ATTITUDE TOWARDS e-LEARNING IN RELATION TO ACADEMIC PERFORMANCE AND ACADEMIC STRESS AMONG STUDENT-TEACHERS OF NAGALAND

Thesis Submitted to Nagaland University in Partial Fulfilment of the Requirement for the Degree of Doctor of Philosophy in Education

By

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Regn No: Ph.D./TED/00398

UNDER THE SUPERVISION OF

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NAGALAND UNIVERSITY

KOHIMA CAMPUS, MERIEMA,

KOHIMA, NAGALAND

2024

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I, **Asale Vitso**, hereby declare that this thesis entitled "**Attitude towards e-learning in relation to Academic Performance and Academic Stress among Student-Teachers of Nagaland**" is a record of my own original research work conducted under the supervision of **Prof. Pradipta Kumar Pattnaik**, Department of Teacher Education, Nagaland University, Kohima campus, Meriema. The content of this thesis did not form the basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted earlier in part or in full, for award of any degree at any other university/institute.

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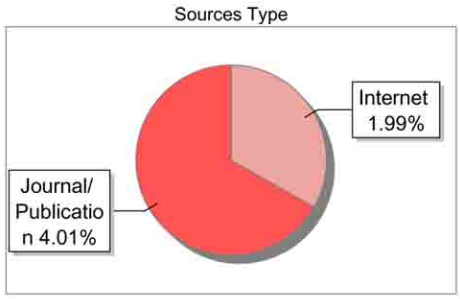

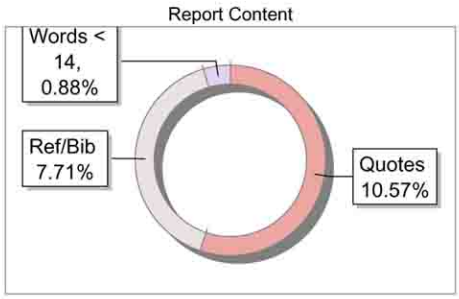

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CERTIFICATE

This is to certify that Ms. Asale Vitso, bearing Registration No. Ph.D./TED/00398 from the Department of Teacher Education, Nagaland University, Kohima Campus, Meriema, has completed her Ph.D. thesis entitled "**Attitude towards e-learning in relation to Academic Performance and Academic Stress among Student-Teachers of Nagaland**" under my supervision and guidance.

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ACKNOWLEDGEMENT

First and foremost, I give thanks to **ALMIGHTY GOD** for His mercies, provisions, protection, sustenance, good health and favour. I am eternally grateful.

My immense gratitude goes to my supervisor, **Prof. Pradipta Kumar Pattnaik**, Professor in the Department of Teacher Education, Nagaland University, Kohima Campus, Meriema, for accepting to supervise me in the first place. I am thankful for his kindness, thorough supervision and for impacting my life. For all your encouragement, wisdom and constructive feedback, I am ever grateful. Sir, thank you for everything and may God reward you.

I also convey my sincere thanks to Prof. Gyanendra Nath Tiwari, Head of the Department of Teacher Education, Nagaland University, Kohima Campus, Meriema, for his invaluable help and guidance throughout my studies. My heartfelt gratitude to all the faculty and staff of the Department of Teacher Education, Nagaland University, Kohima Campus, Meriema, for all your meticulous and tireless support.

I sincerely appreciate my Principal, Dr. Elizabeth Walling, State College of Teacher Education, Kohima, for allowing me to take up this research and for the encouragement, contribution and support.

To all my seniors, colleagues and friends, I say a big “Thank You” for your immense love and support in diverse ways. I also extend my appreciation to all my “December, 2020 Ph.D. Batchmates” for your help along the way.

To all those who participated in the research and provided the required data, I express my sincere appreciation.

This journey would have been impossible without my wonderful in-laws and family members. I thank you all from the bottom of my heart for your unceasing prayers, love and support and always being there in times when I needed help.

