against online learning, this study identifies attitudes as either distinctly positive or negative. The 13% of students who possess a positive attitude aligns with the study of Zhu et al. (2020), Xia et al. (2022), Mushtaque et al. (2021) and Ullah, Khan & Khan (2017) which states that students were contented with online instructions and helps improve traditional classes, offer opportunity to build with their peers, supportive teacher enhances their technological skills, and computer-mediated instruction is beneficial. On the other hand, the 14% of students who held a negative attitude towards online learning is in consistent with the study of Zhu et al. (2020), Adnan & Anwar (2020), Xia et al. (2022), Mukhametshin et al. (2021) and Ullah, Khan & Khan (2017). These studies point to several contributing factors for dissatisfaction, including decreased attendance and interest, students struggled with technical issues and internet access due to financial constraints, lack of interaction, lack of suitable content for online courses and group projects, absence of in-depth explanations leading to unable to grasp the content, decreasing academic quality, decrease motivation and discipline and lack of guidance.

There is a significant difference in students' perceptions of online learning based on socio-economic status (SES), where upper SES students had a higher perception of online learning than middle SES students. The findings are in consistent with the

previous studies of Bast (2021), Al-Ajeely et al (2023), Saputra et al (2022), Halim & Safiai (2024), and Cuisia-Villanueva & Núñez (2021) as their findings highlighted that students' preference for online learning is positively linked to their socioeconomic status. Those from affluent families tend to view online learning more favorably because they have greater access to resources, better technological support, and are more capable of engaging with online platforms. In contrast, students from middle or lower socioeconomic backgrounds often face financial constraints, limited access to necessary tools, and a lack of parental support, which makes it difficult for them to effectively participate in online teaching and learning environments. Therefore, Saputra et al. (2022) suggested free internet and appropriate teaching method for those in need to ensure learners' success. On the other hand, the study found a significant difference in students' attitude of online learning based on socio-economic status (SES), where the lower SES students had more positive attitude toward online learning than middle SES students. The finding is in contrast with those of Siddiqui, Shah & Arisar (2021), Chavan & Begum (2022), Carmi (2024), Prakasha et al. (2022) and Adenuga et al. (2011) as students from lower SES (Socio-Economic Status) or BPL (Below Property Line) family either struggled with educational setbacks, perform less academically, or students' SES have no effect at all in their attitudes towards online learning. Moreover, Adenuga et al. (2011) further revealed that students from upper, middle or lower shows a negative attitude towards it due to lack of access to resources. The reason lower SES students in Mizoram had a more positive attitude toward online learning compared to middle SES students is due to the flexibility it offers. Online learning eliminates the need for travel to reach learning institution, saving both time and money. It also allows students to conveniently attend lectures and access learning materials from home, giving them more time to study and complete their assignments.

With regard to the fifth objective, the analysis of the study found no significant difference in university students' perceptions of online learning based on gender, both genders possess neutral perception towards online learning. The finding is consistent with the previous studies of Kamal et al. (2023) and Korlat et al. (2021).

However, the finding contradicts the studies by Greier, Drenowatz & Sappl (2022), Idrizi, Filiposka & Trajkovik (n.d.) and Bast (2021) as they find that female students faced greater challenges in acquiring software skills compared to their male counterparts and experienced higher levels of stress due to the online learning environment. In contrast, male students generally performed better, showed higher engagement with technology, and used it more frequently. Likewise, the analysis of the study found no significant difference in university students' attitude of online learning based on gender, both genders possess neutral attitude towards online learning. This finding aligns with the results of previous studies by Kamal et al. (2023), Mahnun et al. (2022) and Saranya & Manivannan (2024) but contradict with the previous studies of Bahar & Asil (2018), Yu (2021), Zulfiqar, Ajmal & Bano (2023) where these studies found that male students demonstrated strong technical performance, outperformed their female peers, and exhibited a more positive attitude toward technology.

With regard to the sixth objectives, the study found no significant difference in university students' perceptions of online learning based on locale. The finding is similar with the previous study of Septianingsih & Erliza (2021) indicating that online mode worked well throughout the epidemic but in contrast with those of Bast (2021) and Siddiqui, Shah & Arisar (2021) where students from urban areas were more open to online learning during pandemic while rural students struggled with technical issues and increased stress. Similarly, the study found no significant difference in university students' attitude of online learning based on locale, and this finding aligns with the previous study of Siddiqui, Shah & Arisar (2021) both urban and rural students have a moderately positive opinion towards online learning while the current finding is in contrast with those of Yanlin & Royo (2024), Chavan & Begum (2022), AnanthaRamu (2024) and Dhamija (2014) as rural students struggled to access to online learning , encounter internet issues and have lower satisfaction than their urban counterparts while urban students have greater access to gadgets and supportive environment, have more advanced technological infrastructure, with cities generally being more technologically equipped compared to rural areas.

With regard to the seventh objectives, the analysis found no significant difference in university students' perceptions toward online learning based on discipline (STEM and non-STEM) and the current finding is in consistent with the findings of Ortiz-Rojas et al. (2023) where both STEM(Science) and non-STEM(non-science) teachers and students found the online model satisfactory because of its flexible nature while the finding's contradict with those of Das & Bhattacharyya (2023), Al-Zohbi et al.(2022), Owston et al.(2020). Newsome et al. (2022) and Bush et al. (2016) where STEM (science) students outperformed non-STEM (non-science) students because they had prior experience and are more techno-savvy, had higher satisfaction and benefitted more from online mode than their non-science counterparts. Similarly, the analysis found no significant difference in university students' attitudes toward online learning based on discipline (STEM vs. non-STEM) and this findings is in align with those of Dhamija (2014) but contradicts with those of Siddiqui, Shah & Arisar (2021) stating that science students exhibiting a more positive attitude than arts students while the findings of Kalyanasundaram & Madhavi (2021) and del Gobbo et al. (2021) indicating non-STEM(non-science) students have higher engagement during learning and STEM(science) students possess lower satisfaction.

It is found no significant difference in university students' perceptions toward online learning based on institution, and the finding is in consistent with the previous study of Kamal et al. (2023) where students from both public and private schools have a mixed impression or neutral perception about online learning. Contrastingly, the analysis found significant difference in university students' attitudes toward online learning based on institution, wherein private university students have more positive attitude towards online learning in comparison to their public counter parts and the findings is in contrast with the previous study of Nasir & Neger (2022) where both institution of private and public found the online platform useful which shapes their attitude positively.

Teachers' and Students' Attitude towards Technology

Teachers' attitude towards technology was found to be moderate, the study found that most of the teachers of about 69% had a moderate or neutral attitude towards technology. However, the present study is in contrast with the previous study of Mahajan (2016) as many teachers avoid using ICT due to fear of technology and teacher need regular practice to build confidence in order to overcome such problems.

Further, majority of the postgraduate students of about 70% in Mizoram possess a neutral attitude towards technology. The present study is in consistent with the previous finding of Aswathi & Haneefa (2020) as they found that majority of students had a moderate attitude toward IT. However, the study is in contradict with the previous study of Hoque et al. (2020) where students had a negative attitude of educational technology, while majority had a positive perspective.

The study found no significant difference in university teachers' attitude toward technology based on gender, and the finding is supported by the previous study of Sehjal (2021), Islahi & Nasrin (2019) where both gender of teachers share similar attitude towards technology but contrast with the previous findings of Guillén-Gámez & Rodríguez-Fernández (2022) stating female teachers have a more positive attitude than male teachers.

The study found no significant difference in university teachers' attitude toward Technology based on type of institution ICFAI (private institution) & MZU (public institution), but the recent study is contrast with the previous study of Sehjal (2021) indicating that private school teachers displaying a more positive attitude compared to those in government schools, and also in contrast with the previous study of Pir & Islam (2024) stating that Public institutions showing more openness and enthusiasm which is likely due to the influenced by the work sector.

The study found no significant difference in university teachers' Attitude toward Technology based on discipline (non-STEM & STEM), and the recent study is in consistent with the previous study of Parviz (2024) who revealed that both STEM

and non-STEM teachers had positive opinions about technology integration into the classroom. However, the recent findings is in contrast with the previous study of Aktulun, Kasapoglu & Aydogdu (2024) who argued that STEM student teachers displayed more positive attitudes and less worries toward technology integration compared to non-STEM peers.

Regarding students' attitude towards technology, the analysis found no significant difference in university students' attitudes toward technology based on gender but the finding is in contrast with the previous studies of Alharthi (2020) who claimed that both gender of university students were discontented with the technology due to difficulty in navigating, neglect students' preferences, lacked flexibility, and due to unfamiliarity, and also in contrast with the previous study of Akbar, R. A. (2016) who reported that when it comes to technology integration, female students are more positive than their male counterparts.

The analysis found no significant difference in university students' attitudes toward technology based on locale but the current findings is in contrast with the previous study of Akbar, R. A. (2016) who claimed that rural students had a more positive attitude toward ICT compared to their urban counterparts which is due to the greater flexibility and accessibility it offers for rural areas.

The analysis also found no significant difference in university students' attitudes toward technology based on their disciplinary background. This might be because the introduction of technology is relatively new in Mizoram and students' discipline does not strictly determine their attitude towards technology. Also, the analysis further found no significant difference in university students' attitudes toward technology based on institution indicating no clear cut affect of public and private type of institutions in determining students' attitude towards technology.

However, a significant difference was observed on socio-economic status (SES), where the attitudes toward technology differed significantly across SES groups, with middle SES students scoring higher than lower SES students but lower than upper SES students. This indicates that students from upper SES obtained the most positive attitude towards technology, followed by those from middle SES and then lower

SES, and the current findings is in consistent with the previous studies by Lebens, Graff & Mayer (2009); Henry & Olukemi (2015); McKenzie et.al. (2014) who claims that children from lower SES origins are more reluctant and less inclined to utilize technology, creating a subtle digital gap that may affect their future job prospects while students from higher SES backgrounds both excelled in computer science and held more favorable attitudes towards them.

Thus, in present findings SES of students turn out to be a prominent demographic variable that influences the perception and attitudes of students towards online learning and technology.

Usage of technology and teaching-learning platforms among university students and teachers of different disciplines

It is evident from the findings that the most commonly used teaching-learning platforms used by university teachers were – Google classroom, Zoom Meet, WhatsApp, Google Drive, Google Meet. However, some Department like Education mentioned Webex and Telegram, Management mentioned ChatGPT, Social Sciences mentioned Telegram, Webex and Cisco, School of Engineering mentioned Microsoft Teams. So, the current finding is in very much agreement with numerous Indian studies reported during the pandemic where mostly similar platforms have been used as supported by the previous study of Prabawati et al. (2021) who reported Google classroom, Youtube, Google form and WhatsApp (WA) are some common online application viewed positively by both teachers and students which helped student and teacher grasp and deliver lessons easily in a more interactive and engaging.

It is evident from the findings that the most commonly used teaching-learning platforms used by university students were – Google classroom, Zoom Meet, WhatsApp, Google Drive, Google Meet. However, some Department like Mizo mentioned about Webex and some departments of Engineering also mentioned Microsoft Teams and Cisco. So, the current finding is in very much agreement with numerous Indian studies reported during the pandemic where mostly similar platforms have been used as supported by the previous study of Prabawati et al. (2021) reporting Google classroom, Youtube, Google form and WhatsApp are some

sort of online application viewed positively by both teachers and students which helped student grasp delivery of lessons easily without boredom.

Teachers' Problem in Synchronous Online Learning

The major problems encountered by postgraduate teachers in synchronous online learning include - internet issues like low bandwidth on both students and teachers' sides which poses difficulties in ensuring students' attention and hampers smooth delivery of instruction. In addition, irregular power supply during delivery of instruction greatly hinders effective teaching. Furthermore, students have to deal with limited access to essential resource such as unequal internet access, devices such as mobile phone, Wi-Fi and laptops, which are not readily accessible by some students which impact online learning. This recent finding is supported by the previous studies of Akram et al (2022); Almahasees, Mohsen & Amin (2021) who claims that internet issue, technical problems and lack of infrastructure prevent teacher from effective implementation of online teaching.

Minimal physical interaction makes students unwilling to engage with lessons and makes it hard to control student behaviour effectively. In addition, when students keep their cameras off, teachers can't observe body language and reactions, making it difficult to assess engagement and determine whether students understand the lessons. Teachers often felt that online learning feels like one-way communication because lectures are delivered without receiving feedback or participation from students and are reluctant to engage in class. Furthermore, language barriers pose a challenge specifically to some students who struggle with English, which teachers could clarify concepts in the local language in a physical classroom which further leads to comprehension difficulties. Teachers' inability to cater to individual learning needs in online education blocks individualized support and guidance received by students. This recent finding is supported by the previous study of Almahasees, Mohsen & Amin (2021) who reported that challenges such as limited interaction, low motivation poses problem in online teaching and also claimed that online mode could not fully replace traditional face-to-face instruction but served only as a temporary solution during COVID-19.

Teacher reported that experiencing virtual learning for the first time proved to be challenging for both teachers and students, as unfamiliarity with technology diminishes student engagement and interest which is supported by the previous findings of Akram et al. (2022); Gururaja (2021) stating that teachers lack E-learning skills which is caused by the absence of prior experience and training with online instruction.

Problems faced by students during synchronous and asynchronous online learning process

With regard to the thirteenth objectives, the findings of the study concluded that the major problems encountered by postgraduate students in synchronous online learning include - internet issues, frequent power cuts, lack of technological skills, unfamiliarity of online learning, one way teaching-learning, monotonous mode of learning, and the inability to attend practical classes which is supported by the previous study of Erlangga (2022); Cahyani et al, (2021); Erickson et al. (2020); Fernandez, Ramesh & Manivannan (2022). Özüdoğru (2021); Donasari, Tala, & Hamidah (2021); Anastasakis, Triantafyllou & Petridis (2023) who claims that internet connectivity issues, technical issues hamper building rapport and engage in in-depth discussions which affect the overall quality of learning.

Unapproachable teachers made students feel uneasy to ask for help and clarify doubts which is supported by the previous study of Persada, et al (2022) and Özüdoğru (2021) which claims that students' acceptance of synchronous learning depends on teacher traits and trust, while also hinders building rapport with peers and teachers.

Communication barriers in online learning makes students fear of being misunderstood in online classrooms and such barrier arise from low internet bandwidth and technical glitches and this finding is supported by the previous study of Erlangga (2022) and (Özüdoğru, 2021) where poor communication due to internet issues and technical glitches poses communication barriers. In addition, non-Mizo teachers' accents create comprehension difficulties.

Students faced difficulties in downloading assignments or uploading their completed work due to internet failures. Frequent connectivity issues disrupted their ability to access study materials on time and submit tasks efficiently and this finding is supported by the previous study of Erlangga (2022) where students reported they experience difficulty understanding the material due to technical issues and limited internet access which reduced learning effectiveness.

Problems with learning from home occurs mainly due to distractions from family members, lack of privacy, noise pollution, artificial classroom settings, lack of proper seating area, making it harder to grasp concepts effectively. Moreover, attending online classes from bed and household chores makes students lose focus and even made them lethargic which is supported by the previous study of Fernandez, Ramesh & Manivannan (2022) where students' responsibility in household, sickness and demise of family members makes students lose focus and concentration in their studies.

The absence of genuine peer interaction hindered their ability to participate in collaborative activities during online classes which is consistent with the previous study of Erickson et al., (2020); Özüdoğru (2021); Anastasakis, Triantafyllou & Petridis (2023) who indicates that absence of rapport and lack of interaction hinders effective online learning.

Students claimed they experienced concentration difficulties due to prolonged used of devices making it harder for students to stay focused during lessons. Additionally, physical discomfort is being reported due to prolonged usage of mobile phones/ laptops/tablets/PC for online classes. Poor posture and repetitive hand movements contribute to these issues, affecting concentration, productivity, and overall well-being which is supported by the previous study of Fernandez, Ramesh & Manivannan (2022) who claims that prolonged exposure to screentime and devices create physical ailments. Furthermore, students reported that they feel sleepy after prolonged exposure to the blue light from mobile phones and computers.

5.6 Recommendations

The following are some crucial suggestions for enhancing Mizoram's online education system:

1. *Enhance Accessibility and Digital Infrastructure*

It is recommended to ensure stable internet connections for both teachers and students, especially in rural, underserved areas or during monsoon season. Creating a Lending and Return Policy to necessary devices such as laptops, tablets and additional data plans for students in needs while encouraging appropriate return windows after completion of dissertations or exams.

2. *Provide Training for Faculty and Students*

Teachers and students struggled to handle devices and online platforms effectively since they were unfamiliar with them and it was their first time utilizing them, conducting regular workshops to enhance digital literacy and effective use of online platforms such as Zoom Meeting, Google Meet, LMS, email, etc., should be considered. It is also recommended for teachers to have help desks and technical support available for troubleshooting during online sessions.

3. *Adapt Teaching Methods for Online Environments*

Since students find online learning dull, ineffective and boring, students recommend teachers to incorporate interactive tools such Power Point Presentation (PPT), Digital White Board, stressing and promoting visual-aids, deliver lessons with explanation in relation to real-life examples to make teaching-learning more engaging and interesting. This way, teachers can keep lecture enjoyable and interesting to avoid fatigue and unseriousness.

4. *Address Mental and Emotional Well-being*

Giving students extra breaks or more recess time between each class to ensure a balanced schedule is recommended which will avoid screen fatigue and burnout.

Teachers are expected to be friendly and approachable and should make time and opportunities for students to express their ideas which in turn can support mental well-being of students.

5. *Encourage Active Learning and Participation*

It is evident that students profited a lot from recorded lessons particularly when exams are approaching. Therefore, encouraging both synchronous and asynchronous forms is essential to meet a wide range of learning requirements and time constraints.

6. *Foster Student-Teacher Interaction*

Students expected teachers to be open and approachable so that they can feel comfortable seeking their help and clarifying doubts. In addition, in order to encourage rapport between students, teachers are also obliged to provide time and chances for pupils to share their thoughts.

7. *Evaluate Fairly and Inclusively*

Students recommended to take exam seriously. It is evident that there is widespread cheating and practice of unfair means in online mode exams. So, it is recommended to inform a more effective online evaluation methods that ensures fairness such as adopting Proctoring tools and reliable assessment to eliminate unethical acts during online exams.

8. *Recognize Limitations and Subject-Specific Challenges*

Students from STEM recommended to adapt online pedagogy by incorporating Digital Whiteboard, fewer slides of PPT with more explanation of lessons through real-life examples and encouraging hands-on learning, while students from non-STEM recommended incorporating PPT with suitable slides and with visual aids to make leaning more engaging.

9. *Bridge the Digital Divide Among Faculty*

It is evident that a lot of teachers particularly old ages struggled to use online platform and are less tech-savvy than younger teachers, so it is recommended that senior faculty members receive mentoring in order to facilitate their shift to online teaching resources.

10. *Balance Online and Offline Components*

Students suggested trying blended or hybrid learning methods after the pandemic, like the flipped classroom, which mix the convenience of online learning with the interaction of in-person classes.

11. *Promote a Culture of Accountability*

Teacher reported the absence of ethical concerns in online class such as students log in to online classes but remain inactive, pretending to be present. So, introducing strict digital attendance systems and participation tracking to ensure students stay engaged is highly recommended.

12. *Customize Learning Paths*

Students reported that unexpected guests and random visits from friends and family made it difficult for them to actively attend classes, and rural students found it challenging to regularly attend online classes because their economic activities were tied to jhum cultivation. For this reason, it is recommended to provide options for personalized learning plans or pacing, especially for students who need additional time due to personal or family challenges.