Lastly and most importantly, I will be forever grateful to my dear husband, Visedelie Theünuo, who stood by me through thick and thin. Thank you for your prayers, understanding, encouragement, patience, love, support and above all, rising to the challenges. To my kids: Diethonuo, Ketholeü and Khriesituo, I say "Thank You" for bearing with me at the most difficult times and for cheering me on even though you could not fully understand the stress I was going through. It is your unconditional love and support that helped me reach the end of this journey.

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CONTENTS

Declaration	i
Certificate of Plagiarism Check	ii
Certificate	iii
Acknowledgment	iv-v
Contents	vi-x
List of Tables	xi-xiii
List of Figures	xiv
List of Abbreviations	xv-xvi

Sl. No.	CHAPTER -I: INTRODUCTION	Page No.
1.1.	Background of the Study	1
1.1.1.	A brief history of the evolution of the term e-learning	4
1.1.2.	Characteristics of e-learning	6
1.1.3.	Types of e-learning	6
1.1.4.	Benefits of e-learning	7
1.1.5.	Challenges of e-learning	9
1.1.6.	e-learning Platforms	10
1.1.7.	Mobile Applications	11
1.1.8.	Social Media Tools	13
1.2.	Relevance of e-learning in teaching-learning process	13
1.3.	Pandemic and e-learning	14
1.4.	e-learning during the Pandemic in Nagaland	15
1.5.	A brief profile of Nagaland	16
1.6.	Establishment of Teacher Education Colleges in Nagaland	17
1.7.	Attitude towards e-learning	22
1.8.	Academic Achievement	23
1.8.1.	Types of Academic Achievement Tests	24
1.8.2.	Impact of e-learning on Academic Performance	24
1.9.	Academic Stress	25
1.9.1.	Impact of e-learning on Academic Stress	26

1.10.	Need and Significance of the Study	26
1.11.	Statement of the Problem	27
1.12.	Operational Definition of the Terms Used	27
1.13.	Objectives of the Study	27
1.14.	Hypotheses of the Study	29
1.15.	Delimitation of the Study	33
1.16.	Variables of the Study	33
CHAPTER -II: REVIEW OF RELATED LITERATURE		
2.1.	Introduction	34
2.2	Studies related to Attitude towards e-learning	34
2.3.	Studies related to Attitude towards e-learning in relation to Academic Performance	45
2.4.	Studies related to Attitude towards e-learning in relation to Academic Stress	55
2.5.	Research Gap	67
CHAPTER – III: METHODOLOGY		
3.1.	Introduction	68
3.2.	Research Method	68
3.3.	Population of the Study	68
3.4.	Sample of the Study	69
3.5.	Sampling Technique	73
3.6.	Tools Used	73
3.6.1.	Attitude towards e-learning Scale constructed and standardized by Dimple Rani (2016).	73
3.6.2.	Achievement Test for Student-Teachers	77
3.6.2.1	Question Design	87
3.6.3.	Academic e-learning Stress Scale	100
3.7.	Procedure of Data Collection	107
3.8.	Statistical Techniques Used	108
3.9.	Analysis of Data	108
CHAPTER -IV: DATA ANALYSIS AND INTERPRETATION		
4.1.	Introduction	109

4.1.1.	Gender-wise status of attitude towards e-learning, academic performances and academic stress among student-teachers of Nagaland	109
4.1.2.	Status of attitude towards e-learning, academic performances and academic stress with respect to educational qualification among student-teachers of Nagaland	111
4.1.3.	Status of attitude towards e-learning, academic performances and academic stress with respect to pedagogy opted among student-teachers of Nagaland	114
4.1.4.	Status of academic performance among student-teachers of Nagaland	117
4.1.5.	Status of academic stress among student-teachers of Nagaland	118
4.2.	Objective wise data analysis	119
4..2.1.	Attitude towards e-learning differential with respect to gender and educational qualification of student-teachers for the total sample	119
4.2.2.	Attitude towards e-learning differential with respect to pedagogy opted for the total sample of student-teachers of Nagaland	121
4.2.2.1.	Post hoc t-test of attitude towards e-learning with respect to pedagogy opted	123
4.2.3.	Influence of attitude towards e-learning differential on academic performance of student-teachers of Nagaland	125
4.2.3.1.	Post hoc t-test of attitude towards e-learning differential on academic performance	127
4.2.4.	Attitude towards e-learning differential on academic stress of student-teachers of Nagaland	129
4.2.4.1.	Post hoc t-test of attitude towards e-learning differential on academic stress	130
4.2.5.	Relationship between attitude towards e-learning and academic performance of student-teachers of Nagaland	132

4.2.6.	Relationship between attitude towards e-learning and academic stress with respect to gender, educational qualification and pedagogy opted among student-teachers of Nagaland	134
4.2.7.	Relationship between academic performance and academic stress with respect to gender, educational qualification and pedagogy opted among student-teachers of Nagaland	136
4.2.8.	Relationship among attitude towards e-learning, academic performance and academic stress of student-teachers of Nagaland	138
4.2.9.	Influence and interaction on attitude towards e-learning with respect to gender, educational qualification and pedagogy opted of student-teachers of Nagaland	139
4.2.10.	Influence and interaction on academic performance with respect to gender, educational qualification and pedagogy opted of student-teachers of Nagaland	144
4.2.11.	Influence and interaction on academic stress with respect to gender, educational qualification and pedagogy opted of student-teachers of Nagaland	149
CHAPTER – V: MAJOR FINDINGS, DISCUSSIONS, EDUCATIONAL IMPLICATIONS, CONCLUSION AND SUGGESTIONS FOR FURTHER RESEARCH		
5.1	Introduction	155
5.2.	Major findings of the Study	155
5.3.	Discussions	162
5.4.	Educational Implications	166
5.5.	Conclusion	168
5.6.	Suggestions for Further Research	169
SUMMARY		
1.	Introduction	170
2.	Review of Related Literature	170
3.	Research Gap	171

4.	Need and Significance of the Study	171
5.	Statement of the Problem	171
6.	Operational Definition of the Terms Used	172
7.	Objectives of the Study	172
8.	Hypotheses of the Study	173
9.	Delimitation of the Study	178
10.	Variables	178
11.	Research Methodology	178
12.	Population of the Study	178
13.	Sample of the Study	178
14.	Tools Used	178
15.	Procedure of Data Collection	179
16.	Statistical Techniques Used	179
17.	Analysis of Data	179
18.	Major Findings of the Study	179
19.	Discussions	186
20.	Educational Implications	190
21.	Conclusion	192
22.	Suggestions for Further Research	193
Bibliography		194
Appendices		
I.	Attitude towards e-learning Scale	
II.	Achievement Test for Student-Teachers	
III.	Academic e-learning Stress Scale	
IV.	Paper Presentations	
V.	Paper Publications	

List of Tables

Table No.	Description	Page No.
1.1.	Literacy rate of Nagaland as per 2011 census with respect to gender	17
1.2.	Year of establishment and type of Teacher Education Colleges in Nagaland	19
1.3.	Number of trained and untrained teachers in Nagaland during the year 2013-2014	21
2.1.	Summary of research studies on attitude towards e-learning	39
2.2.	Summary of research studies on academic performance	51
2.3.	Summary of research studies on academic stress	61
3.1.	Intake capacity of Teacher Education Colleges in Nagaland	69
3.2.	Gender wise distribution of the sample	70
3.3	Distribution of the sample with respect to educational qualification	71
3.4.	Distribution of sample based on pedagogy opted	72
3.5.	Area-wise distribution of items	75
3.6.	Scoring system	75
3.7.	Norms for interpretation of the level of e-learning	76
3.8.	Distribution of sample on the basis of gender, educational qualification and pedagogy opted	79
3.9.	The index of difficulty and index of discrimination used in item analysis adopted from Padua and Santos (1997)	80
3.10.	Difficulty index and interpretation	81
3.11.	Discrimination index and interpretation	83
3.12.	Description of the achievement test items	85
3.13.	Reliability of the achievement test	86
3.14.	Distribution of sample on the basis of gender, educational qualification and pedagogy opted	103
3.15.	Scoring system	103
3.16.	Selected items for the academic e-learning Stress Scale	104
3.17.	Reliability of Academic e-learning Stress Scale	106
3.18.	Dimension wise distribution of items	106