13. *Enhance Visual and Content Design*

It is highly recommended to train faculty in creating visually engaging and pedagogically sound content using multimedia such as videos, infographics (visual representations of information), interactive diagrams, which is suitable for non-STEM students. Likewise, avoiding text-heavy slides, but rather make use of

storytelling and examples to explain abstract concepts is recommended, particularly in theoretical subjects in STEM like pure mathematics, and emphasizing visual effects rather than texts alone in subjects like Geology and Botany.

14. *Institutional Support and Policy Framework*

Students recommend to improve technology and software within the institution as they believe institution likely has sufficient funds to adopt better practices such as initiating steps to implement simple, easy-to-follow rules, for instance ‘Lending Policy’ to support financially challenged students by providing them with necessary tools and devices, and setting up a Return policy for those tools and devices after use.

15. *Incorporate Inclusive Pedagogy*

There is a significant gap in digital literacy due to students’ socio-economic status and cultural background, where some students lack the necessary skills and experience to navigate online platforms effectively. So, it is recommended to offer low-bandwidth alternatives such as downloadable PDFs instead of videos, providing recorded lessons available for students in different time zones or with unreliable internet.

16. *Reward and Recognize Effort*

The anonymity of students often results in sincere learners going unnoticed in online class, while those who are less dedicated manage to progress effortlessly. So, teachers recommend acknowledging sincere and dedicated students’ achievements in online formats through virtual awards, shout-outs, or digital badges.

17. *Immediate supply of learning material*

Students recommend providing study materials and lecture recordings immediately after class for a better learning experience.

18. *Eliminating Night Classes*

Students reported that night classes overlapped their dinner time leading to inconsistency in student engagement, so it is recommended to schedule all classes during day time.

19. *Reducing lengthy class duration*

Students suggest teachers to prepare in advance, manage time effectively, and complete topics within 30 minutes to sustain students' interest. Classes exceeding two hours lead to confusion, making it difficult to retain information. So, students recommend lectures to be concise, lasting no more than 30 minutes, to keep students engaged.

20. *Follow strict schedule of class timing*

Students expect and recommend teachers to strictly adhere to class timings, as extended sessions make it challenging to balance their studies with assisting family-run businesses and managing household activities. Classes conducted based on the teacher's convenience rather than structured scheduled such as irregular timing disrupts students' daily routines.

21. *Extra breaks between classes*

Students highly recommend longer breaks between each class as a short 30-minute lunch break causes some students to miss the first session after lunch.

22. *Maintaining Online etiquette*

Teachers recommend students to turn on the camera, mute speakers, attending class quietly, responding when asked questions, and maintaining punctuality, which is the key aspects of online etiquette expected from students.

5.6.1. Specific recommendations to Overcome Primary Challenges of Online Teaching-Learning

Online teaching-learning has become an essential part of modern education, especially after the pandemic. However, it faces several primary problems such as poor internet connectivity, lack of interaction, technical challenges, and reduced student motivation. To make online education more effective and student-friendly, specific recommendations and practical solutions are needed to address these challenges.

Table 5.2

Tables of Primary Challenges of Online Teaching-Learning and their proposed solutions

Prominent Problems from the Findings	Suggestions
1. In online learning, co-curricular activities which breaks the monotony of traditional mode learning is utterly absent.	Teachers are suggested to organize discussions, quiz, debate or competition which can stir interaction at occasional intervals to increase students' engagement which will break the monotony of online classes.
2. Internet connectivity issues specifically low internet bandwidth has significantly disrupted and hinders effective classes as it causes technical glitches, breaking voice, and lesson gap.	Recorded lectures and offline learning materials (like downloadable PDFs or pre-recorded videos) should be made available to ensure students facing connectivity issues do not miss important content.
3. Unapproachable teachers tend make students feel intimidated and hesitant to ask questions or seek clarification.	Students expected teachers to be open and approachable so that they can feel comfortable seeking their help and

clarifying doubts.

4. Insufficient data due to high platform consumption during online class sessions pose an obstacle for students, specifically for students who do not own WIFI connection.

It is suggested that institution should provide addition data packages to students.

Moreover, recorded lectures and offline learning materials (like downloadable PDFs or pre-recorded videos) should be made available.
5. Students experienced sudden power cut or irregular power supply particularly during monsoon or rainy seasons and their phone batteries drained quickly which disrupts effective delivery of lessons.

Teachers should record all live sessions and share them later, so students affected by power cuts can catch up without missing critical lessons.
6. Students lack privacy at home which is caused by distraction by family members, household chores, noise pollution which affect the students' seriousness, inattentiveness and further caused laziness among the students.

Providing noise-cancelling headphones or study kits to students in need, along with educating families about respecting study hours, can improve focus and reduce disruptions.
7. Rural students reported that since their economic activities are linked to jhum cultivation, they had to participate actively, making it difficult to attend online classes regularly. Their parents often did not grasp the concept of online education, and rural society perceived them as lazy for attending classes during

Institutions should conduct awareness programs in rural areas to educate parents and community members about the importance and legitimacy of online education. Furthermore, offering flexible class schedules, recorded lessons, and asynchronous learning options can allow students to balance educational

the day. Many assumed that students were using online learning as an excuse to avoid their responsibilities in jhum cultivation.

8. Students reported that their families often misunderstand online classes, assuming students are free since they are not physically attending school. Some families perceive attending classes as an excuse to avoid chores which add tensions and hesitation among the students.

commitments with agricultural responsibilities like jhum cultivation.

Institutions can engage families through orientation sessions or parent-teacher meetings to explain the structure and importance of online classes. Highlighting class schedules, academic expectations, and the need for a quiet, uninterrupted environment can help families take online learning more seriously.

9. Teachers often schedule classes at their convenience, leading to irregular class timings that disrupt students' schedules and made students struggled with punctuality in online classes.

Students recommend classes to follow a regular schedule rather than being conducted based on the teacher's convenience, as irregular timing disrupts students' daily routines.

10. Students reported limited recess time between each classes made them feel restless and overwhelmed.

Students recommend longer breaks between each class with a 10–15-minute breaks as the possible solution.

11. Classes exceeding two hours often lead to confusion, making it difficult to retain information.

Students suggest lectures to be concise, lasting no more than 30 minutes, to keep students engaged.

12. Students reported that night classes overlapping with dinner time cause disruptions, leading to inconsistency in student engagement.	Students suggest to complete all classes during daytime.
13. Students from STEM discipline complains that overly lengthy and unengaging PowerPoint presentations or excessive slides can lead to boredom which reduce interest.	Students from STEM discipline suggest to incorporate a digital whiteboard with a digital pen for explanations to enhance clarity and interest as relying only on slides can make the learning process dull and ineffective.
14. Lecture-based explanation without PPT decrease students' interest and engagement.	Students from Arts discipline prefer PPT with Slides over lecture alone. They suggested to use meaningful slides with relevant examples rather than relying solely on explanations without PPTs.
15. Prioritizing 'theory' over 'practical' learning in online mode.	Students suggested that for fields requiring practical work, especially in STEM discipline, hands-on learning should be prioritized in order to gain in-dept knowledge of the subject matter.
16. Overly long PPTs with around 50 slides can discourage students and make lectures dull.	Students suggest using shorter presentations with about 10 slides with more explanation from real-life examples.
17. Many students struggle with	Students suggest teachers to post

learning when online class videos cannot be recorded or revisited, as they lose the chance to review concepts, clarify doubts, and catch up on missed content. materials online immediately after class sessions, along with recorded lessons and downloadable learning materials, PDFs for easier access and review.

18. It is evident that around 20% of students, lack personal devices or a reliable internet connection for attending online learning. Institution should create 'Lending and Return Policy' for students' in need where necessary resources like laptops and additional data packages are offered and be borrowed by students and then returned after exams and dissertation.

5.6.2. General Recommendations for Improving Online Teaching-Learning in line with NEP 2020 and UGC ODL Guidelines, 2020

A. In light of the findings of this study and aligning with the vision of the National Education Policy (NEP) 2020 regarding online learning and digital education in India, the following general recommendations are proposed:

1. Students struggled in online class due to lack of devices, connectivity and insufficient data due to high platform consumption during online class. The limited access to essential and vital resources by students negatively impact quality of online learning. Based on the study's findings and aligned with NEP 2020 Section 24.4 (e) of bridging the digital divide and promoting equity and inclusion, recommend utilizing mass media such as radio and television for educational broadcast to people with limited digital connectivity in order to address the diverse needs of students. Furthermore, NEP 2020 Section 24.4 (f) recommended using E-learning platforms like DIKSHA, SWAYAM, and SWAYAMPBHA to create virtual labs, ensuring all students are not left out in accessing quality practical learning. This section suggests providing Socially and Economically Disadvantaged Groups (SEDG)

students and teachers with suitable digital devices, such as tablets with pre-loaded content (such as pre-installed apps, videos, e-books, software, etc).

2. Students lose interest due to long and unengaging PPT-based lectures. In accordance with NEP 2020 Section 24.4 (d) stress on engaging and experiential learning, teachers are suggesting to adopt interactive, student-friendly tools such as educational apps and gamified activities, available in multiple languages with clear instructions, rather than relying solely on static PowerPoint slides.

Section 24.4 (g) further highlights the need for training and incentives for teachers in learner-centered pedagogy, enabling them to create high-quality online content and effectively use digital platforms and tools to enhance student engagement.

3. Some teachers, especially senior faculty, faced difficulties in effectively using online platforms. NEP 2020 Section 24.3 highlights the importance of equitable technology use and faculty development by training teachers in digital tools and pedagogy. Therefore, it is recommended that institutions offer suitable training programs. Such initiatives will equip teachers with the necessary skills to become effective online educators.

4. To overcome the monotony of online classes and make them more engaging and interactive, NEP 2020 Section 24.4 (d) recommend teacher to integrate fun-based learning and encouraged using student-friendly tools and apps to increase participation and improve concentration.

5. Language barriers make it difficult for some students to understand online lessons, especially those struggling with English. Unlike physical classrooms, online settings often lack local language support, making comprehension harder. To address this, institutions should create digital learning materials in regional languages and adopt bilingual modes of instruction, as recommended in NEP 2020 (Section 4.11 and 4.12), which emphasizes the importance of multilingual education and mother tongue as a medium of instruction. Teachers should also be encouraged to explain concepts in the local language when students struggle with English, to improve understanding and inclusivity.

B. In light of the findings of this study and aligning with the vision of the University Grants Commission (UGC) focusing on both Online Programmes and Open and Distance Learning (ODL) the following general recommendations are proposed:

1. Online classes often clashed with the agricultural responsibilities of rural students, as many are involved in **jhum cultivation**, UGC Online and ODL Regulation Annexure-IX recommend institutions to offer Asynchronous learning options through Learning Management System (LMS) which is capable of handling all file types, including PDFs, Word documents, audio files (MP3), video files (MP4), and various e-learning formats to accommodate the needs of rural learners engaged in agriculture.
2. Students lose interest due to long and unengaging PPT-based lectures. To address this, UGC Regulations Annexure-IX recommends incorporating learner engagement strategies by implementing interactive multimedia content in both activities and course design, thereby increasing student participation and interest.
3. Cheating in online assessments is common which enable students to commit unfair means since there is no direct supervision, invigilation and control from teachers. As per UGC Regulations Part-IV on assessment and evaluation, it is recommended examination centres to have proctored machine such as CCTV monitoring and biometric systems. If CCTV is unavailable, proper videography should be done, and recordings must be submitted to the institution. All CCTV/video records must be kept for at least five years. Each exam centre will have an observer appointed by the institution, and their report must be submitted mandatorily.
4. Ethical concerns in online class such as students log in to online classes but remain inactive, pretending to be present are the primary unfair academic performance which further impact learning. In order to maintain ethical standards, UGC Online and ODL Regulations Part-III implement 'Learner 's Authentication Requirements –Active Engagement of the Learners' where student engagement in online classes will be tracked through participation in discussions (synchronous/asynchronous), assignments, program activities, and LMS analytics, ensuring a minimum of two hours of participation every two weeks

5. Insufficient learning materials and inconvenient access to recorded lessons in online learning leads to ineffective online learning. To overcome this issue and enhance the quality of online education, the UGC Online and ODL Regulations recommend the Learning Management System (LMS) to enable learners to access educational content such as recorded lectures, reading materials, assignments, and additional resources on various devices, including PCs, laptops, tablets, and smartphones.

6. To overcome the monotony of online classes and make them more engaging and interactive, UGC Regulation Annexure-IX- ‘Collaboration and Communication’ recommend online platform to support communication and peer interaction through features like online chats, forums, user groups, and messaging.

7. Student reported overly long duration classes which exceeds 2 hours cause confusion, decrease retention. In accordance with UGC Online and ODL Regulations Annexure-IX, ensure a balanced blend of synchronous (live- video/audio conferencing, live chat etc) and asynchronous (Discussion Forum, Blogs, Wikis etc) content to offer flexibility and self-paced learning, particularly beneficial for students managing household duties or those in shared device environments.

Thus, the implementation of the UGC (Online and Open and Distance Learning) Regulations and the National Education Policy (NEP) 2020 has positioned online learning as an integral component of higher education, thereby making it essential to examine teachers’ and students’ perceptions and the practices of online learning in Mizoram. Additionally, with reference to NEP 2020, up to 40% of a student’s total course credits can be earned through online learning platforms such as MOOCs and SWAYAM.

Both these regulatory frameworks strongly promote and emphasize the integration of online education, particularly in the realm of higher education, as a means to enhance flexibility, accessibility, and the overall quality of learning. NEP 2020 Section 24.1 acknowledges the risks associated with technology, especially when traditional in-person education is not always feasible. Accordingly, it encourages examining the benefits of virtual learning while also considering its drawbacks. Additionally, it emphasizes the need to optimize ICT-based initiatives to ensure equitable access to education now and in the future.

5.7 Suggestion for Further Studies

Following are some suggestive studies which should be further undertaken with regard to online teaching-learning:

1. A comparative study of state level on perception and attitude of students and teachers towards online learning.
2. A study on stakeholder' problems and suggestions on ways to solve problems about online learning.
3. A follow-up study on how perception and attitudes of teachers and students toward online learning evolved from the onset of the COVID-19 pandemic to Post Pandemic.
4. A study on whether students in Mizoram retain concepts better through offline or online methods.
5. Exploring how teachers adapt their online teaching strategy over time and the challenges they faced during this transition.
6. Analysing ways to tackle and reduce cheating in online exam through proctoring tools.
7. Compare the efficacy of various online assessment models (e.g., open-book exams, project-based evaluation) in relation to online versus offline tests to ensure fairness, maintaining academic integrity, and minimizing malpractice.
8. A case study on Government policies and initiatives to evaluate the effectiveness and accessibility of programs like Mizoram's digital infrastructure or ICT in education.
9. Examine how professional development programs affect teachers' confidence and attitude towards online pedagogy.
10. Investigate strategies to bridge the digital divide by ensuring equitable access to essential resources for students from rural and economically disadvantaged backgrounds.
11. Conduct a long-term study on how online learning affects students' behavior and psychology and suggest ways to promote engagement and interaction.

12. Assess the feasibility and educational outcomes of hybrid (online + offline) and blended (asynchronous + synchronous) learning models across disciplines, paying special attention on STEM and non-STEM courses.
13. Explore adaptive learning platforms that accommodate individual learning styles and linguistic needs, especially for non-native language speakers.
14. Study the short-term and long-term health implications of extended screen time and sedentary learning environments on students and teachers.
15. Research the best scheduling practices, related to appropriate class durations and break intervals, to enhance learning retention and allow for balanced personal responsibilities.
16. Investigate how parent and community perceptions of online education influence student participation, especially in rural areas.
17. Propose awareness programs on how household dynamics affect students' participation during online learning and suggest ways to foster supportive home environments.
18. Examine how cultural expectations and social norms affects students' participation and learning outcomes in online settings.

5.8. Conclusion

It is conclusive that the transition to online learning has been both essential and insightful in the contemporary educational landscape. While it provided a much-needed solution during the global health crisis, it also revealed a significant gap in digital readiness, pedagogical adaptability, and student well-being. The findings from both postgraduate students and teachers in Mizoram demonstrate the complex nature of these challenges and emphasize how urgently institutional changes are required to make online learning more effective, inclusive, and human-centric. The study presents a comprehensive view of students' and teachers' experiences, challenges, and preferences regarding online learning. While online education offered flexibility, convenience, and technological skill development, particularly benefiting students in remote areas, it also exposed significant drawbacks that affect learning quality and student engagement.

One of the most prominent findings of the study is that both university teachers and students in Mizoram exhibited a mixed perception of online teaching–learning, reflecting neither a fully positive nor negative stance but rather a moderate or neutral outlook. Furthermore, both groups perceived online teaching–learning as a temporary measure and asserted that it cannot substitute traditional modes of instruction due to numerous constraints.

Students also revealed that subjects requiring abstract thinking, calculations, or practical application such as mathematics, philosophy, and technical disciplines pose the greatest challenges in an online setting. Students often rely heavily on teacher guidance for such subjects, which online platforms fail to provide adequately. Despite this, students appreciated recorded lectures, improved time management, and reduced living and transportation costs.

However, despite the flexibility it offers, the disadvantages weigh heavily. Online learning was marked by monotony, reduced concentration, and a lack of discipline due to excessive comfort. Technical issues such as unstable internet, power blackouts, and absence of suitable learning environments further hindered learning. Students also criticized online examinations for being unfair, prevalent cheating, stressful, not depicting actual capabilities, and time constraints as major issues.

For students, online learning often brings about a sense of isolation, disconnection, and disengagement. Many have reported suffering from technology-related anxiety stemming from lack of adequate training, fear of technical failure, and unfamiliarity with virtual platforms. Poor internet connectivity, particularly in rural areas during peak hours, further exacerbates their frustration, leading to interrupted classes, loss of continuity, and widening educational disparities. The situation is worsened by environmental and household distractions, irregular power supply, high data consumption, and inadequate learning spaces. Particularly for rural and economically disadvantaged students, responsibilities like jhum cultivation and household chores create additional barriers to active participation. Students also experience a lack of personal interaction, leading to minimal engagement, hesitation to ask questions due to shyness, and an overall decrease in motivation.

The monotony of online learning environment caused to missed out students from the essential elements of co-curricular activities such as sports, games, and artistic competitions which breaks the monotony of traditional mode learning. Students are overburdened and overwhelmed with workload and the absence of opportunity for students' holistic development in online curriculum negatively affects the overall quality of learning.

Mental and physical health issues are another major concern. Long hours of screen exposure, poor posture due to lack of seating arrangements, and limited physical activity have led to fatigue, body aches, eye strain, and even mental health conditions. Regarding mental health, students report stress, anxiety, procrastination, and even signs of ADHD and FOMO due to the monotonous and superficial nature of online classes. The open-book exam format, while logistically feasible, often undermines the seriousness of assessments and affects long-term retention and academic integrity.

Similarly, teachers face substantial hurdles in delivering effective instruction. Internet issues, one-way communication, and minimal physical cues (like body language and facial expressions) make it difficult to assess comprehension and engagement. Many students turn off their cameras, making it nearly impossible for teachers to observe participation or address individual needs. Teachers also report the challenge of catering to students with varying levels of digital literacy and access to devices, especially when trying to maintain fairness and discipline in online assessments. The lack of study materials, unfamiliarity with technology, and difficulties in managing time and lesson duration further impede teaching effectiveness.

Moreover, both students and teachers agree that the absence of two-way communication and in-person interaction diminishes the quality of learning. Teachers claimed they are unable to provide personalized feedback, and students often feel neglected or invisible in the virtual classroom. Some students take advantage of this anonymity, while others despite being sincere feel overlooked.