3.19.	Scoring system	107
3.20.	Norms for interpretation of academic stress level	107
4.0.1.	Mean and Standard Deviation of attitude towards e-learning, academic performance and academic stress of male and female student-teachers of Nagaland	110
4.0.2.	Mean and Standard Deviation of attitude towards e-learning, academic performance and academic stress of graduate and postgraduate student-teachers of Nagaland	112
4.0.3.	Mean and Standard Deviation of attitude towards e-learning, academic performance and academic stress of student-teachers of Nagaland with respect to pedagogy opted	114
4.0.4.	Academic performance status among student-teachers of Nagaland	117
4.0.5.	Academic stress status among student-teachers of Nagaland	118
4.1.	Significance of difference in mean scores and standard deviation on attitude towards e-learning with respect to gender and educational qualification of student-teachers of Nagaland	119
4.2.	e-learning attitude differential with respect to pedagogy opted of student-teachers for the total sample	121
4.2.1.	Post Hoc t-Test for mean and standard deviation of attitude towards e-learning of student-teachers of Nagaland with respect to pedagogy opted	123
4.3.	Influence of e-learning attitude differential on academic performance of student-teachers	125
4.3.1.	Post Hoc t-Test for attitude towards e-learning differential on academic performance of student-teachers (high academic performance, average academic performance and low academic performance)	127
4.4.	e-learning attitude differential on academic stress of student-teachers	129
4.4.1.	Post Hoc t-Test for Mean and Standard Deviation of attitude towards e-learning differential on academic stress of student-teachers (high academic stress, average academic stress and low academic stress)	130

4.5.	Relationship between e-learning attitude and academic performance of student-teachers	132
4.6.	Relationship between e-learning attitude and academic stress with respect to gender, educational qualification and pedagogy opted among student-teachers	134
4.7.	Relationship between academic performance and academic stress with respect to gender, academic qualification and pedagogy opted among student-teachers	136
4.8.	Relationship among attitude towards e-learning, academic performance and academic stress of student-teachers	138
4.9.	Influence and interaction on attitude towards e-learning with respect to gender, educational qualification and pedagogy opted of student-teachers of Nagaland	140
4.10.	Influence and interaction on academic performance with respect to gender, educational qualification and pedagogy opted of student-teachers	145
4.11.	Influence and interaction on academic stress with respect to gender, educational qualification and pedagogy opted of student-teachers	150

List of Figures

Figure No.	Description	Page No.
1 (a)	Gender-wise literacy rate in Nagaland as per Census of India, 2011	17
1 (b)	Map of Nagaland	18
1 (c)	Map showing the study location in the state of Nagaland	20
1 (d)	Status of teachers in Nagaland during the year 2013-2014	21
3 (a)	Gender wise distribution of sample	70
3 (b)	Distribution of sample with respect to educational qualification	71
3 (c)	Distribution of sample based on pedagogy opted	72
4 (a)	Status of e-learning attitude, academic performance and academic stress with respect to gender	110
4 (b)	Status of e-learning attitude, academic performance and academic stress with respect to educational qualification	112
4 (c)	Status of e-learning attitude, academic performance and academic stress with respect to pedagogy opted	115
4 (d)	Status of academic performance of student-teachers	117
4 (e)	Status of academic performance of student-teachers	118
4 (f)	e-learning attitude differential on gender and educational qualification	120
4 (g)	e-learning attitude differential on pedagogy opted	122
4 (h)	Post Hoc t-Test on e-learning attitude with respect to pedagogy opted	124
4 (i)	Influence of e-learning attitude on academic performance	126
4 (j)	Post Hoc t-Test of e-learning attitude differential on academic performance	128
4 (k)	e-learning attitude differential on academic stress	129
4 (l)	Post Hoc t-Test of e-learning attitude differential on academic stress	131
4 (m).	Interactional effect on attitude towards e-learning	141
4 (n)	Interactional effect on academic performance	146
4 (o)	Interactional effect of gender, educational qualification and pedagogy opted on academic stress	151