Despite these challenges, both groups recognize the potential of online learning when implemented thoughtfully. Students have suggested several improvements, including regular and well-structured scheduling of classes rather than class conducted on convenience of teachers, shorter lecture durations, an approachable and technologically competent teacher, a visually rich and interactive teaching methods, such as digital whiteboards, meaningful PowerPoint presentations, animations and real-life examples to make online learning livelier and more interesting. Teachers recommend students to maintain online etiquette by keeping cameras on, muting mics, and being punctual. A mutual understanding of each other's constraints is crucial for fostering a more empathetic and effective learning environment.

It is obvious that a more inclusive, adaptable, and balanced educational paradigm is required. Many students and teachers advocate for a hybrid approach that blends the accessibility of online learning with the engagement and depth of offline instruction. A flipped classroom model, where materials are shared asynchronously and discussed in live sessions, has been proposed to encourage critical thinking and active participation. Similarly, synchronous sessions focused on doubt-clearing and discussion, supported by robust learning materials and recorded lectures, can enhance the effectiveness of asynchronous self-learning.

Ultimately, although traditional classroom environments are generally preferred by students due to their interactive and engaging qualities, they acknowledge that if major advancements are made, online learning has immense potential as teachers and students likely adapt their skills in post-pandemic. A hybrid model which combined flexibility with face-to-face engagement, emerges as the most favored model as it allows greater flexibility through asynchronous mode while also encouraging commitment and discipline through synchronous mode, highlighting the need for systemic support, teacher training, and learner-centered approaches to truly enhance the online education experience.

In conclusion, high speed internet connectivity is the backbone for all digital programmes (Express Computer, 2018), while online education offers undeniable benefits - such as flexibility, accessibility, and technological advancement, it also

poses important problems that need to be carefully resolved. Ensuring equitable access to resources, fostering interactive and inclusive teaching methods, providing mental health support, and maintaining academic integrity are essential to achieve digital learning's maximum potential. The ultimate goal should be to create a learner-centered environment that prioritizes both technological efficiency and human connection, ensuring that no student is left behind in the digital age.

5.9 Limitations of The Study

The study sampled fourth-semester postgraduate University students of MZU and ICFAI from the session 2021–2023 in the Academic Block Year 2023, as they were the primary group of post-graduate students during the time of data collection, who experienced online learning during their first and second semesters. Several limitations occur during the process of data collections which were mentioned below:

Time constraints – As a doctoral candidate registered in 2021, a significant time constraint is experienced in executing the various phases of this research by the investigator. By April 2023, when the investigator conducted the main data collection, only a limited group of students with relevant online learning experience remained, specifically 4th-semester postgraduate students from the academic block year 2021–2023. Prior to this, the researcher had methodically developed and validated the research tools, established content validity by consulting 25 experts from Mizoram University (MZU) and Institute of Advanced Studies in Education (IASE) in order to ensure the tools' robustness. Additionally, in December 2022, a pilot test was administered to 6th-semester undergraduate teachers and students at Pachhunga University College to conduct item analysis to further refine the instrument. However, the gradual progression of students through the academic program resulted in a limited pool of eligible respondents who had substantial exposure to online learning, thus narrowing the sample to those who met the criteria for this study. The actual data collection commenced in April 2023, and the entire data collection process was completed in January 2025.

Sample size – As previously noted, when the researcher reached the stage of actual data collection in April 2023, the pool of university students who had direct experience with online learning was notably limited. The majority of students with significant exposure to online instruction had either advanced in their academic programs or graduated. Consequently, only a small cohort of students remained eligible, specifically the 4th-semester postgraduate students from the Academic Block year 2021–2023. This group comprised 593 students, representing one of the few remaining cohorts who had experienced online learning within the timeframe relevant to this study.

However, despite these limitations, with a sample size of around 600 students, even if restricted to 4th semester postgraduate students, is a reasonable size for statistical analysis. The sample provided detailed and well-considered responses, demonstrating a high level of engagement with the study's questions. The insights gathered from this cohort were particularly valuable, as their experiences allowed for an examination of online learning's impact within the context of higher education at a critical time. Their responses contributed meaningfully to the research objectives, allowing for a nuanced analysis despite the constraints imposed by the limited participant pool. This sample thus served as an essential bridge, enabling the study to capture the perspectives of one of the last groups of students with firsthand online learning experience within the university's phased return to in-person instruction.

APPENDIX-I

SECTION A

General Information Pro-forma for Students

Name of the Student :

Course Enrolled for :

Specialization if any :

Sex : **Male/Female**

Age : **>30 / < 30**

Residence during pandemic classes: Rural/Urban

Institution :

Department :

School :

Please tick the devices used in Online Classes: Mobile phone, laptop, tablet, Personal Computer, Smart TV, Any other please Specify_____

Please Tick the Online teaching-learning Platforms used by you:

Google Classroom, Google meet, Google drive, Zoom meeting, Cisco, Microsoft Teams, Whats app, Telegram, Webex, Any other please Specify

Contact no. :

Email ID :

Serial No.	Statements	(SA)	(A)	(UD)	(D)	(SD)
Perception towards Synchronous Online Learning						
1	Learning online seems better than face-to-face mode					
2	It seems easier to clarify doubts from teachers in online classes					
3	The online presentations by teachers look more detailed					
4	Discussion in online classes seems clearer					
5	Online learning seems to give more scope of exhibiting creativity					
6	Online learning seems to make me more confident learner					
7	Synchronous online mode is more student oriented than asynchronous as there is active participation from the students					
8	Queries can be answered easily in synchronous online learning					
9	Synchronous online classes enhance completion of assignments by students within deadlines					
10	Online classes increase regular participation of the students					
11	It is not easy for me to use computer, tablet, video calls, online learning applications in online classes etc.					
12	Online classes seem exciting compared to normal class					

	teaching					
13	Network failure is the biggest barrier in learning in online classes					
14	Synchronous online learning seems to be capable of providing the sense of community of classroom environment					
15	It is interesting to be evaluated online staying at distant location					
Perception towards Asynchronous Online Learning						
16	Asynchronous online learning seems more flexible and convenient					
17	Asynchronous online learning seems easier on part of learner					
18	Asynchronous online learning seems to be easily accessible to learners from different socio-economic status					
19	Learning seems more convenient through the platform of asynchronous learning					
20	It seems lesson can be re-learned by revisiting the online resource as many times in asynchronous platforms					
21	It is easy to study from recorded lectures over synchronous platforms					
22	Asynchronous learning helps to learn in one's own pace					
23	Asynchronous online classes enhance the learning due to exposure to multiple learning resources					

24	Asynchronous learning is less expensive than synchronous learning					
25	Asynchronous platforms of learning help to reach out to teachers at any point of time					
26	Asynchronous learning poses less strain as it is not time bound					
27	Accessing learning material over email, WhatsApp and discussion groups is very student friendly					
28	Watching recorded videos and audios fasten review of learned content before examination					
29	It seems comfortable to pose questions, clarify doubts and drop suggestions in online discussion groups over asynchronous platforms					
30	I am relaxed when I learn through asynchronous classes					

APPENDIX-II

SECTION A

General Information Pro-forma for Students

Name of the Student :

Course Enrolled for :

Specialization if any :

Sex : **Male/Female**

Age : **>30 / < 30**

Residence during pandemic classes: Rural/Urban

Institution :

Department :

School :

Please tick the devices used in Online Classes: Mobile phone, laptop, tablet, Personal Computer, Smart TV, Any other please Specify_____

Please Tick the Online teaching-learning Platforms used by you:

Google Classroom, Google meet, Google drive, Zoom meeting, Cisco, Microsoft Teams, Whats app, Telegram, Webex, Any other please Specify

Contact no. :

Email ID :

Serial. No.	Statement	(SA)	(A)	(UD)	(D)	(SD)
Attitude towards Synchronous Online Learning						
1	I lack the immediate help I need from my teacher in online learning					
2	I can actively participate in online classes since it is student friendly					
3	I am annoyed when a lecture is disrupted in mid of class due to network failure					
4	It is burdensome for me to stay focused on my work in online classes					
5	I can complete my assignments easily while learning through online classes					
6	I feel spontaneous when engaging in group learning activities through online classes					
7	I am comfortable in handling online synchronous learning platforms					
8	I lack concentration while learning through online classes					
9	I don't feel productive when learning through online classes					
10	I am satisfied with my teachers in terms of teaching and guidance in online classes					
11	I often do not understand the topic explained in online					

	classes					
12	I am disturbed by network failure which cause misunderstanding in online classes					
13	I am mentally absent due to lack of interactions in online classes					
14	I have confident about my learning through online classes					
15	I am more enriched in my learning through blending of synchronous online and face to face classes					
Attitude towards Asynchronous Online Learning						
16	My learning has enhanced through accessing online resources related to course content asynchronously					
17	I am benefitted by teachers' recorded lectures in my learning					
18	I respond and interact with my teachers and peers asynchronously without interrupting their schedule					
19	I re-watch recorded sessions for reviewing my lessons before my final exam					
20	My doubts are not completely answered through asynchronous mode of online learning					
21	I am stressed learning asynchronously when I am unable to interact with teachers through face-to-face mode					
22	I prefer synchronous online learning over asynchronous learning					
23	I can learn through online recorded lectures if I miss					

	them due to illness or other emergent condition					
24	I dislike asynchronous online learning because it is mostly one-way learning					
25	I badly miss the sense of belongingness to a classroom community while I am learning online asynchronously					
26	I lack spontaneity in learning while accessing online resources asynchronously					
27	I improved in technological skills while browsing online resources					
28	I often get indulged in social media chats while browsing internet for my learning					
29	Online learning resources enable me to conduct further research before posing questions in online discussion group					
30	I pay less concentration while learning from online asynchronously					

APPENDIX-III

SECTION – A

General Information Proforma for Teachers

Name of the Teacher(Optional) :

Educational qualification :

Sex : Male/Female

Age < 30

30 - 45

46-50

50 and above

Teaching Experience :1-10 Years

11-20 Years

21-30 Years

More than 30 years

Institution :

Department :

School :

Please tick the devices used by you in Online Classes: Mobile phone, laptop, tablet, Personal Computer, Smart TV, If Any other please Specify_____

Please Tick the Online teaching-learning Platforms used by you:

Google Classroom, Google meet, Google drive, Zoom meeting, Cisco, Microsoft Teams, Whats app, Telegram, Webex, If Any other please Specify_____

Contact no. :

Email ID :

Serial No.	Statements	(SA)	(A)	(UD)	(D)	(SD)
Perception towards Synchronous Online Teaching						
1	It gives a sense of satisfaction when reaching out to students is possible through online teaching					
2	It needs more preparation to teach in online classes					
3	It is difficult to ensure students engagement in online classes					
4	Teaching in online classes is more convenient as lectures can be taken on evenings and off days					
5	It seems students prefer to mute their audio and switch off their video in online classes making the whole teaching process one way					
6	Online classes developed sense of responsibility and commitment to teach under new prevailing circumstances					
7	Online classes seem to be an opportunity to learn alternative modes of teaching amidst unfavorable situations					
8	Poor internet connectivity disrupts the flow of teaching-learning process					
9	Complex concepts are not well explained in online classes					
Perception towards Asynchronous Online Teaching						
1	The requirement of resource is less in asynchronous					

	teaching in comparison to synchronous					
2	Asynchronous teaching always needs to be blended with face-to-face mode of teaching to be more impactful					
3	Asynchronous platforms are much easier to handle compared to synchronous platforms					
4	Inability to understand the content of online material may make learners to struggle with boredom and fail to engage in learning					
5	Students can easily lag behind in progressing in absence of constant motivation by the teachers					
6	Students are found to be less engaging with a recorded session because they feel that they can always do it later					
7	Students may not have an access to teachers for clarifying their doubts in asynchronous learning platforms					
8	Asynchronous learning does not work well for some students who need more attention from teachers					
9	Asynchronous learning platforms caters more to individual needs of learners					
10	Asynchronous teaching is successful when students exhibit higher level of motivation, commitment and independent learning skills					
11	Asynchronous learning is based on principle of self-learning as one learns at own pace and is self directed to succeed in a course					

APPENDIX-IV

SECTION – A

General Information Proforma for Teachers

Name of the Teacher(Optional) :

Educational qualification :

Sex : Male/Female

Age < 30

30 - 45

46-50

50 and above

Teaching Experience :1-10 Years

11-20 Years

21-30 Years

More than 30 years

Institution :

Department :

School :

Please tick the devices used by you in Online Classes: Mobile phone, laptop, tablet, Personal Computer, Smart TV, If Any other please Specify_____

Please Tick the Online teaching-learning Platforms used by you:

Google Classroom, Google meet, Google drive, Zoom meeting, Cisco, Microsoft Teams, Whats app, Telegram, Webex, If Any other please Specify_____

Contact no. :

Email ID :

Attitude towards Synchronous Online Teaching						
1	My speed of course coverage has fastened in online classes					
2	I received less feedback from students' end due to limited communication through synchronous online platforms					
3	I cannot identify students' emotions in online classes					
4	I cannot ensure students' engagement in online classrooms					
5	I see students lacking the sense of community in online classes as they are distant apart					
6	I found identifying students' learning problems difficult in online classes					
7	I am not comfortable in evaluating students through online platforms					
Attitude towards Asynchronous Online Teaching						
1	My teaching is enhanced through asynchronous online teaching as it enabled me teach remote and diverse groups of students					
2	I dislike teaching students through asynchronous platforms as they miss out the opportunity to be punctual in learning process					
3	I found that students are less creative in making their online assignments due to their access to readymade information online					

4	Asynchronous distant mode of learning promotes passive learning which is done only to meet the deadlines of finishing assignments and passing examination					
5	I found that students' critical thinking skills are greatly hampered due to less efforts on their collaborative team work in asynchronous mode of learning					

APPENDIX-V

Following questions are specifically in relation to **Synchronous teaching-learning** which you experienced during pandemic and post pandemic semesters. Please tick your suitable response for each question. You have to choose one option out of “rarely”, “sometimes” or “always” according to your experience. Some questions are to be answered in **Yes and No**. Also there are some **open-ended questions** for you to fill.

1. Do you feel nervous when it comes to study in an online classroom?

Rarely	Sometimes	Always

2. Are you insecure about your computer/electronic device skills?

Rarely	Sometimes	Always

3. Are you scared of being misinterpreted while communicating in online classrooms?

Rarely	Sometimes	Always

4. What are the necessary things that may help to cope your anxiety in online learning?

5. If you feel anxious in online classes specify the reasons for your anxiousness by ticking the options provided:

- i) Lack of adequate training for online session
- ii) Monotony of online environment
- iii) Less scope of two way communication
- iv) Fear of being tested for online skills
- v) Artificial setting of online classroom
- vi) Any other please specify _____

6. Do you own personal devices and stable internet connection at your home for online classes?

Yes	No

7. Did you face data pack insufficiency while attending the online classes?

Rarely	Sometimes	Always

8. Do you think online classes consume large amount of data which pose problems to a lot of students?

Yes	No

9. Does your internet supply often get interrupted making it difficult to learn in online classes?

Rarely	Sometimes	Always

10. Did you face problems with audio quality while attending online classes?

Rarely	Sometimes	Always

11. Did you have the problem of poor video quality during video conferencing session in online classes?

Rarely	Sometimes	Always

12. Have you ever struggled while downloading assignments or uploading completed work due to internet failure?

Rarely	Sometimes	Always

13. Do you think that synchronous online learning platforms consume more internet data than asynchronous platforms?

Yes	No

14. Do you face problem while logging into live classes, communicating with teacher and friends and creating and submitting work through online learning platforms?

Rarely	Sometimes	Always

15. Do you face difficulty in learning where online class videos could not be recorded or watched later?

Rarely	Sometimes	Always

16. Did you face your device incompatibility problem with the learning platforms used during online classes?

Rarely	Sometimes	Always

17. If you are from rural origin, what is your main problem in learning in online mode?

18. If you are from urban origin, what is your main problem in learning in online mode?

19. Did you face problems in learning from home during online classes?

Rarely	Sometimes	Always

20. Is your home environment suitable for learning and attending online classes?

Yes	No

21. Did you have a proper seating area at your home to attend online classes?

Yes	No

22. Did the noise and disturbances from home prevent you from learning in online classes?

Rarely	Sometimes	Always

23. Do you think lack of a real peer group interaction prevented you from doing collaborative activities in online classes?

Rarely	Sometimes	Always

24. Is it hard for you to find quiet locations during online classes?

Rarely	Sometimes	Always

25. Did household chores distract you from attending online classes? If yes, what type of problem do you mostly faced? _____

26. If you faced problem in learning from home specify what was the biggest hurdle? _____

27. Do you feel that there is boredom in online classes due to repetition of lecture based teaching?

Rarely	Sometimes	Always

28. Do you feel you were not given personalized guidance by your teacher for improving and identifying your weakness during online classes?

Rarely	Sometimes	Always

29. Do you find it difficult to complete your assignments due to communication barriers in online classrooms?

Rarely	Sometimes	Always

30. Can you specify some specific barrier to communication in online classes? _____

31. If you are dissatisfied with teaching methods and practices, then state what is your ideal expectation in online classes regarding teaching methods? _____

32. Do you think you are productive in online class than traditional class? If no, why? _____

33. Do you face difficulty in concentration due to the harmful radiations from device used for online classes?

Rarely	Sometimes	Always

34. Do you suffer from ailments like headaches, back-pain, neck-pain, wrist pain and eye strain due to prolonged usage of mobile phones/ laptops/tablets/PC for online classes?

Rarely	Sometimes	Always

35. Do you feel sleepy after prolonged exposure to the blue light from mobile phones and computers?

Rarely	Sometimes	Always

36. If you have suffered with any health issues while learning in online classes please specify it and do you have any suggestion to overcome it in online classes?

37. Is it difficult for you to join online class on time?

Yes	No

38. Did you face the problem of missing out a lecture while changing from one online class to another?

Rarely	Sometimes	Always

39. Do you frequently respond when the teacher asks a question in online classes? If no, why?

40. Do you usually finish your online assignment in time?

Rarely	Sometimes	Always

41. If you feel that you are not able to follow ideal behaviour in online classes, can you suggest the basic reason for doing so? _____

42. Do you feel lack of interest and enthusiasm in learning through online classes?

Rarely	Sometimes	Always

43. Do you feel unmotivated to visit the online learning portal due to endless oceans of texts, quizzes, and frequent learning assignments?

Rarely	Sometimes	Always

44. Do you think that your concentration is diverted during online classes?

Rarely	Sometimes	Always

45. According to you what can motivate you instantly to join online classes?

APPENDIX-VI

Following questions are specifically in relation to **Synchronous teaching process** which you experienced during pandemic and post pandemic semesters. Please tick your suitable response for each question. You have to choose one option out of “rarely”, “sometimes” or “always” according to your experience. Some questions are to be answered in **Yes and No**. Also there are some **open-ended questions** for you to fill.

1. Do you find it difficult to adapt to different online teaching-learning platforms?

Rarely	Sometimes	Always

2. Do you feel dissatisfied with the limitations of teaching in online classes?

Rarely	Sometimes	Always

3. What is that one thing that you dislike about online teaching?

4. Do you think that rural students stay behind urban students in online classes due to lack of internet connectivity?

Yes	No

5. Do you think insufficient supply of electricity is a major hurdle that prevents rural students from attending online classes?

Rarely	Sometimes	Always

6. Do you think digital divide poses stress for students of rural origin?

Rarely	Sometimes	Always

7. Do you think both urban and rural students face similar internet related problems in online classes?

Rarely	Sometimes	Always

8. What is that one major problem you faced with students from rural origin?

9. Are you satisfied with the quality of audio and video during online classes?

Rarely	Sometimes	Always

10. Do you face frequent occurrence of low bandwidth of internet transmission resulting in poor signal strength?

Yes	No

11. Do you think that most students are not well equipped with a high internet connection that is required for online learning?

Rarely	Sometimes	Always

12. What are the most easy to handle online teaching-learning platforms used by you?

13. Is it okay for you that students keep their cameras off during the online classes?

Rarely	Sometimes	Always

14. Do you think students may resort to unfair means of passing online tests such as cheating in online mode of examination?

Rarely	Sometimes	Always

15. Do you think that facial expressions and other social cues are missing in online classrooms?

Rarely	Sometimes	Always

16. Mention one major problem you encounter due to only virtual presence of students in classes? _____

17. Do you think adequate training for conducting online classes was provided from your university?

Yes	No

18. Do you think you are a computer savvy teacher?

Yes	No

19. Do you think you lack effective communication skills during online teaching?

Yes	No

20. Do you think diversity of learners and distance make online teaching much more challenging?

Rarely	Sometimes	Always

21. What is one major challenge in teaching online classes?

22. What is the major lack in student's performance as a result of online learning?

23. Do you think that male students have an advantage in online learning over female students as they are more techno-savvy?

Rarely	Sometimes	Always

24. Do you think that male and female students do not differ in their attitude towards online learning?

Rarely	Sometimes	Always

25. Who do you think is more engaged in online learning activities male students, female students or both?

26. Do you think students lack effective communication skills for online learning?

Rarely	Sometimes	Always

27. Do you think that students do not stay seated during the whole lecture during the online classes?

Rarely	Sometimes	Always

28. Have you found students keeping their speakers un-muted and posed interruptions during online lectures?

Rarely	Sometimes	Always

29. Do students feel shy to use 'raise hand' features in online classes in case of questions and answers?

Rarely	Sometimes	Always

30. Do students fail to give immediate feedback upon their understanding in online classes?

Rarely	Sometimes	Always

31. What is the most essential online etiquette to be followed by the student in online learning according to you?

32. Do you suffer from ailments like headaches, back-pain, neck-pain, wrist pain and eye strain due to prolonged usage of mobile phones/ laptops/tablets/PC for online classes?

Rarely	Sometimes	Always

33. If you have suffered with any health issues while teaching in online classes please specify it and do you have any suggestion to overcome it in online classes?

APPENDIX-VII

Interviews scheduled to qualitatively explore the feelings, problems, and suggestions of students towards online teaching learning process.

1. What paper do you find most challenging to learn online?
2. How was your experience of learning your subject through online mode?
3. What is your major benefit of online classes during pandemic?
4. What was your experience with examination in online mode?
5. What kind of online learning platforms are you most comfortable with?
6. Did you have difficulties in the use of online learning method?
7. Is it easy to follow online etiquette?
8. Before each class, did the teacher remind you to obey guidelines of online etiquette?
9. Do you find LMS (Learning Management System) useful in uploading assignments?
10. Are your overall expectations the same or different from a traditional class?
11. Are webinars helpful for growing your knowledge?
12. How do you provide feedback to teachers?
13. What is working well with the online learning model that you would like to see continue?
14. What is challenging about online learning model that you would like to suggest improved?

APPENDIX-VIII

This scale consists of 16 statements and it provides five-point Likert scale bearing the headings **Strongly Agree (SA)**, **Agree (A)**, **Undecided (UD)**, **Disagree (D)**, **Strongly Disagree (SD)** against the statements. *Please fill in the option which suits you the best with regard to your **Attitude towards Technology***

Serial No.	Statements	(SA)	(A)	(UD)	(D)	(SD)
1	I feel it is important to be able to find any information whenever I want online.					
2	I feel it is important to be able to access the Internet any time I want.					
3	I think it is important to keep up with the latest trends in technology.					
4	I get anxious when I don't have my cell phone.					
5	I get anxious when I don't have the Internet available to me.					
6	I am dependent on my technology.					
7	Technology will provide solutions to many of our problems.					
8	With technology anything is possible.					
9	I feel that I get more accomplished because of technology.					
10	New technology makes people waste too much time.					
11	New technology makes life more complicated.					
12	New technology makes people more isolated.					
13	I prefer to work on several projects in a day, rather than completing one project and then switching to another.					
14	When doing a number of assignments, I like to switch back and forth between them rather than do one at a time.					
15	I like to finish one task completely before focusing on anything else.					
16	When I have a task to complete, I like to break it up by switching to other tasks intermittently.					

APPENDIX-IX
SOCIO-ECONOMIC STATUS SCALE
Prof Lallianzuali Fanai and Prof RP Vadhera (Revised,2022)

A. Personal Information:

1. Name _____ Age _____ Sex _____
2. Educational Qualification _____
3. Locale _____ Rural/ Urban District _____
4. Father's Education _____ Mother's Education _____

B. Instruction :

On the basis of this Scale, Socio-Economic Status of your family is being studied. You are requested to give information related to the question by putting tick () mark in the place- holder provided against them. The information furnished by you would be used only for research purpose and your identity will be kept confidential. Therefore , feel free and answer all all the questions without any reservation. Along with the questions probable answers are given. You have to tick one of answer which most suits to your family.

1) What is the education of your family members?

	Father / Mother	Eldest son/Eldest daughter	Husband /Self	Brother/ Sister
a) University`s high degree e.g Ph.D. D. Litt., D.Sc., M.D. or similar professional degree.	()	()	()	()
b) Post graduate education (M.A, M.Sc.,M.Com.,M.Ed.,M.Th.)	()	()	()	()
c) Graduate level education(B.A., B.Sc.,B.Com.,B.Ed.,LL.B.,etc) or any other equivalent degree after Intermediate.	()	()	()	()
d) Higher Secondary, Intermediate, and other professional certificate, or any diploma after High School.	()	()	()	()
e) Middle School(Class V-VII) or equivalent training certificate.	()	()	()	()
f) Primary education	()	()	()	()

2) What is the occupation of your family members?

- a) High Administrative (Gazetted) Officer such as
Secretaries, Professors, Director, Principal of College,
Teachers in the University, Colleges and Professionals , Engineer, Doctor, Lawyer,
Bank Manager, Managing Director of Industrial
or Business House, Owner of Factory, Political
Leader like Municipal counselor, MLA & MP etc. () () () ()
- b) Middle class professional such as Higher
Secondary School Teacher,High School Teacher,
Section Officer, Assistant, Research Assistant,
Chemist,J.E.,Wholesaler, Accountants,

- Reknowned Artist, Shop Keeper, Instructor etc. () () () ()
- c) Ordinary professional,such as Clerk, Typist,
Stenographer, Technicians,Laboratory Asst.,Primary
& Middle School Teacher, Salesman, Small shopkeeper,
Electricians, Owner of Small Scale Industry etc. () () () ()
- d) Other Professions such as Peon, Driver,
Lineman, Plumber, Fitter, Masions, Painter,
Mechanics, Carpenter etc. () () () ()
- e) Labourer, Kuli, unskilled workers etc. () () () ()

3) What is the income of your family per month?

- a) Above Rs 300,000/- ()
- b) Between Rs 250,001/- to Rs 300,000/- ()
- c) Between Rs 200,001/- to Rs 250,000/- ()
- d) Between Rs 150,001/- to Rs 20,0000/- ()
- e) Between Rs 100001/- to Rs 150,000/- ()
- f) Between Rs 5,0001/- to Rs 100,000/- ()
- g) Between Rs 15001/- to Rs 50000/- ()
- h) Below Rs 15000/- ()

4) What is the opinion of your friend/otherpeople about you and your family?

- a) Prosperous family ()
- b) Middle class family ()
- c) Low class family ()

5) Tick the following items which your family possesses

- a) Two wheeler (scooter, motorcycle) ()
- b) Four wheeler
- c) Imported car (foreign car)/luxury car ()
- d) Indian car/ Jeep/ Gypsy/Sumo etc ()
- e) Bus, Commercial Truck, JCB,Bulldozer etc. ()
- f) Household commodities -
- g) Personal Computer ()
- h) Laptop ()
- i) Phone Landline ()
- iv) Mobile phone ()
- v) Broadband ()
- vi) Air Conditioner ()
- vii) Washing machine ()
- viii) Microwave oven ()
- ix) Portable T.V & Big T.V ()
- x) Refrigerator ()
- xi) LPG Connection ()
- xii) Water connection ()
- xiii) Electric connection ()
- xiv)) Radio ()

6) Does your family has its own house ? yes/No

If yes, what type of house it is?

a)	R.C.C Building	()
b)	Asbestos Cement (Tile) with Dyna roof/G.C.I Sheet roof	()
c)	Bamboo wall with G.C.I Sheet roof	()
d)	Bamboo wall with thatch roof	()

7) Does you / your parent/husband hold any important post in the church ?

	Father/husband	Mother/self
(a)	Elder(Upa)	Chairperson
(b)	Committee member(TualUpa)	Committee member of the women wing
(c)	Deaconates e.g Preacher, Sunday School teacher, Evangelist etc.	Deaconates e.g preacher, Sunday School teacher.

8) Does you/your parents/husband hold any post in the social organisations like Y.M.A, M.H.I.P etc? yes/no

	Father/husband	Mother/Self
(a) State Level	()	()
(b) District/Group Level	()	()
(c) Locality	()	()

9) (a) Does your family subscribe daily Newspaper ?

(i) Regularly	()
(ii) Ocassionally	()
(iii) Never	()

(b) Does your family subscribe National Newspaper ?

(i) Regularly	()
(ii) Ocassionally	()
(iii) Never	()

SCORING KEY FOR SOCIO ECONOMIC STATUS (SES) SCALE

Prof. Lallianzuali Fanai & Prof. RP Vadhera (Revised, 2022)

1. **(a)** (1), (2), (3), (4)
(b) (1), (2), (3), (4)
(c) (1), (2), (3), (4)
(d) (1), (2), (3), (4)
(e) (1), (2), (3), (4)
(f) (1), (2), (3), (4)

2. **(a)** = 5,

(b) = 4,

(c) = 3,

(d) = 2,

(e) = 1

3. **(a)** = 8,

(b) = 7,

(c) = 6,

(d) = 5,

(e) = 4,

(f) = 3,

(g) = 2,

(h) = 1

4. **(a)** = 3,

(b) = 2,

(c) = 1

5. **(a)** = 1

(b) (i) = 3,

(ii) = 2,

(iii) = 3

- (c)** (i) = 1,
(ii) = 1,
(iii) = 1,
(iv) = 1,
(v) = 1,
(vi) = 1,
(vii) = 1,
(viii) = 1,
(ix) = 1,
(x) = 1,
(xi) = 1,
(xii) = 1,
(Xiii) = 1

6. **(a)** = Yes-(1), No = 0

- (b)** (a) = 4,
(b) = 3,
(c) = 2,
(d) = 1

7. Father/husband Mother/self

(a) = 3	(a) = 3
(b) = 2	(b) = 2
(c) = 1	(c) = 1

8. Father/husband Mother/self

(a) = 3	(a) = 3
(b) = 2	(b) = 2
(c) = 1	(c) = 1

9. **(a)**

(i) = 3,

(ii) = 2,

(iii) = 1

(b)

(i) = 3,

(ii) = 2,

(iii) = 1.

Notes : Classification

(a). Upper 27 percent of the sample on this scale was taken as High SES group.

(b). Middle 46 percent the sample on this scale was taken as Middle SES group.

(c). Lowest 27 percent of the sample on this scale was taken Low SES group.

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Enhancing Academic Excellence: An Analysis of UGC's Draft Regulations, 2025 in the Context of Global Policies

Sayantan Mandal, Sheriya Sareen, Sumit Sikdar, Joby Varghese and Gaurav Bhaduri

Navigating Pathways: Policy and Research Imperatives in Artificial Intelligence for Higher Education

Ramulu Bhukya

The Epidemic of Retracted Researches in Indian Higher Educational Institutions: The Dark Side of Indian Academia

Ignes R Lalmuanpuii and Nitu Kaur

Advancing Inclusive and Effective Online Learning: Addressing Challenges and Maximizing Opportunities for Student Achievement

Suresh Yenugu

Disparity in the Fellowship of Indian Doctoral Students: A Damper for Scientific Research?

– Communication

Advancing Inclusive and Effective Online Learning: Addressing Challenges and Maximizing Opportunities for Student Achievement

Ignes R Lalmuanpuui* and Nitu Kaur**

The present paper aims to identify various problems faced by students and teachers in online learning and to offer remedial measures towards such problems. The purpose of this study is to review online learning with respect to its effects on mental health, inclusivity, objectivity, key issues, and solutions. Online learning has transformed education by offering flexibility, and enhancing motivation, engagement, and technological skills while fostering teamwork and self-confidence among learners. However, it presents significant challenges, particularly in terms of mental and physical health, accessibility, inclusivity, and evaluation. Key challenges include increased stress, anxiety, and depression among students, particularly females, as well as reduced physical activity during online learning periods. Technical barriers such as inadequate ICT infrastructure, poor connectivity, and the digital divide between rural and urban areas further exacerbate these issues. The lack of culturally diverse materials, ineffective online assessments, and limited interaction contribute to reduced inclusivity and engagement. Future online learning models must prioritize inclusivity, equity, and the holistic welfare of students. Integrating human-centered approaches, leveraging innovative technologies, and addressing systemic barriers will ensure that online education becomes more engaging, equitable, and impactful.

Online learning was not an obvious option before the outbreak of the pandemic of COVID-19 in developing nations like ours, however after that, the way of living changed for most people, especially in the areas of teaching-learning where online learning and the adoption of technology is a necessity despite most of the facilities were unprepared for such (Garlinska et al., 2023). Almost every sector has been impacted by the pandemic, including business, government, tourism, education, and health in a way that encourages these sectors to embrace online tactics and the educational needs that enable students to transition from an unfamiliar learning environment to online learning (Hongsuchon et al, 2022). Even while online learning

offers a way to access and continue teaching-learning across nations, there are several challenges when putting these strategies into practice. Students are more likely to suffer from depression, anxiety, and psychological stress. (Azmi, Khan & Azmi, 2022). Thus, it is evident that fewer in-person interactions have had a major impact on academic results and learning motivation (Liu, Ma & Chen, 2024). As a result, poor use of the online learning that comes with adopting technology can hinder learning and cause students to feel isolated, which will negatively affect their motivation, engagement, retention, and satisfaction. (Chai et al., 2024). In order to meet the needs of learners' motivation, engagement, and outcomes over educational and geographic characteristics, it is imperative to implement sound pedagogical designs in light of the growing demands of online learning in post-pandemic conditions ((Ismailov & Chiu, 2022, Goudarzi et al., 2023). This will ensure inclusivity and diversity. Therefore, the purpose of this study is to review online learning concerning its effects on mental health, inclusivity, ethical learning, key issues, and solutions. In light of the numerous reviews of related literature, this paper will be devoted to presenting viable solutions to the issues surrounding online learning for both teachers and students.

It has been demonstrated that technology improves motivation, engagement, and teamwork among learners of all ages, including those with special needs. It also helps pupils strengthen their technology abilities and increases their sense of self-confidence (Costley, 2014). Despite these benefits, there exist several difficulties with online learning environments as well, especially with regard to students' physical and mental health. Depressive symptoms are prevalent among university students which are caused by stress, exam anxiety, disinterested online learning strategies, and decreased productivity. Compared to male students, female students specifically reported higher levels of stress, anxiety, and depression (Azmi et al., 2022). Furthermore, female participants expressed higher levels of tension and eye strain, with some devices more uneasy to use than others as a result of usage patterns, screen brightness, or quality (Victor et al., 2023). In addition, regardless of gender, university students' physical activity dramatically declined throughout the online learning period, but the school closure had no effect on their mental health

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(Chu & Li, 2022). Therefore, incorporating well-being tools like mindfulness content, enabling peer-to-peer and student-teacher communication, offering a comprehensive introduction, and guaranteeing ongoing technical assistance are all crucial steps in addressing students' mental health issues (Roddy, 2017). Enhancing students' psychological resilience, developing emotional ties, and increasing intrinsic motivation are essential for academic achievement in blended learning (Liu et al., 2024). Online academic support increases productivity, drive, creativity, and accessibility to assistance. In addition, it improves pupil retention, digital proficiency, and self-efficacy, and offers social advantages (Walsh et al., 2024). In order to succeed academically in digital learning environments, instructors must prioritize their well-being, integrate modern technological advances, and engage in ongoing professional development (Sato et al., 2024).

Inclusivity in online learning is pivotal to ensure that learning environments are designed in such a way that they cater to the diverse needs of pupils by considering accessibility and minimizing barriers. Digital resources like blogs, multimedia presentations, and video lectures help culturally diverse students academically, yet they frequently struggle since there is a dearth of multicultural information. So, in order to encourage inclusivity and participation, teachers should use culturally appropriate materials (Yeboah et al., 2020). Even though online learning reduces barriers, equity is hampered by a lack of internet and device availability, inadequate teacher preparation, and low student proficiency in online learning (Tate & Warschauer, 2022). In addition, educational access is limited by socioeconomic, digital, linguistic, and societal constraints (Ersoy, 2023). Despite that online and hybrid learning hampers underprivileged students to obtain education, it also advances equity by making learning more flexible and accessible (Ikebuchi, 2023). Therefore, it is recommended that student support, teacher training, and digital access be improved (Tate & Warschauer, 2022). Also, some of the alternatives include developing digital skills, increasing financial aid, encouraging cultural inclusivity, establishing online communities, and offering personalized content (Ersoy, 2023).

Despite the fact that online learning enables examination and evaluation, it lacks objectivity. From the study of Laldhawma et al., 2022, it has been found that the majority of teachers believe that online tests are unfair and pupils prefer objective items. Furthermore, online learning presents a number of difficulties, such

as problems with evaluation and cheating detection (Goudarzi et al., 2023).

Online learning has been shown to allow for the continuation of education, however, there are certain drawbacks. Although distance learning is flexible, it may also cause isolation and technical problems, thus it calls for a lot of self-control. To maximize its advantages, these issues must be resolved (Garlinska, Proniewska, & Pregowska, 2024). The most challenging subject is math, and frequent connectivity problems cause disruptions in the classroom (Laldhawma et al., 2022). Online learning presents a number of difficulties, such as inadequate bandwidth, bad infrastructure, a lack of technical expertise, delayed feedback, and problems with evaluation and cheating detection (Goudarzi et al., 2023). In addition, overuse of videoconferencing can lower energy and performance, underscoring the importance of taking students' digital preferences into account (Rodríguez et al., 2023). Moreover, there is a digital divide between teachers in rural and urban areas, with higher-ranking, older instructors being more actively involved (Amirova et al., 2023). Educational access is limited by socioeconomic, digital, linguistic, and societal constraints (Ersoy, 2023). Also, most students prefer to learn offline, while underdeveloped nations deal with issues including inadequate infrastructure and limited funding (Meng et al., 2024). So, in order to resolve such issues, teachers should employ difficult, complex questions, engage students, promote involvement, and randomly select exam questions in order to resolve these issues (Goudarzi et al., 2023). To accommodate different learning styles, educators need to be tech-savvy and able to use tools like social robotics, mixed reality, and video games to increase engagement (Rodríguez et al., 2023). Enhancing digital education requires training for younger teachers and improving ICT infrastructure (Amirova et al., 2023). Some of the alternatives include developing digital skills, increasing financial aid, encouraging cultural inclusivity, establishing online communities, and offering personalized content (Ersoy, 2023). Improving ICT infrastructure, helping low-income students, increasing social contacts, taking mental well-being into account, and having backup plans for online learning emergencies are essential elements to resolve issues related to online learning (Meng et al., 2024).

Several studies have provided some practical answers to the issues of online education. Universities can assess and improve learning outcomes by concentrating on technological pedagogical knowledge (TPK), which helps in comprehending

how to use technology to improve teaching strategies, and technological content knowledge (TCK), which focuses on using technology to deliver specific content efficiently (Khazo, 2022). The efficacy of online education is enhanced by motivation and strategic online learning. While students should actively participate, encourage peer interaction, and set clear learning objectives, instructors should use a variety of learning methods to create engaging, interactive settings that meet students' content needs (Hongsuchon et al., 2022). Live interactions in blended learning environments better support students' intrinsic needs, inclusiveness, and sense of belonging (Ismailov & Chiu, 2022). Prioritizing ethical integrity and guaranteeing responsibility through well-defined norms are essential for researchers. To improve these guidelines and advance relational ethics, constant discussion is necessary (Costello et al., 2023). To accommodate different learning styles, educators need to be tech-savvy and able to use tools like social robotics, mixed reality, and video games to increase engagement (Rodríguez et al., 2023). Teachers who incorporate human-centered features into their lessons (by increasing human connection in the virtual world) improve learning outcomes by personalizing online instruction, which makes students feel less alone and more involved (Chai et al., 2024). In comparison to traditional techniques, gamification improves academic performance and retention by increasing motivation, engagement, and satisfaction while meeting basic requirements (Lampropoulos & Sidiropoulos, 2024). The effects of AI on academic integrity, especially plagiarism, should alarm students. Fostering an ethical learning environment requires clear policies, sophisticated plagiarism detection, and creative assessments (William, 2024). Future learning models should be created by educators considering the welfare and sense of community of students as top priorities. Fostering relationships between teachers, students, and peers, delivering resources for skill development, and reinforcing support can improve students' sense of belonging, (Rajan et al., 2024).

Conclusion

Online learning has transformed education by offering flexibility, and enhancing motivation, engagement, and technological skills while fostering teamwork and self-confidence among learners. However, it presents significant challenges, particularly in terms of mental and physical health, accessibility, inclusivity, and evaluation.

Key challenges include increased stress, anxiety, and depression among students, particularly females,

as well as reduced physical activity during online learning periods. Technical barriers such as inadequate ICT infrastructure, poor connectivity, and the digital divide between rural and urban areas further exacerbate these issues. The lack of culturally diverse materials, ineffective online assessments, and limited interaction contribute to reduced inclusivity and engagement. To address these challenges following strategies are recommended:

- **Mental Health and Well-being:** Incorporate mindfulness tools, enable communication channels, and provide ongoing technical support to promote student resilience and engagement.
- **Inclusivity and Accessibility:** Develop culturally appropriate materials, improve digital infrastructure, and provide financial aid, fostering interactive and inclusive environments and personalized content to support diverse learners.
- **Teacher Training and Technological Integration:** Equip educators with skills to use advanced tools like mixed reality, social robotics, and gamification, fostering interactive and inclusive environments. Continuous professional development is essential.
- **Ethical and Effective Learning Environments:** Promote academic integrity through clear policies, innovative assessment methods, and relational ethics.
- **Enhanced Student Support:** Foster communities for peer and teacher interactions, improve digital literacy, and prioritize emotional well-being and a sense of belonging.

Therefore, future online learning models must prioritize inclusivity, equity, and the holistic welfare of students. Integrating human-centered approaches, leveraging innovative technologies, and addressing systemic barriers will ensure that online education becomes more engaging, equitable, and impactful.

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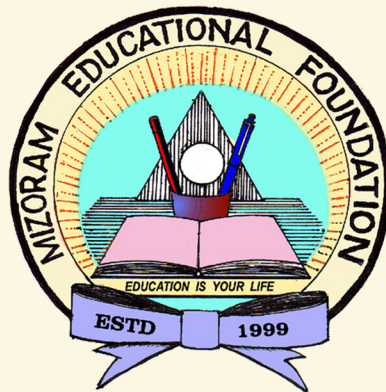
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Challenges and Insights from Teachers on Online Teaching: A Qualitative Analysis

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Abstract

An unprecedented global shift from traditional classroom instruction to online teaching was brought about by the COVID-19 pandemic, with synchronous modalities of delivery emerging as the main educational approach in Mizoram. This study highlights the difficulties with recommendations while examining postgraduate teachers' experiences with synchronous online teaching during the epidemic. A qualitative data collected through open-ended questionnaire questions their experiences with online teaching. Results show that while teachers demonstrated adaptability in transitioning to online teaching, the process was hindered by persistent technological challenges, inadequate digital infrastructure, and a lack of training, particularly in rural areas. Pedagogical adjustments were necessary but often difficult due to reduced student engagement, limited feedback, and the absence of non-verbal cues. Teachers faced increased workloads, time-management struggles, and emotional strain, compounded by isolation and the blurred boundaries between personal and professional life.

Keywords: Teacher experiences, Synchronous Online Learning, COVID-19 Pandemic

Introduction

The swift shift to online teaching especially during the COVID-19 pandemic transformed education globally, offering continuity but also exposing significant challenges. Teachers frequently encountered issues like unstable internet access, weakened engagement, and diminished classroom interaction barriers that amplified concerns around motivation, interaction dynamics, and technological readiness (Ro

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et al., 2024; Fernando, Luis & Luis, (2025). In the Indian context, disparities in access to gadgets further exacerbated these problems, varying levels of digital literacy, and socio-economic differences between urban and rural learners. Understanding teachers lived experiences in navigating these challenges is critical for informing policy decisions, enhancing online pedagogy, and ensuring equitable access to quality education (Roa et al., 2024).

Objectives of the Research

1. To explore the problems faced by teachers during synchronous online teaching process.
2. To propose solutions for overcoming the challenges encountered in the synchronous online teaching process.

Research Methodology

The purpose of this qualitative study using an open-ended questionnaire is to investigate Mizoram teachers' experiences with synchronous online teaching during the COVID-19 pandemic. For the purpose of the study, Disproportionate Stratified Random Sampling was employed where different departments of Mizoram University (MZU) and Institute of Chartered Financial Analysts of India (ICFAI), Aizawl, Mizoram served as strata.

Findings related to Objective No. 1: To explore the problems faced by teachers during synchronous online teaching process.

A. Challenges faced by teachers during synchronous online teaching process:

Following is the analysis of teachers' response for open ended items of the questionnaire:

1. What is that one thing that you dislike about online teaching?

Teachers dislike several aspects of online teaching which were - internet issues on both sides (teacher and student) and difficulties in ensuring students' attention due to connectivity problems. Teacher struggle to gauge students' understanding and manage their behavior effectively due to lack of physical interaction which limits eye contact and classroom control. When students turn off their cameras, teachers cannot observe their reactions, making it harder to assess engagement. Rapid feedback is challenging, and body language cues are lost, making it difficult to determine if students truly comprehend the material. Student participation is often minimal, with many remaining idle and insincere. Online teaching tends to be one-way communication, as students do not engage actively. Distractions from family

members further hinder focus, making lessons feel monotonous. Communication barriers affect learning, making online teaching resemble distance education with minimal student interaction, ultimately reducing its effectiveness.

2. What is that one major problem you faced with students from rural origin?

Teachers face several challenges when working with students from rural areas which include frequent power cuts and internet connectivity issues on the students' end, as well as limited access to essential resources such as high-end mobile phones, Wi-Fi, laptops, and stable internet connections. Rural students often experience more network disruptions during online classes, leading to difficulties in learning. Additionally, there is a noticeable disparity in digital literacy, with some students lacking the necessary training and familiarity with online platforms. A lack of interest in online learning further compounds the issue. Moreover, language barriers arise as some students struggle with English, which could have been clarified in their local language in a physical classroom setting.

3. What are the easiest to handle online teaching-learning platforms used by you?

The most user-friendly online teaching-learning platforms reported by teachers include Google Meet, which allows easy access to upload study materials where students can download based on their internet availability, WhatsApp is convenient for clarifications and discussions and Zoom is ideal for teaching. Other widely used platforms include Google Classroom, Google Drive and Telegram.

4. Mention one major problem you encounter due to only virtual presence of students in classes?

Teachers face several challenges due to the virtual presence of students in online classes. These include internet issues, minimal interaction causing students to feel shy or hesitant to ask questions, and difficulty in assessing students' understanding. Building personal connections is nearly impossible, and teachers cannot verify if students are genuinely attending. The absence of facial expressions and body language reduces engagement, making it hard to gauge attentiveness. Identifying students is difficult, and many lack motivation, concentration, and classroom etiquette. Power cuts, background noise, multitasking during lessons, insincerity, and widespread cheating in online assessments further hinder effective teaching. Additionally, online teaching lacks the dynamic, interactive nature of traditional classrooms.

5. What is one major challenge in teaching online classes?

Major challenge in teaching online classes reported by teachers are as follows - difficulty in capturing students' attention, lack of technical equipment, and frequent

connectivity disruptions. Limited student-teacher communication and insufficient student responses make engagement challenging, often resulting in one-way teaching. Teachers struggle to assess student attentiveness, as many are unwilling to participate. Unfamiliarity with technology reduces student interest, and unequal internet access creates learning disparities. Interactive sessions are often missing, and delivering practical knowledge requires more effort than offline teaching. Additional issues include lack of study materials, inadequate online infrastructure, power cuts, and exhaustion from prolonged screen time. Teachers also find it difficult to address individual student needs. However, some educators have adapted to the system by adopting a more motivational approach.

6. What is the major lack in student's performance as a result of online learning?

Major lack in student's performance as a result of online learning reported by teachers are as follows - Connectivity issues hinder focus, and students struggle with in-depth understanding, especially in technical subjects like programming. Online exams are taken less seriously and are often ineffective. Student interaction has declined, with many unwilling to engage with teachers or respond to questions. Poor time management, lack of resources, and ethical concerns in academic performance further impact learning. Creativity and manners are lacking, along with issues like late attendance and reduced self-motivation. Many students neglect acquiring knowledge, affecting their dedication and seriousness. Shy and introverted students struggle to clarify doubts, leading to superficial learning. Additionally, sincere students often go unrecognized, while less dedicated learners pass easily.

7. What is the most essential online etiquette to be followed by the student in online learning according to you?

The most essential online etiquette to be followed by the student in online learning as reported by teachers are as follows - students should always respond to questions or discussions initiated by teachers, even with a simple answer like "yes" or "no," as it contributes to engagement. Knowing when to participate and when to listen is crucial, along with maintaining active involvement in discussions. To minimize disruptions, students should keep their cameras on, face the screen as much as possible, and mute their microphones during lectures and attend classes in a quiet, vacant room. Students should prepare themselves in advance on the topic to be covered enhances comprehension. Prompt responses or feedback when asked by the teacher are essential. Silent attendance is expected, as unintentional activation of audio or video can disrupt the class. Punctuality is important, and students should avoid interrupting or disturbing the teacher while they are delivering the lecture.

Maintaining classroom decorum, focusing on key concepts, and staying attentive are vital. Additionally, students should dress appropriately, and ensure a stable internet connection for uninterrupted participation.

8. If you have suffered with any health issues while teaching in online classes please specify it and do you have any suggestion to overcome it in online classes?

Teachers face various health issues while conducting online classes, including throat irritation, headaches, migraines, back and neck pain, wrist pain, and eye strain due to prolonged screen exposure. Continuous sitting for long hours also leads to backaches and tailbone pain. Teaching for extended periods, often exceeding six hours a day, results in mental exhaustion and fatigue.

To mitigate these issues, teachers suggest keeping sufficient water to relieve throat irritation, taking short breaks during classes, and informing students about health concerns. Breaking sessions into smaller intervals can also help reduce strain and improve overall well-being.

B. Thematic analysis of teachers' experiences with online instruction during the COVID-19 epidemic

Teachers' experiences with online instruction during the COVID-19 epidemic were conveyed by a number of recurrent themes that emerged from the questionnaire data's thematic analysis. These themes are presented below.

1. Technological Preparedness and Accessibility

Teachers reported varying levels of familiarity with online platforms at the onset of the pandemic. While some adapted quickly to tools such as Google Meet, Zoom, and WhatsApp for classroom interaction, others struggled with the lack of technical training. Unstable internet connections, power outages, and the absence of adequate digital devices posed significant challenges, especially in rural areas. These limitations disrupted class continuity and hampered effective delivery of lessons.

2. Pedagogical Adjustments

Making the transition from conventional in-person techniques to a purely online mode required teachers to redesign lesson plans, adopt digital resources, and modify teaching strategies. Many acknowledged difficulty in assessing students' comprehension due to limited feedback mechanisms and the absence of non-verbal cues. Some attempted innovative approaches, including recorded lectures and interactive quizzes, but noted that these required extra preparation time.

3. Student Engagement and Participation

Maintaining active student engagement emerged as one of the most challenging aspects. Teachers observed reduced participation, especially from students lacking stable internet or conducive home environments for learning. Distractions at home, camera-off tendencies, and reluctance to speak during class were common, leading to reduced interaction and limited collaborative learning.

4. Workload and Time Management

Teachers indicated that online teaching increased their workload due to the need to prepare digital materials, troubleshoot technical issues, and follow up individually with students. Balancing professional responsibilities with personal obligations at home proved difficult for many teachers.

5. Emotional and Professional Well-being

Many teachers experienced feelings of isolation, fatigue, and stress during prolonged exposure to screen and prolonged periods of online teaching. The absence of in-person interaction with colleagues and students negatively affected morale. However, some expressed that overcoming these challenges enhanced their adaptability, digital literacy, and resilience as educators.

6. Challenges in Teaching Students from Rural Areas

Teachers noted that children in rural areas had restricted access to gadgets like computers, smartphones, and Wi-Fi, frequent power outages, and inadequate internet connectivity. Participation was hampered by many people's low levels of digital literacy and inexperience with online platforms. A lack of interest in online learning and language barriers, particularly the difficulty of understanding English without the option for local language clarification, further affected engagement. These factors combined to widen the learning gap between rural and urban students.

7. Essential Online Etiquette for Students

Teachers emphasized that students should actively engage by responding to questions and participating in discussions while knowing when to listen. Keeping cameras on, facing the screen, muting microphones during lectures, and attending from a quiet environment were considered crucial to minimize disruptions. Preparation before class, punctuality, and maintaining classroom decorum were highlighted as key to effective learning. Teachers also stressed the importance of appropriate dress, stable internet connectivity, and avoiding interruptions during lectures.

8. Problems in Online Examinations

Teachers observed that students often approached online exams with less seriousness, leading to compromised assessment quality. Issues included superficial preparation, reliance on unfair means, and lack of genuine effort. Connectivity problems disrupted test-taking, and the absence of strict monitoring reduced accountability. As a result, online examinations were seen as less effective in accurately evaluating student knowledge and skills.

9. Technological Issues

Teachers reported that frequent internet connectivity problems, coupled with limited access to essential digital devices such as laptops, high-end smartphones, or stable Wi-Fi, significantly disrupt the flow of online classes. In addition to resulting in missed classes and delays, these technological limitations also make it more difficult for students to access course materials, engage fully in class, and turn in assignments on time.

10. Parental Disruptions

It was also observed that many students face frequent interruptions from family members while attending online classes at home. Such disturbances break the students' concentration, cause them to miss important parts of the lecture, and make it difficult to maintain a focused learning environment. This lack of a dedicated, quiet study space ultimately diminishes engagement and overall academic performance.

11. Language Barriers in Online Learning

Teachers reported that language barriers posed a significant challenge in the online learning environment. Some students struggled to comprehend lessons delivered in English, leading to gaps in understanding and reduced participation. Teachers noted that, in a physical classroom, such difficulties could have been addressed more effectively through immediate clarification in the students' local language, which is harder to facilitate in virtual settings.

Findings related to Objective No.2: To propose solutions for overcoming the challenges encountered in the synchronous online teaching process.

The major challenges encountered by teachers and their proposed solutions for overcoming the challenges encountered in the synchronous online teaching process are highlighted below:

TABLE. 1

Challenges faced by teachers during online teaching and their suggestions

Sl. No.	Challenges	Suggestions / Solutions
1	Technological Preparedness and Accessibility – Teachers had varying familiarity with online platforms; unstable internet, power outages, and lack of devices disrupted classes.	Provide structured digital training for teachers; supply devices to under-resourced schools; improve rural internet infrastructure; offer recorded sessions for students who miss classes.
2	Pedagogical Adjustments – Difficulty in adapting lesson plans and assessing students without non-verbal cues.	Use interactive tools like polls, quizzes, and breakout rooms; incorporate formative assessments; encourage use of recorded lectures for reinforcement.
3	Student Engagement and Participation – Reduced interaction, camera-off tendencies, and distractions at home.	Implement engagement policies (camera-on rule); introduce small-group activities to sustain attention.
4	Workload and Time Management – Extra time required for material preparation and follow-up with students.	Provide collaborative lesson planning support; reduce non-essential administrative tasks; offer time management workshops.
5	Emotional and Professional Well-being – Feelings of isolation, stress, and fatigue from prolonged screen time.	Organize peer-support groups; schedule regular breaks; promote blended teaching models when possible.
6	Challenges in Teaching Rural Students – Poor connectivity, lack of devices, low digital literacy, and language barriers.	Set up community learning hubs with internet access; provide bilingual resources; train students in basic digital skills.
7	Essential Online Etiquette for Students – Lack of punctuality, camera-off habits, inappropriate dress, and noise disruptions.	Conduct online orientation on etiquette; enforce classroom rules; encourage parents to support a distraction-free study space.

8	Problems in Online Examinations – Superficial preparation, unfair means, lack of monitoring, and connectivity issues.	Use proctoring software; design application-based questions; split large exams into smaller timed segments; provide mock tests.
9	Technological Issues – Frequent internet disruptions and lack of devices for students.	Provide affordable data packages for students; set up school-managed device loan schemes; maintain offline-accessible resources such as recorded lessons and PDFs.
10	Parental Disruptions – Frequent interruptions at home during class.	Educate parents on the importance of uninterrupted learning through Parents-Teachers Association (PTA) meetings; suggest creating a dedicated quiet corner for online classes.
11	Language Barriers - Students face difficulty understanding lessons delivered in English.	-Use bilingual explanations, combining English with the local language. -Provide supplementary study materials or summaries in the local language. -Encourage students to ask questions in either language to ensure clarity and understanding.

Summary of Findings

The findings show that the shift to online learning brought diverse challenges and adaptations for teachers. Technological preparedness varied, some adapted quickly to platforms like Google Meet and Zoom, while others lacked training. Poor internet, frequent power outages, and limited devices, especially in rural areas, disrupted lessons.

Teachers redesigned lesson plans, tried to engage students in the most practical way, but still problems surfaced. Overall, technological, pedagogical, social, and emotional challenges collectively shaped the effectiveness of online education during the pandemic.

Conclusion and Implication

The findings reveal that while teachers demonstrated adaptability in transitioning to online teaching, the process was hindered by persistent technological challenges, inadequate digital infrastructure, and a lack of training, particularly in rural areas. Pedagogical adjustments were necessary but often difficult due to reduced student engagement, limited feedback, and the absence of non-verbal cues. Teachers faced increased workloads, time-management struggles, and emotional strain, compounded by isolation and the blurred boundaries between personal and professional life. Rural students were disproportionately disadvantaged by poor connectivity, device shortages, low digital literacy, and language barriers, widening the educational gap. Assessment quality was weakened by problems with online exams, such as absenteeism and poor student attitudes. Language barriers in online learning reduce comprehension and engagement, but bilingual teaching, local-language materials, and flexible questioning can improve understanding and participation. Furthermore, frequent disruptions from parents and home environments, along with the need for better online etiquette, highlighted the importance of structured, distraction-free learning spaces. These challenges collectively indicate that while online education offers flexibility, its effectiveness depends heavily on technological readiness, student discipline, and strong institutional support.

However, it is important to note that teachers' technological skills can improve over time through proper training and continuous professional development. With structured workshops, hands-on practice, and exposure to various digital tools, teachers can gradually build confidence and competence in using ICT. Ongoing support, peer collaboration, and institutional encouragement further enhance their ability to integrate technology effectively into teaching, ultimately making online instruction more engaging and impactful.

Furthermore, online teaching-learning remains a crucial and relevant aspect of education, as emphasized in UGC Guidelines and NEP 2020, which promote digital platforms and blended learning to enhance access and quality in higher education.

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This is to certify that

Ms. Ignis R. Lalmuanpuui, Research Scholar, Department of Education, Mizoram University

has participated and presented a paper entitled

Assessing the Effectiveness and Challenges of Synchronous Online Teaching among University Teachers in Mizoram

in the **National Seminar on Contemporary Issues in Education**, 7th November 2025,
held at Department of Education, Mizoram University.

Dr. Vanlaluatela Hlondo
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Department of Education, Mizoram University*

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Head
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ABSTRACT

PERCEPTION AND ATTITUDE OF UNIVERSITY TEACHERS AND STUDENTS TOWARDS ONLINE TEACHING-LEARNING IN MIZORAM

**AN ABSTRACT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF
PHILOSOPHY**

IGNES R. LALMUANPUII

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SCHOOL OF EDUCATION

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**PERCEPTION AND ATTITUDE OF UNIVERSITY TEACHERS AND
STUDENTS TOWARDS ONLINE TEACHING-LEARNING IN MIZORAM**

BY
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Submitted
In partial fulfillment of the requirement of the Degree of Doctor of Philosophy
in Education of Mizoram University, Aizawl

INTRODUCTION

Online learning refers to educational instruction delivered via electronic devices, allowing learners to access content remotely (Moore et al., 2011). There are two important key branches of online learning: synchronous and asynchronous learning. According to Mohammadi (2024), asynchronous online learning is an online course that allows students to participate from anywhere at any time, with most of the content delivered online. Synchronous online learning increases the sense of social presence (Lajoie et al., 2020), while asynchronous online learning allows for deeper and more thoughtful communication (Martin et al., 2020)

These two modes form the core of the present research, as they are widely implemented in higher education institutions in Mizoram, a state located in the Northeastern region of India. Synchronous learning involves real-time interactions between teachers and students, such as live classes or discussions, while asynchronous learning allows students to engage with materials at their own pace, outside of a set schedule (Park & Bonk, 2007; Lynch, 2014). By concentrating on these formats, the study aims to examine how they are utilized in relation to higher education in Mizoram and the unique challenges and opportunities they present.

After a century, the world faced a massive pandemic known as COVID-19, which caused chaos in the lives of most people. During this time, the world's operations had to be suspended in every aspect. Education is one of the most crucial factors that aids in a man's progress, development, and growth; nevertheless, it was also discontinued when the pandemic struck (World Economic Forum, 2022). But fortunately, the government across countries found a way to continue education, that is through online or virtual setting.

According to Mohammadi (2024), asynchronous online learning is an online course that allows students to participate from anywhere at any time, with most of the content delivered online. Synchronous online learning increases the sense of social presence (Lajoie et al., 2020), while asynchronous online learning allows for deeper and more thoughtful communication (Martin et al., 2020)

This research aims to assess and evaluate the level of awareness and readiness for online learning among university teachers and students. While many students and educators may be familiar with virtual environments and video conferencing, there is still a gap in their experience as effective virtual learners and instructors (Sato et.al., 2023). The study also seeks to delve into the specific experiences and challenges faced by both teachers and students during the pandemic, as it is evident that numerous difficulties arise in the online learning landscape. By examining these issues, the research intends to shed light on the obstacles encountered in virtual education and highlight the areas that need improvement for a more effective and inclusive online learning experience. Thus, this study aims to draw conclusions and investigate such problems and propose a solution to tackle those problems and offer recommendations to improve and enhance the quality of online learning.

THE GIST OF LITERATURE REVIEW

The literature emphasizes that online learning is not inherently good or bad; rather, its effectiveness depends on several factors including infrastructure quality, student support, instructional design, and socio-demographic variables. While online learning offers promising benefits like flexibility, engagement, and technology integration, it also demands robust support systems, inclusive teaching strategies, and continuous adaptation to meet diverse learner needs. Addressing disparities especially in access, gender equity, and student-teacher interaction remains vital for ensuring a more inclusive and effective digital education landscape.

The review reveals that while online learning served as a crucial alternative during the COVID-19 pandemic, it is largely perceived by teachers as a temporary solution rather than a permanent replacement for traditional instruction. Teachers' attitudes and perceptions are influenced by factors such as digital literacy, institutional support, discipline, location, and gender. Although some educators appreciate the flexibility and innovation offered by online platforms, many face challenges related to technology access, lack of training, and reduced student engagement. Notably, STEM teachers and those in urban or government institutions

tend to hold more favorable views compared to their counterparts. Overall, the findings highlight the need for improved infrastructure, targeted training, and blended learning approaches that combine the strengths of both online and in-person education to ensure effective, inclusive, and sustainable teaching practices in the future.

The review of related literature also highlights that while online learning offers numerous advantages such as flexibility, accessibility, increased student engagement, and the potential for technological innovation in education, it is also fraught with considerable challenges.

The literature underscores that motivation, mental well-being, teacher preparedness, and personalized instruction play pivotal roles in the effectiveness of online education. Human-centered teaching, gamification, mindfulness tools, and social interaction significantly enhance student participation and satisfaction.

However, persistent problems like poor internet connectivity, digital device unavailability, lack of technical expertise, exam-related unfairness, and mental health issues (especially among female students) hinder the overall success of digital education. These issues are compounded in underdeveloped and rural areas due to infrastructural deficits and socioeconomic barriers.

It is essential to invest in teacher training, infrastructure enhancement, ethical frameworks, and student-centered approaches. Blended and hybrid learning models, combining asynchronous and live interactions, seem to offer a balanced solution by supporting both independence and social engagement. Ultimately, future educational models must prioritize equity, student well-being, personalized learning, and strong community connections to ensure meaningful and inclusive learning experiences in the digital age.

Thus, after reviewing around 117 studies, the researcher made the above-mentioned conclusion which led to the rationale of the present study.

RATIONALE OF THE STUDY

In the light of reviewed studies an appropriate rationale for the conduct of proposed study is derived. The present study is an attempt to explore the very freshly acquired perceptions and attitudes of students and teachers of higher education towards online teaching-learning process, since the onset of COVID- 19 pandemic in the state of Mizoram. On March 24, 2020, Prime Minister Narendra Modi called for a complete lockdown of the entire nation for 21 days in an effort to control the COVID-19 pandemic (The Economic Times, 2021).

The review of related studies is indicative that no study was conducted in the proposed area until 2022, wherein one study from Mizoram was reported. Hence the present study was rightly timed and required in order to explore the students' and teachers' perspective in Mizoram.

The rapid expansion of online learning has reshaped higher education, providing new learning formats that transcend geographical boundaries. However, this shift has also exposed significant challenges that impact the effectiveness of online education, particularly in terms of accessibility, quality, and student well-being. This study aims to explore the multifaceted challenges of online learning, with a focus on how socio-economic status, unmet learner needs, health issues, mental health concerns, decreased engagement during instruction, and barriers to technology adoption affect student outcomes and equity in higher education.

Thus, the rationale of the study lead to some research questions emerging in the mind of the researcher. The present study aims to understand the perceptions of university teachers and students towards synchronous and asynchronous online teaching- learning. Also, the study attempted to study the awareness and preparedness of university teachers and students and to find out the specific experiences and problems faced by them during pandemic with regard the synchronous mode. Thus, for achieving the aim, following research questions are proposed which needs to be answered:

RESEARCH QUESTIONS

1. What is the perception of university students towards online learning process?
2. What is the perception of university teachers towards online teaching process?
3. What is the attitude of university students towards online learning process?
4. What is the attitude of university teachers towards online teaching process?
5. How students and teachers of different disciplines differ in usage of technology and online teaching-learning platforms?
6. How students' socio-economic status, gender, locale and attitude towards technology influence the online learning process?
7. What kind of problems are faced by teachers and students during synchronous online teaching-learning process?
8. How can online teaching-learning process be improved for enhancing quality of education?

STATEMENT OF THE PROBLEM

The present study is therefore entitled as “*Perception and Attitude of University Teachers and Students towards Online Teaching-Learning in Mizoram*”

OPERATIONAL DEFINITIONS OF KEY TERMS

- **Perception:** Perception is an idea, a belief or an image people have as a result of how to see or understand (Hornby, 2006). In the present study, perception refers to the ideas and beliefs acquired by teachers and students for online teaching and learning respectively.
- **Attitude:** An attitude is a mental or neural state of readiness, organized through experience, exerting a directive or dynamic influence on the individual's response to all objects and situations to which it is related (Allport, 1935). In the present study, attitude refers to the strong mental

inclination of feelings held by teachers and students towards online teaching and learning respectively.

- **University Teachers:** In the present study University teachers refers to teachers teaching in the universities of Mizoram.
- **University Students:** In the present study University students refers to students studying in the universities of Mizoram.
- **Online Teaching-Learning:** Online teaching-learning refers to processes happening in online classes which fall into two categories -synchronous and asynchronous, each of which aligns with different students' interests, personalities, and learning styles. Synchronous teaching-learning refers to real-time online teaching-learning event in which a group of students are engaged in learning by a teacher at the same time unbound by space through virtual mode. It is best exemplified by online classes, training sessions, and webinars taught through an online platform. Asynchronous online teaching-learning is where teaching materials are posted online, and learners work through them in their own time, communicating with each other and the teacher via discussion boards or forums, or even by email.

OBJECTIVES THE STUDY

1. To study the perception of university teachers and students towards online teaching-learning process.
2. To study the attitude of university teachers and students towards online teaching-learning process.
3. To find out the university students' and teachers' attitude towards technology
4. To explore the usage of technology and teaching-learning platforms among university teachers and students of different disciplines.
5. To compare university students' perception and attitude for online learning with respect to gender, locale, socio-economic status, disciplinarity and type of institution.

6. To compare university teachers' perception and attitude for online teaching with respect to gender, disciplinarity and type of institution.
7. To compare university students' attitude towards technology with respect to gender, locale, socio-economic status, disciplinarity and type of institution.
8. To compare university teachers' attitude towards technology with respect to gender, disciplinarity and type of institution.
9. To explore the problems faced by students and teachers during synchronous online learning process.

METHOD OF STUDY

For the current study, a mixed approach that incorporates both quantitative and qualitative data analysis was employed using a Convergent Parallel Design. Convergent Parallel Design is a mixed approach-based design in which simultaneously the researcher is interested to gain both quantitative and qualitative data and triangulate it for better insights. As a result, the current study has been characterized as descriptive research. Another way to think about this study is as a status check and to get a clear picture on online teaching-learning at post-graduate level of university in Mizoram with special emphasis on the perception and attitude encountered by post-graduate student and teacher.

SOURCES OF DATA

To obtain precise information for this investigation, only primary data sources were used. The primary sources of data collection for this research are outlined as follows.

Primary Sources: As this study investigates the perception and attitude toward online learning on university teachers and students in Mizoram, the primary sources of data consist of university students and their teachers.

POPULATION

The current study's researcher's objective is to investigate the perception and attitude of post-graduate teachers and students in the two universities of Mizoram toward online teaching and learning. Consequently, the study focuses on two primary populations for investigation.

Population 1: The first population comprised of all university students studying at Mizoram Central University (MZU) and the Institute of Chartered Financial Analysts of India (ICFAI) a private university in Mizoram.

Population 2: The second group of population comprised of all university teachers teaching at Mizoram University (MZU), a central university and the Institute of Chartered Financial Analysts of India (ICFAI) a non-government university in Mizoram. There is no Master Science stream in ICFAI except for Master of Science (Geography) which is kept under Arts Stream. Hence, students and teachers of this department were categorized under STEM courses for the purpose of analysis. The students and teachers of the school of Fine Arts, Architecture & Fashion Technology in Mizoram University were kept under STEM courses.

As shown in Table 3.1 and Table 3.2 describes the population size of teachers and students from the two Universities of Mizoram. It is to be noted that only fourth semester students were included in the population as they were the only students who experienced online learning during the year 2020-2021.

Table 3.1*Description of population of teachers and students from Mizoram University (MZU)*

Sl. No	School	Department	Teacher	Student
1		Commerce	7	40
2		Economics	6	50
3		Library & Information Science	6	25
4		Management	8	35
5	SEMIS	Mass Communication	6	30
6		Tourism & Hospitality Management	5	20
7	Humanities & Language	English & Cultural Studies	5	40
8		Mizo	5	50
9		Hindi	5	25
10	School of Education	Education	20	65
11	Social Sciences	History & Ethnography	7	45
12		Political Science	6	45
13		Public Administration	6	40
14		Psychology	6	35
15		Sociology	4	30
16		Social Work	6	30
17	ES & NRM (Earth Science & Natural Resource Management)	Environmental Science	7	30
18		Forestry	6	30
19		Geography and Resource Management	6	30
20		Geology	5	30
21		Horticulture, Aromatic & Medicinal Plants	8	30
22		Extension Education & Rural Development	1	NA
23	Physical Sciences	Chemistry	6	30
24		Physics	7	30
25		Industrial	2	20

26		Chemistry Mathematics & Computer Sciences	6	35
27	Engineering Technology	Information Technology	5	15
28		Electronics & Communication	8	15
29		Engineer Computer	5	15
30		Engineering Electrical	3	15
31		Engineering Civil	6	15
32		Engineering Food Technology	4	15
33	Fine Arts, Architecture & Fashion Technology	Planning & Architecture	8	NA
34	Medical & Paramedical Sciences	Clinical Psychology	3	30
35	Life Sciences	Botany	7	30
36		Zoology	8	30
37		Biotechnology	6	30
Total			225	1110

Table 3.2

Description of population of teachers and students from Institute of Chartered Financial Analysts of India (ICFAI)

Sl. No	Faculty	Department	Teacher	Student
1	Management	MA (Business Administration)	6	11
2		MA (Commerce)	5	21
3		MA(Economics)	4	24
4	Humanities &	MA(Education)	4	27
5	Social Sciences	MA (Social Work)	7	39
6		MA (History)	4	7
7		MA (Pol. Sc)	4	50
8		MA(English)	4	23
9		MA (Mizo & Cultural Studies)	4	37
10		M.Sc. (Geography)	4	20
11		MA Sociology	NA	NA
Total			35	259

SAMPLE AND SAMPLING TECHNIQUE

Disproportionate Stratified Random Sampling was adopted for the selection of samples, where each department within different disciplines serves as a separate stratum for data collection.

Sample size: As per the latest data of 2021, there are a total of approximately 2200 students in Mizoram University and Master program of PUC, Constituent College, Mizoram University based on admission in the year 2020 & 2021 (Source: Controller of Examination, MZU) and 252 teachers in MZU and 113 teachers in PUC (Source: Academic Cell, MZU); and 450 students and 28 regular and 26 visiting teachers in ICFAI University (Source: Official Data, ICFAI). All together number of teachers' and students' population is 419 and 2650 respectively. As only students of 4th Semester formed the population of the present study, they being the only available batch that experienced online learning. The collected sample of students was altogether 593 and that of teachers was 62. This counts for 43% of the total population for students and 24% of the total population for teachers.

Tables 3.3 and 3.4 present the samples of both teachers and students drawn from the two universities in Mizoram.

Table 3.3

Description of sample of teachers and students from Mizoram University (MZU)

Sl. No	School	Department	Teacher	Student
1	SEMIS	Commerce	2	28
2		Economics	1	NA
3		Library & Information Science	1	13
4		Management	1	NA
5		Mass Communication	1	12
6		Tourism & Hospitality Management	NA	2
7	Humanities & Language	English & Cultural Studies	NA	NA
8		Mizo	NA	2
9		Hindi	1	3
10	School of Education & Social Sciences	Education & M.Ed.	NA	43
11		History & Ethnography	2	15
12		Political Science	3	18
13		Public Administration	1	32
14		Psychology	1	29
15		Sociology	1	28
16		Social Work	2	2
17		Environmental Science	2	9
18		Forestry	1	4
19		Geography and Resource Management)	1	22
20	ES & NRM (Earth Science & Natural Resource Management)	Geology	2	13
21		Horticulture, Aromatic & Medicinal Plants	NA	6
22		Extension		NA

		Education & Rural Development	NA	
23	Physical	Chemistry	2	20
24	Sciences	Physics	1	12
25		Industrial Chemistry	1	NA
26		Mathematics & Computer Sciences	2	29
27	Engineering Technology	Information Technology	3	4
28		Electronics & Communication	1	3
29		Computer Engineering	1	17
30		Electrical Engineering	1	2
31		Civil Engineering	3	NA
32		Food Technology	2	3
33	Fine Arts, Architecture & Fashion Technology	Planning & Architecture	3	3
34	Medical & Paramedical Sciences	Clinical Psychology	2	NA
35	Life Sciences	Botany	1	20
36		Zoology	2	5
37		Biotechnology	2	17
Total			50	416

Table 3.4

Description of sample of teachers and students from Institute of Chartered Financial Analysts of India (ICFAI)

Sl. No	Faculty	Department	Teacher	Student
1	Management	MA (Business Administration)	2	8
2		MA (Commerce)	1	19
3		MA(Economics)	1	13
4	Humanities &	MA(Education)	4	16
5	Social Sciences	MA (Social Work)	NA	27
6		MA (History)	NA	3
7		MA (Pol. Sc)	1	29
8		MA(English)	2	19
9		MA (Mizo & Cultural Studies)	1	31
10		M.Sc. (Geography)	NA	12
11		MA (Sociology)	NA	NA
Total			12	177

Sampling Technique: This research aims to analyse the perceptions and attitudes of university teachers and students towards the practice of online teaching and learning in Mizoram. There are two institutions of higher learning in Mizoram, namely Mizoram University (MZU), a central university, and The Institute of Chartered Financial Analysts of India (ICFAI) University, a privately run university. The different PG programmes offered in both the universities were chosen as strata from which students and teachers were randomly chosen in the current research. In the current study, sample collection was carried out through Disproportionate Stratified Random Sampling. It is necessary to acknowledge that the researcher could not get back responses from some departments which are mentioned as Not Available (NA) in the sample description (Table 3.3 and Table 3.4).

With respect to the population, two samples have been considered for the present study:

Sample 1: A total of 593 students enrolled into different discipline PG departments of Mizoram University and PG departments of ICFAI University were chosen in line with the stratified disproportionate random sampling method.

Sample 2: A total of 62 teachers teaching at PG level in various discipline departments of Mizoram University and PG courses in ICFAI University were chosen in line with the stratified disproportionate random sampling method.

TOOLS AND TECHNIQUES OF DATA COLLECTION

For this study, the following tools and techniques were utilized:

A self-developed perception cum attitude scale to study the perception and attitude of students towards online learning process

1. A self-developed perception cum attitude scale to study the perception and attitude of teachers and students towards online teaching-learning process
2. A self-developed questionnaire to find out the problems faced by teachers and students during synchronous online teaching -learning process and gather suggestions to improve synchronous online teaching-learning.
3. A self-developed semi-structured interview schedule to qualitatively explore the feelings, problems and suggestions of students towards synchronous online teaching-learning process.
4. A standardized Media and Technology Usage and Attitude scale by Rosen et al. (2013) was used to find out students' and teachers' attitude towards technology.
5. Socio-economic Status Scale developed by Lallianzuali Fanai and R.P.Vadhera (Revised, 2022) was adopted for the purpose of collecting students' SES profile.

A self-developed perception cum attitude scale to study the perception and attitude of students towards online learning process

Construction of Perception and Attitude Scale for Students: Researcher herself constructed a perception scale and an attitude scale for determining the perception and attitude of university students pertaining to online learning. Both the scales used 5-point Likert rating scale rated on a range of strongly agree to strongly disagree. These scales were specifically in the context of online learning which were further divided into two heads – synchronous and asynchronous online learning. In light of the experiences acquired during synchronous and asynchronous online learning, students marked how they perceived and felt about online learning process by selecting the best options out of options provided.

The perception scale comprised of both positive and negative statements under the two dimensions synchronous and asynchronous online learning. Positive statements were rated as 5, 4, 3, 2, and 1 for response strongly agree, agree, neutral, disagree, and strongly disagree respectively and scoring goes reverse for negative statements as 1, 2, 3, 4, 5. The tool was validated for its first draft by 25 experts from the field of Education comprising of 50 statements under two dimensions, synchronous and asynchronous online learning. After consulting with the experts, 15 items under each dimension were retained. There are 2 negative statements out of 15 items under the dimension synchronous online learning and no negative items in 15 items under the dimension asynchronous online learning. Then the second draft of the tool was analysed through item analysis procedure (Table 3.5) on a sample of 137 students and all 30 items were retained. Also, it was tried at this stage to find out the measures of internal consistency of the perception scale. Firstly, the Cronbach alpha was estimated on the same initial 137 sample of students for the perception scale and was obtained as 0.952, a very high value indicating the internal consistency of all 30 items. Finally, the split half reliability corrected for Spearman-Brown formula of the perception scale was calculated on 100 randomly selected PG students and it was found to be 0.85, which is considered to be highly reliable. A copy of the student perception scale is provided in Appendix 1.

The attitude scale comprised of both positive and negative statements under the two dimensions synchronous and asynchronous online learning. Positive statements get a score of 5,4,3,2,1 for strongly agree, agree, neutral, disagree, strongly disagree options respectively and scoring is reversed for negative statements as 1, 2, 3, 4, 5. The tool was validated for its first draft by 25 experts from the field of Education comprising of 45 statements under two dimensions, synchronous and asynchronous online learning. After consulting with the experts, 15 items under each dimension were retained. There are 8 negative statements out of 15 items under the dimension synchronous online learning and 7 negative items out of 15 items under asynchronous online learning. Then the second draft of the tool was analysed through item analysis procedure (Table 3.6) on a sample of 137 students and all 30 items were retained. Also, it was tried at this stage to find out the measures of internal consistency of the attitude scale. Firstly, the Cronbach alpha was estimated on the same initial 137 sample of students for the attitude scale and was obtained as 0.911, also a very high value indicating the internal consistency of all 30 items. Finally, the attitude scale's split-half reliability was calculated on 100 randomly selected PG students and it was found to be 0.81, which is considered to be highly reliable. A copy of the attitude scale for students is enclosed vide Appendix 2.

A self-developed perception cum attitude scale to study the perception and attitude of teachers towards online teaching process

Construction of Perception and Attitude Scale for Teachers: Researcher herself constructed a perception scale and an attitude scale for finding out the perception and attitude of university teachers regarding online teaching. Both the scales used 5-point Likert rating scale rated on a range of strongly agree to strongly disagree. These scales were specifically in the context of online teaching which were further divided into two heads – synchronous and asynchronous online teaching. In light of the experiences acquired during synchronous and asynchronous online teaching, teachers marked how they perceived online teaching process by selecting the best options out of options provided.

The perception scale comprised of both positive and negative statements under the two dimensions synchronous and asynchronous online teaching. Positive statements were rated as 5, 4, 3, 2, and 1 for response strongly agree, agree, neutral, disagree, and strongly disagree respectively and scoring goes reverse for negative statements as 1, 2, 3, 4, 5. The tool was validated for its first draft by 25 experts from the field of Education comprising of 39 statements under two dimensions, 20 items for synchronous and 19 items for asynchronous online teaching. After consulting with the experts, all 39 items were content validated. Owing to long length of the tool the initially first sampled teachers expressed their concern to shorten the tool. Hence through thorough consultation with experts 9 items were retained under synchronous dimension and 11 items were retained under asynchronous dimension all together making 20 items. Then the second draft of the tool was analysed through item analysis procedure (Table 3.7) on 55 teachers and all items were retained. Also, it was tried at this stage to find out the measures of internal consistency of the perception scale. Firstly, the Cronbach alpha was estimated on the same initial 55 sample of teachers for the perception scale and was obtained as 0.891, also a very high value indicating the internal consistency of all 20 items. Finally, the perception scales' split half reliability was calculated on sample of 55 teachers and it was found to be 0.85 which is considered to be highly reliable index. There are 5 negative statements out of 9 statements under the dimension synchronous online teaching and 6 negative items out of 11 statements under asynchronous online teaching. A copy of the perception scale for teachers is provided vide Appendix 3.

The attitude scale comprised of both positive and negative statements under the two dimensions synchronous and asynchronous online teaching. Positive statements get a score of 5,4,3,2,1 for strongly agree, agree, neutral, disagree, strongly disagree options respectively and scoring is reversed for negative statements as 1, 2, 3, 4, 5. The tool was validated for its first draft by 25 experts from the field of Education comprising of 40 statements under two dimensions, 20 items for synchronous and 20 items for asynchronous online teaching. After consulting with the experts, all 40 items were content validated. Owing to long length of the tool the initially first sampled teachers expressed their concern to shorten the tool. Hence

through thorough consultation with the experts, 7 items were retained under synchronous dimension and 5 items were retained under asynchronous dimension. Then the second draft of the tool was analysed through item analysis procedure (Table 3.8) on 55 teachers and all items were retained. Also, it was tried at this stage to find out the measures of internal consistency of the attitude scale. Firstly, the Cronbach alpha was estimated on the same initial 5 sample of teachers for the attitude scale and was obtained as 0.907, also a very high value indicating the internal consistency of all 12 items. Finally, the attitude scales' split half reliability was calculated on sample of 55 teachers and it was found to be 0.94 which is considered to be very highly reliable index. There are 6 negative statements out of 7 statements under the dimension synchronous online learning and 4 negative items out of 5 items under asynchronous online teaching. A copy of the attitude scale for teachers is enclosed vide Appendix 4.

Procedure of Item Analysis for constructed scales

For item analysis, a small-scale preliminary study on the perception and attitude scale was conducted from December 2022 to February 2023 at Pachhunga University College (PUC) with the principal's permission. Data were obtained from college teachers and students for this purpose. Additionally, the data was distributed via a hard copy for teachers and a Google Form for students, allowing them to respond at their convenience. Some teacher data was also sampled from Government Aizawl College (GAC) with the principal's permission. Altogether a total of 137 students from PUC and 55 teachers were sampled from PUC and GAC. After the Perception and Attitude scales for students and teachers was administered on 137 students and 55 teachers respectively, the responses were ordered in decreasing sequence, and the top and bottom 27% of the sample were chosen for item analysis. A t-test was then performed to assess the discriminative value of all the items i.e. 30 items for students; perception scale, 30 items for students' attitude scale, 20 items for teachers' perception scale and 12 items for teachers' attitude scale respectively. Statements with 't' value greater than 2.65 (df=70) and 2.78 (df=26) respectively for students' and teachers' data, which indicate statistical significance at the 0.01 confidence level, were retained. Following this process all the 30 items of students'

perception scale, 30 items of students' attitude scale, 20 items of teachers' perception scale and 12 items of teachers' attitude scale were retained.

Construction of Questionnaire

A questionnaire was constructed to find out the problems faced by students during synchronous online learning process and to gather suggestions to improve synchronous online learning. The first draft of the questionnaire was constructed after review of related literature comprising of 45 items which are specifically in relation to online learning experienced during pandemic and post-pandemic semesters. There are 26 items of Structured Questionnaire to respond against each item by ticking against 'rarely', 'sometimes' or 'always' options according to their experience. The questions also consist of 4 items of Contingency Questionnaire to be responded by follow-up questions, 6 items of Close-Ended Questionnaire to be answered in Yes/No, 9 items of Open-Ended Questionnaire to obtain rich and descriptive data. The tool was validated for its content by 30 teachers from Education.

Another questionnaire was constructed to find out the problems faced by teachers during synchronous online teaching process and gather suggestions to improve synchronous online teaching. The first draft of the questionnaire was constructed after review of related literature comprising of 33 items which are specifically in relation to online learning experienced during pandemic and post-pandemic semesters. There are 19 items of Structured Questionnaire to respond against each item by ticking against 'rarely', 'sometimes' or 'always' options according to their experience. The questions also consist of 5 items of Close-Ended Questionnaire to be answered in Yes/No, 9 items of Open-Ended Questionnaire to obtain rich and descriptive data. The tool was validated for its content by 30 teachers from Education.

Construction of interview Schedule

A self-developed semi-structured interview was designed to qualitatively examine the feelings, challenges, and suggestions of postgraduate students regarding

the online learning process. The initial draft of the interview, consisting of 18 items, was created after reviewing relevant literature to ensure a comprehensive exploration of the subject. The tool was validated for its content by 30 teachers from Education. The purpose of the interview of the students to triangulate the findings

Attitude Towards Technology scale

The standardized scale of Media and Technology Usage and Attitude scale by Rosen et al. (2013) was employed to find out students' and teachers' attitude towards technology which consists of 16 statements providing five-point Likert scale bearing the headings Strongly Agree (SA), Agree (Agree), Undecided (UD), Disagree (D), Strongly Disagree (SD) against the statement. This Attitude scale has four sub-scales namely – Positive Attitudes Toward Technology (6 items), Anxiety About Being Without Technology or Dependence on Technology (3 items), Negative Attitudes Towards Technology (3 items) and Preference For Task Switching (4 items). Scoring for item 15 is reversed with Strongly Agree=1 and Strongly Disagree=5. Rest all items are scored as Strongly Agree=5 and Strongly Disagree=1. Both the teachers and students filled the options which suits them best with regard to their attitude towards Technology.

Socio-economic Status Scale

The socio-economic status scale developed by Lallianzuali Fanai and R.P.Vadhera (Revised, 2022) was adopted for the purpose of collecting students' SES profile. The scale measures a person's social and economic position relative to others in society. On the basis of this scale, socio-economic status of the student family is being studied. The scale which has been developed for this purpose is a point scale where the points range between 0 to 8 depending upon the items or variables under assessment. The nature of the scale is comprehensive and multi-dimensional as it encompasses various aspects of a person's social and economic position. The scale is specially constructed in context of the Mizo society. Students were requested to give information related to the questions by putting tick mark in the place-holder provided against them along with which the questions probable answers are given. Students ticked one of the answers which most suits to their family.

A. DESCRIPTIVE ANALYSIS:

FINDINGS RELATED TO OBJECTIVE 1:

To study the perception of university teachers and students towards online teaching-learning process.

Students: The mean was found to be 92.03 with a standard error of mean to be 0.5 and a standard deviation of 12.39. The maximum score was 128 and the minimum score was 48. Students' perception towards online learning were categorized based on statistical assumption of $\text{Mean} \pm 1 \text{ SD}$. 72% students were found to possess a moderate or neutral perception towards online learning.

The mean for Synchronous online learning perception was found to be 40.37 whereas the mean for Asynchronous online learning perception was found to be 51.66, showing a higher favourability for Asynchronous modality of online learning.

Teachers: The mean was found to be 52.79 with a standard error of mean to be 0.60 and a standard deviation of 4.77. The maximum score was 71 and the minimum score was 43 respectively. Teachers' perception towards online teaching were categorized based on statistical assumption of $\text{Mean} \pm 1 \text{ SD}$. 62% teachers were found to possess a moderate or neutral perception towards online learning

The mean for Synchronous online teaching perception was found to be 24.27 whereas the mean for Asynchronous online teaching perception was found to be 28.51, showing a higher favourability for Asynchronous modality of online teaching.

FINDINGS RELATED TO OBJECTIVE 2:

To study the attitude of university teachers and students towards online teaching-learning process.

Students: The mean was found to be 85.47 with a standard error of mean to be 0.45 and a standard deviation of 10.98. The maximum score was 139 and the minimum score was 53. Students' attitude towards online learning were categorized based on statistical assumption of $\text{Mean} \pm 1 \text{ SD}$. 72.68% students were found to possess a moderate or neutral attitude towards online learning.

The mean for Synchronous online learning attitude was found to be 40.41 whereas the mean for Asynchronous online learning attitude was found to be 45.05, showing a higher favourability for Asynchronous modality of online learning.

Teachers: The mean was found to be 27.35 with a standard error of mean to be 0.59 and a standard deviation of 4.69. The maximum score was 38 and the minimum score was 18 respectively. Teachers' attitude towards online teaching were categorized based on statistical assumption of $\text{Mean} \pm 1 \text{ SD}$. 63% teachers were found to possess a moderate or neutral attitude towards online learning,

The mean for Synchronous online teaching attitude was found to be 15.5 whereas the mean for Asynchronous online teaching attitude was found to be 11.85, showing a higher favourability for Synchronous modality of online teaching.

FINDINGS RELATED TO OBJECTIVE 3:

To find out the university students' and teachers' attitude towards technology

Students: The mean was found to be 56.38 with a standard error of mean to be 0.24 and a standard deviation of 5.90. The maximum score was 76 and the minimum score was 38. Students' attitude towards technology were categorized based on statistical assumption of $\text{Mean} \pm 1 \text{ SD}$. 76.72% students falling were found to possess a moderate or neutral attitude towards technology.

Teachers: The mean was found to be 55.91 with a standard error of mean to be 0.81 and a standard deviation of 6.38. The maximum score was 67 and the minimum score was 34. Teachers' attitude towards technology were categorized based on statistical assumption of $\text{Mean} \pm 1 \text{ SD}$. 71% teachers falling were found to possess a moderate or neutral attitude towards technology.

FINDINGS RELATED TO OBJECTIVE 4:

To explore the usage of technology and teaching-learning platforms among university teachers and students of different disciplines.

Students: It was found that most students used Mobile Phone and Laptops for attending their online classes. Some students also mentioned of having Personal

Computer and very few mentioned about having a Tablet. Further the findings shows that the most commonly used teaching-learning platforms used by university students were – Google classroom, Zoom Meet, WhatsApp, Google Drive, Google Meet. However, department of Mizo mentioned about Webex and some departments of Engineering also mentioned Microsoft Teams and Cisco. Exceptionally in some departments like Commerce and Mass Communication mentioned about You-tube platform.

Teachers: Technology usage by university teachers was limited to use of Personal Computer, Laptops and occasionally Mobile Phones. Some teachers also mentioned of using Smart TV and Tablets for conducting online classes. Moreover, it is evident from the findings that the most commonly used teaching-learning platforms used by university teachers were – Google classroom, Zoom Meet, WhatsApp, Google Drive, Google Meet. However, some Department like Education mentioned Webex and Telegram, Management mentioned ChatGPT, Social Sciences mentioned Telegram, Webex and Cisco, School of Engineering mentioned Microsoft Teams and Cisco.

B. INFERENCE ANALYSIS:

For the purpose of Inferential Analysis, null hypotheses were stated in order to statistically test them. Following Objectives 5 to 6 shows the findings of this analysis.

FINDINGS RELATED TO OBJECTIVE 5:

To compare university students' perception and attitude for online learning with respect to gender, locale, socio-economic status, disciplinarity and type of institution.

- **Gender:** The perception of university students towards online learning does not significantly differ with respect to gender. Hence, the null hypothesis is retained.

The attitude of university students towards online learning does not significantly differ with respect to gender. Hence, the null hypothesis is retained.

- **Locale:** The perception of university students towards online learning does not significantly differ with respect to locale. Hence, the null hypothesis is retained.

The attitude of university students towards online learning does not significantly differ with respect to locale. Hence, the null hypothesis is retained.

- **SES:** The perception of university students towards online learning significantly differs with respect to SES. Hence, the null hypothesis is rejected. Further post-hoc analysis revealed that the upper SES students' perception is significantly higher than middle SES students' perception.

The attitude of university students towards online learning significantly differs with respect to SES. Hence, the null hypothesis is rejected. Lower SES students' attitude is significantly positively higher than middle SES students' attitude.

- **Disciplinarity:** Perception of university students towards online learning does not significantly differ with respect to STEM and non-STEM discipline. Hence, the null hypothesis stays back.

The attitude of university students towards online learning does not significantly differ with respect to non-STEM and STEM discipline. Hence, the null hypothesis stays back.

- **Institution:** The perception of university students towards online learning does not significantly differ with regard to their institution. Thus, the null hypothesis is retained.

The attitude of university students towards online learning significantly differs with regard to their institution. Thus, the null hypothesis is rejected.

FINDINGS RELATED TO OBJECTIVE 6:

To compare university teachers' perception and attitude for online teaching with respect to gender, disciplinarity and type of institution.

- **Gender:** The perception of university teachers towards online teaching does not significantly differ with respect to gender. Hence, the null hypothesis is retained. Further owing to the small sample size of groups of university teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test. The comparison of the perception of university teachers towards online teaching on the basis of their gender using a Mann-Whitney U test revealed no significant differences in the perception towards online teaching between male and female university teachers. Hence the null hypothesis was accepted.

The attitude of university teachers towards online teaching does not significantly differ with respect to gender. Hence, the null hypothesis is retained. Further owing to the small sample size of groups, the investigator decided to conduct a non-parametric equivalent statistic for student t-test. The comparison of the attitude of university teachers towards online teaching on the basis of their gender using a Mann-Whitney U test revealed no significant differences in the attitude towards online teaching between male and female university teachers. Hence the null hypothesis was accepted.

- **Disciplinarity:** Perception of university teachers towards online teaching does not significantly differ with respect to STEM and non-STEM discipline. Hence, the null hypothesis stays back. Further owing to the small sample size of university teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test. The comparison of the perception of university teachers towards online teaching on the basis of their disciplinarity using a Mann-Whitney U test revealed no significant differences in the perception towards online teaching between STEM and non-STEM university teachers. Hence the null hypothesis was accepted.

The attitude of university teachers towards online teaching does not significantly differ with respect to non-STEM and STEM discipline. Hence, the null hypothesis stays back. Further owing to the small sample size groups of university teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test. The comparison of the attitude of university teachers towards online teaching on the basis of their disciplinarity using a Mann- Whitney U test revealed no significant differences in the attitude towards online teaching between STEM and non-STEM university teachers. Hence the null hypothesis was accepted.

- **Institution:** The perception of university teachers towards online teaching does not significantly differ with regard to their institution. Thus, the null hypothesis is retained. Further owing to the small sample size of ICFAI teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test. The comparison of the perception of university teachers towards online teaching on the basis of their institution using a Mann- Whitney U test revealed no significant differences in the perception towards online teaching between MZU and ICFAI university teachers. Hence the null hypothesis is accepted.

The attitude of university teachers towards online teaching does not significantly differs with regard to their institution. Thus, the null hypothesis is retained. Further owing to the small sample size of ICFAI teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test. The comparison of the attitude of university teachers towards online teaching on the basis of their institution using a Mann- Whitney U test revealed no significant differences in the attitude towards online teaching between MZU and ICFAI university teachers. Hence the null hypothesis is accepted.

FINDINGS RELATED TO OBJECTIVE 7:

To compare university students' attitude towards technology with respect to gender, locale, socio-economic status, disciplinarity and type of institution.

- **Gender:** University students' attitude towards technology does not significantly differ with respect to gender. Hence, the null hypothesis is retained.
- **Locale:** University students' attitude towards technology shows no variation with respect to their locale. Therefore, the null hypothesis stays back.
- **Socio-economic status:** There is significant difference in students' attitude towards technology based on their socio-economic status. Since ANOVA is significant, null hypothesis is rejected.

It is observed that middle SES students' attitude towards technology is significantly higher than lower SES students' attitude towards technology and further middle SES students' attitude towards technology is significantly lower than upper SES students' attitude towards technology and also upper SES students' attitude towards technology is significantly higher than lower SES students' attitude towards technology.

- **Disciplinarity:** University students' attitude towards disciplinarity does not significantly differ with respect to gender. Hence, the null hypothesis is retained.
- **Institution:** University students' attitude towards institution does not significantly differ with respect to gender. Hence, the null hypothesis is retained.

FINDINGS RELATED TO OBJECTIVE 8:

To compare university teachers' attitude towards technology with respect to gender, disciplinarity and type of institution.

- **Gender:** University teachers' attitude towards technology does not significantly differ with respect to gender. Hence, the null hypothesis is retained.

Further owing to the small sample size of university teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test. The comparison of the attitude towards technology possessed by university teachers on the basis of their gender using a Mann- Whitney U test revealed

no significant differences in the attitude towards technology between male and female university teachers. Hence the null hypothesis was accepted.

- **Disciplinarity:** University teachers' attitudes towards technology do not differ significantly based on their disciplinarity. Therefore, the null hypothesis is accepted.

Further owing to the small sample size of university teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test. The comparison of the attitude towards technology possessed by university teachers on the basis of their disciplinarity using a Mann- Whitney U test revealed no significant differences in the attitude towards technology between STEM non-STEM university teachers. Hence the null hypothesis was accepted.

- **Institution:** University teachers' attitudes towards technology do not differ significantly by type of institution. Thus, the null hypothesis is upheld.

Further owing to the small sample size of university teachers, the investigator decided to conduct a non-parametric equivalent statistic for student t-test. The comparison of the attitude towards technology possessed by university teachers on the basis of their institution using a Mann- Whitney U test revealed no significant differences in the attitude towards technology between MZU and ICFAI university teachers. Hence the null hypothesis is accepted.

FINDINGS RELATED TO OBJECTIVE 9:

Percentage Analysis

This section discusses the findings of objective 9 closed ended responses which are as follows:

Teachers' Responses:

- 47% of teachers reported that they rarely struggle to adapt to various online teaching and learning platforms.
- 77% of teachers reported they are dissatisfied with online instruction.

- Majority of teachers (98%) claimed that rural students stay behind urban students in online classes due to lack of internet connectivity.
- 58% of teacher think that insufficient supply of electricity is a major hurdle that prevents rural students from attending online classes
- 55% of teachers think digital divide consistently causes stress for rural students.
- 44% of teachers think both urban and rural students face similar internet related problems in online classes.
- 74% of teachers express dissatisfaction with the quality of audio and video during online classes
- Majority of teachers (approximately 81%) report struggling with frequent low internet bandwidth, leading to poor signal strength
- 53% of teachers think that students occasionally face internet issues, and 40% feel that most students consistently lack adequate internet connectivity for effective online learning.
- 16% of teachers reported feeling comfortable when students turning off their cameras.
- 55% of teachers think students consistently engage in unfair means during online mode exams.
- 63% of teachers feel students' cues are consistently missing in online learning environments.
- Half of the teachers report that their university provided adequate training for conducting online classes, while the other half report that such training was not provided.
- 69% of teachers consider themselves techno-savvy, while approximately 31% do not feel the same way.
- 32% of teachers feel they lack effective communication skills during online teaching, while nearly 68% do not believe they have this deficiency.

- 24% of teachers feel that learner diversity and distance consistently make online teaching significantly harder.
- 35% of teachers think that male students sometimes hold an advantage in online learning than females because of their technological skills.
- 40% of teachers feel that male and female students do not differ in their approach to online learning.
- 21% of teachers think that students consistently lack effective communication skills in an online learning environment.
- 19% of teachers assume that students always struggle to remain seated during the entire lecture in online classes.
- 29% of teachers observed students leaving their speakers unmuted and causing interruptions during online lectures
- 35% of teachers think that students always hesitate to ask questions to clarify their doubts during online classes.
- 29% feel that students consistently fail to give immediate feedback upon their understanding in online classes
- 27% teachers consistently suffer from such ailments due to extended screen time

Students' Responses:

- 8% of students reported they always feel nervous in an online learning environment.
- 7% of students reported they always feel insecure about their technological abilities.
- 15% of students reported scared of being misinterpreted while communicating in online classrooms
- Majority of students (80%) reported owning personal devices and having a stable internet connection at home for online classes, while the remaining 20% do not.

- 12% of students consistently struggle with inadequate data for attending online classes.
- Majority of the students (80%) claimed that online classes have consumed large amount of data which often posed problems to them, but the remaining 20% do not feel the same way.
- Majority (72%) of students occasionally face connectivity issues, and the remaining 14% consistently deal with interrupted internet supply during their online classes.
- Majority of the students (80%) faced problems with audio quality while attending online classes
- 75 of students encounter problem of poor video quality during video conferencing session in online classes
- 69% of students struggled while downloading assignments or uploading completed work due to internet failure
- 78% of students declares synchronous online learning platforms consume more internet data than asynchronous platforms
- 80 of students face problem while logging into live classes, communicating with teacher and friends and creating and submitting work through online learning platforms
- 70% of students reported facing difficulty in learning where online class videos could not be recorded or watched later
- 71% of students face device incompatibility problem with the learning platforms used during online classes
- 78% of students either occasionally or consistently face problems in learning from home during online classes
- 26% of students disagreed stating home environment is not suitable for learning conditions.

- Majority of students (77%) owned a dedicated seating area at home for attending online classes, while 23% of students do not.
- 71% of students stated that noise and disturbances from home prevent them from learning in online classes
- 85% of student report that the absence of genuine peer interaction rarely hindered their ability to participate in collaborative activities during online classes
- 61% of students find it hard to have quiet locations during online classes
- 78% of students stated that online classes are boring due to repetition of lecture-based teaching
- 75% of students reported they were given personalized guidance by their teacher for improving and identifying weakness during online classes
- 62 of students find it difficult to complete assignments due to communication barriers in online classrooms
- 53% of students experienced concentration difficulties caused by harmful radiation from devices used for online classes
- 88% of students experience ailments such as headaches, back pain, neck pain, wrist pain, and eye strain due to prolonged use of mobile phones, laptops, tablets, or PCs for online classes
- 93% of students reported they feel sleepy after prolonged exposure to the blue light from mobile phones and computers
- 44% of students claimed having difficulty joining online classes on time, while 56% of students disagreed.
- 67% of students encounter the issue of missing a lecture while transitioning from one online class to another
- 33% of students rarely complete their online assignments on time
- 89% of students reported they lack interest and enthusiasm in learning through online

classes

- 82% of students reported they feel unmotivated to access the online learning portal due to overwhelming amounts of text, quizzes, and frequent assignments
- 91% students reported that their concentration is diverted during online classes

QUALITATIVE ANALYSIS:

This section discusses the findings of objective 9 open ended responses which are as follows:

To explore the problems faced by students and teachers during synchronous online learning process.

Following are major problems faced by students:

1. Monotony of online learning environment: The opportunity for physical movement, exercise, exhibiting students' potential and skills and engage in various type of learning activity which can help students' holistic development is missed out in online curriculum which negatively affects the overall quality of learning.
2. Low bandwidth: Internet connectivity issues specifically low internet bandwidth has significantly disrupted and hinders effective classes as it causes technical glitches, breaking voice, and lesson gap. Additionally, it is reported that low bandwidth during night time greatly conflict activities during class hours.
3. High data consumption: Insufficient data due to high platform consumption during online class sessions pose an obstacle for students, specifically for students who do not own WIFI connection.
4. Irregular power supply: Students experienced sudden power cut or irregular power supply particularly during Monsoon or rainy seasons and their phone batteries drained quickly which disrupts effective delivery of lessons.
5. Lack of Privacy at home: Distraction by family members, household chores, noise pollution, inadequate learning environment, lack of seating

area and attending online classes from bed arises due to lack of privacy at home which further affect the students' seriousness, inattentiveness and laziness among the students which further affect the overall effectiveness of online classes.

6. Online classes as excuse to avoid Jhum cultivation for rural students - Rural students reported that since their economic activities are linked to jhum cultivation, they had to participate actively, making it difficult to attend online classes regularly.
7. Misinterpretation of online classes by family: Students reported that their families often misunderstand online classes, assuming students are free since they are not physically attending school. Some families perceive attending classes as an excuse to avoid chores which add tensions and hesitation among the students.
8. Delays and irregular scheduling disrupt learning: Teachers often schedule classes at their convenience, disrupting students' schedules and disregarding their regular routines. Students recommend classes to follow a regular schedule rather than being conducted based on the teacher's convenience, as irregular timing disrupts students' daily routines.
9. Long class duration: Student reported that long duration classes which exceeds 2 hours unable them to balance studies with family-run business and managing household activities. So, they expect and recommend teachers to strictly follow class timings.
10. Physical and mental health issues: Online learning and its environment have led to both physical and mental health concerns among students. Extended class durations (4-6 hours) result in body aches, nausea, and even conditions like piles due to prolonged sitting.
11. Preference for shorter and engaging PPTs over long PPTs: It is evident that overly long or poorly designed PPTs are unproductive. Student propose teachers to prepare in advance, manage time efficiently, and conclude topics within 30 minutes to maintain interest.

Following are the primary findings from the response of teachers:

1. Students turn off their cameras: Teachers stated that when students keep their cameras off, they are unable to observe body language and reactions, students tend to be hesitant in providing immediate feedback, making it difficult to assess engagement and determine whether students understand the lessons.
2. Distractions from family members: Distractions caused by family members further disrupt focus, divert students' attention, and reduce their level of seriousness due to household movements and noise.
3. Limited access to essential resources: Essential and vital resources such as unequal internet access and devices such as mobile phone, Wi-Fi and laptops are not readily accessible by some students which impact online learning.
4. Disparity in digital literacy: There is a significant gap in digital literacy, as some students lack the necessary skills and experience to navigate online platforms effectively.
5. Multitasking during lessons: It is reported that students tend to multitask with personal preferences and household activities during lessons which hampers effective learning.
6. Cheating in online assessments: It is evident that online exams enable students to commit unfair means since there is no direct supervision, invigilation and control from teachers.
7. Unfamiliarity with technology: Experiencing virtual learning for the first time proved to be challenging for students, as unfamiliarity with technology diminishes student engagement and interest.
8. Ethical concerns: Ethical concerns in online class such as students log in to online classes but remain inactive, pretending to be present, digital divide and unequal access to learning devices and better internet are the primary unfair academic performance which further impact learning.
9. Gender impact: It is evident from the study that gender do not have influence on the attentiveness of students during online classes, which means that both male and female students actively engaged and demonstrate proficiency in handling learning devices.

10. Online etiquette: Teachers consider turning on the camera, muting speakers, attending class quietly, responding when asked questions, and maintaining punctuality as the key aspects of online etiquette expected from students.
11. Health issues: It is evident that teachers experienced several health problems, fatigue and mental exhaustion due to due to prolonged screen exposure and continuous sitting for long hours.

MAJOR FINDING OF STUDENTS' INTERVIEW:

1. Most challenging paper in online learning: The study finds that students struggled to cope with subjects which require calculations, abstract concepts and subjects which cannot be grasp by explanation alone such as mathematics, research, theoretical subjects like philosophy, and technical disciplines. It is further reported that while theoretical topics can be understood through reading, mastering calculations requires guidance from teachers to fully comprehend the concepts.
2. Experience of learning subjects through online mode: From the findings of the study, it is revealed that online learning has both pros and cons on students. In the positive side students believe that online learning has improved their technological skills enabling them to navigate various learning applications such as the ability to use online learning platform and Gmail for educational purposes.
On the downside, students find online learning less effective. Long class durations lead to monotony and drowsiness as distractions are more frequent.
3. Major benefit of online classes during pandemic: The most prominent benefits of online learning reported by student is that recorded lessons increase accessibility and helpful especially when exams are approaching.
4. Students' experience with online mode exam: Students strongly dislike online mode exam as they regarded ineffective primarily due to widespread cheating and absence of fairness with only few students maintaining their integrity.
5. Most Preferred online learning platforms used by students: Google Meet, Zoom Meeting, and WhatsApp are preferred for their simplicity, ease of access with minimal issues, and the convenience of creating links effortlessly.

6. Primary Issues with Online Mode Learning: Students struggled to grasp conceptual knowledge in online mode, lack of proper seating area and lack of privacy made students lethargic and lose focus, network instability create knowledge gap, absence of rapport between student and teacher leads to a sense of disconnection, and older teacher unable to handle technology efficiently make learning experiences more complicated.
7. Students' perception regarding online etiquettes: Normally students attend online classes with casual attire. Additionally, the most followed online etiquette by students includes muting speakers, turning off camera, avoiding queries randomly, punctuality, asking queries with appropriate language. Students further mentioned that while most of them adhere to online etiquette, it is the teachers who often fail to do so.
8. Teacher's Reminders on Online Etiquette Before Class: Teachers do not usually remind etiquette before classes because a lot of teacher particularly older ones struggled to handle platforms efficiently due to first-time encountering online classes and also due to lack of familiarity.
9. Students' preferences between online and traditional class: Most students prefer traditional class over online class because physical classes provide a sense of belonging and real classroom environment. In physical classroom, clarifying doubts and making queries is much more feasible than online mode and exams are conducted with greater fairness. Students, however, stated that at present, both students and teacher continue to adapt, so, online mode has the potential to improve.
10. Students' perception on Webinars: It is evident that webinars have little impact on students because individual interests vary significantly, and the content is often too advanced for most students to grasp. Students often do not take it seriously and attend only to fulfil attendance requirements.

RECOMMENDATIONS:

The following are some crucial suggestions for enhancing Mizoram's online education system:

1. Enhance Accessibility and Digital Infrastructure

It is recommended to ensure stable internet connections for both teachers and students, especially in rural, underserved areas or during monsoon season. Creating a Lending and Return Policy to necessary devices such as laptops, tablets and additional data plans for students in needs while encouraging appropriate return windows after completion of dissertations or exams.

2. Provide Training for Faculty and Students

Teachers and students struggled to handle devices and online platforms effectively since they were unfamiliar with them and it was their first time utilizing them, conducting regular workshops to enhance digital literacy and effective use of online platforms such as Zoom Meeting, Google Meet, LMS, email, etc., should be considered. It is also recommended for teachers to have help desks and technical support available for troubleshooting during online sessions.

3. Adapt Teaching Methods for Online Environments

Since students find online learning dull, ineffective and boring, students recommend teachers to incorporate interactive tools such Power Point Presentation (PPT), Digital White Board, stressing and promoting visual-aids, deliver lessons with explanation in relation to real-life examples to make teaching-learning more engaging and interesting. This way, teachers can keep lecture enjoyable and interesting to avoid fatigue and unseriousness.

4. Address Mental and Emotional Well-being

Giving students extra breaks or more recess time between each classes to ensure a balanced schedule is recommended which will avoid screen fatigue and burnout. Teachers are expected to be friendly and approachable and should make time and opportunities for students to express their ideas which in turn can support mental well-being of students.

5. Encourage Active Learning and Participation

It is evident that students profited a lot from recorded lessons particularly when exams are approaching. Therefore, encouraging both synchronous and asynchronous forms is essential to meet a wide range of learning requirements and time constraints.

General Recommendations for Improving Online Teaching-Learning in line with NEP 2020 and UGC Guidelines

A. In light of the findings of this study and aligning with the vision of the National Education Policy (NEP) 2020 regarding online learning and digital education in India, the following general recommendations are proposed:

1. Some teachers, especially senior faculty, faced difficulties in effectively using online platforms. NEP 2020 Section 24.3 highlights the importance of equitable technology use and faculty development by training teachers in digital tools and pedagogy; therefore, it is recommended that institutions offer suitable training programs. Such initiatives will equip teachers with the necessary skills to become effective online educators.
2. To overcome the monotony of online classes and make them more engaging and interactive, NEP 2020 Section 24.4 (d) recommend teacher to integrate fun-based learning and encouraged using student-friendly tools and apps to increase participation and improve concentration.

3. Language barriers make it difficult for some students to understand online lessons, especially those struggling with English. Unlike physical classrooms, online settings often lack local language support, making comprehension harder. To address this, institutions should create digital learning materials in regional languages and adopt bilingual modes of instruction, as recommended in NEP 2020 (Section 4.11 and 4.12), which emphasizes the importance of multilingual education and mother tongue as a medium of instruction. Teachers should also be encouraged to explain concepts in the local language when students struggle with English, to improve understanding and inclusivity.

B. In light of the findings of this study and aligning with the vision of the University Grants Commission (UGC) focusing on both Online Programmes and Open and Distance Learning (ODL) the following general recommendations are proposed:

1. Online classes often clashed with the agricultural responsibilities of rural students, as many are involved in **jhum cultivation**, UGC Online and ODL Regulation Annexure-IX recommend institutions to offer Asynchronous learning options through Learning Management System (LMS) which is capable of handling all file types, including PDFs, Word documents, audio files (MP3), video files (MP4), and various e-learning formats to accommodate the needs of rural learners engaged in agriculture.
2. Students lose interest due to long and unengaging PPT-based lectures. To address this, UGC Regulations Annexure-IX recommends incorporating learner engagement strategies by having teachers include interactive multimedia content in both activities and course design, thereby increasing student participation and interest.
3. Cheating in online assessments is common which enable students to commit unfair means since there is no direct supervision, invigilation and control from teachers. As per UGC Regulations Part-IV on assessment and evaluation, it is recommended examination centres to have proctored

machine such as CCTV monitoring and biometric systems. If CCTV is unavailable, proper videography should be done, and recordings must be submitted to the institution. All CCTV/video records must be kept for at least five years. Each exam centre will have an observer appointed by the institution, and their report must be submitted mandatorily.

Thus, the implementation of the UGC (Online and Open and Distance Learning) Regulations and the National Education Policy (NEP) 2020 has positioned online learning as an integral component of higher education, thereby making it essential to examine teachers' and students' perceptions and the practices of online learning in Mizoram. Additionally, with reference to NEP 2020, up to 40% of a student's total course credits can be earned through online learning platforms such as MOOCs and SWAYAM.

SUGGESTION FOR FURTHER STUDIES:

Following are some suggestive studies which should be further undertaken with regard to online teaching-learning:

1. A comparative study of state level on perception and attitude of students and teachers towards online learning.
2. A study on stakeholder' problems and suggestions on ways to solve problems about online learning.
3. A follow-up study on how perception and attitudes of teachers and students toward online learning evolved from the onset of the COVID-19 pandemic to Post Pandemic.
4. A study on whether students in Mizoram retain concepts better through offline or online methods.
5. Exploring how teachers adapt their online teaching strategy over time and the challenges they faced during this transition.

CONCLUSION:

One of the most prominent findings of the study is that both university teachers and students in Mizoram exhibited a mixed perception of online teaching–

learning, reflecting neither a wholly positive nor negative stance but rather a moderate or neutral outlook. Furthermore, both groups perceived online teaching–learning as a temporary measure and asserted that it cannot substitute traditional modes of instruction due to numerous constraints.

LIMITATIONS OF THE STUDY:

The study sampled fourth-semester postgraduate University students of MZU and ICFAI from the session 2021–2023 in the Academic Block Year 2023, as they were the only remaining post-graduate students who experienced online learning during their first and second semesters.

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