List of Abbreviations Used

i.	COVID-19	: Corona Virus Disease of 2019
ii.	UNESCO	: United Nations Educational, Scientific and Cultural Organization
iii.	UNICEF	: United Nations Children's Emergency Fund
iv.	ICT	: Information and Communication Technology
v.	NPE	: National Policy of Education
vi.	NCF	: National Curriculum Framework
vii.	NEP	: National Education Policy
viii.	NCFSE	: National Curriculum Framework for School Education
ix.	NCFTE	: National Curriculum Framework for Teacher Education
x.	CBT	: Computer-based Training
xi.	PLATO	: Programmed Logic for Automated Teaching Operation
xii.	LMS	: Learning Management System
xiii.	MOODLE	: Modular Object-Oriented Dynamic Learning Environment
xiv.	MOOCs	: Massive Open Online Courses
xv.	WBT	: Web-based Training
xvi.	CD-ROM	: Compact Disc Read Only Memory
xvii.	DVD	: Digital Versatile Disc
xviii.	MHRD	: Ministry of Human Resource Development
xix.	UGC	: University Grants Commission
xx.	SWAYAM	: Study Webs of Active-learning for Young Aspiring Minds
xxi.	GOI	: Government of India
xxii.	NCERT	: National council of educational Research and Training
xxiii.	NCTE	: National Council for Teacher Education
xxiv.	B. Ed.	: Bachelor of Education
xxv.	D. El. Ed.	: Diploma in Elementary Education
xxvi.	M. Ed.	: Master of Education
xxvii.	GPA	: Grade Point Average

xxviii. PSS : Perceived Stress Scale

xxix. PAS : Perception of Academic Stress Scale

xxx. C. R. : Critical Ratio

xxxi. ANOVA : Analysis of Variance

xxxii. SD : Standard Deviation

xxxiii. M : Mean

xxxiv. SPSS : Statistical Package for the Social Science

xxxv. N : Sample Size

xxxvi. df : Degrees of Freedom

xxxvii. r : Correlation Coefficient

xxxviii. R : Multiple Regression

CHAPTER-I
INTRODUCTION

"Technology will never replace great teachers, but technology in the hands of a great teacher can be transformational" – George Couros.

1.1. Background of the Study

Teacher Education occupies a pre-dominant place in the academic area. Teachers' role today has become "very challenging, complex and multifaceted" (Kumar, 2010). With knowledge explosion, a teacher is expected to be well-informed with the latest developments in their profession and also acquire the necessary skills, abilities and competencies. Moreover, the impact of technology in education has created vast opportunity for both the teachers and the students. Teachers now have to reinvent the teaching-learning strategies, methods and techniques to meet the present needs to enable learning. e-learning is gradually taking the place of traditional classrooms and is providing opportunities for innovative ways for teaching-learning process to take place.

The teaching-learning situation using e-learning has been well adapted by several teachers; however, many faced the challenges in adapting the application of technology in teaching-learning process. Practical difficulties have been faced by learners with the abrupt shift in the teaching-learning environment during the COVID 19 lockdown. Unlike the developed countries which have already adopted e-learning in the educational system, several developing countries even now has a long way to go, given the poor infrastructural amenities, the large population, the socio-economic and geographical barriers. UNESCO in its Policy Brief: Education during COVID-19 and beyond (2020) emphasized that Governments around the world prioritized learning continuity during the time of school closures through Information and Communication Technology (ICT), requiring teachers to move to online delivery of lessons. The sudden shift to e-learning without sufficient guidance and resources all over the world increased problems to the already struggling teachers and has also caused academic stress among the students. Therefore, UNESCO insisted on the need for education to be more "flexible, equitable and inclusive" while using technologies in the teaching-learning process.

All the national educational policies emphasized the application of technology. Kothari Commission (1964-66), recognised the important role of teachers in the success and contribution to national development (Kothari Commission, 1964-66, p. 74). It recommended effective career progression programmes for teachers to improve education (Kothari Commission, 1964-66, p. 113). It emphasized the utilization of improved "methods of teaching" which are flexible and activity oriented, giving students opportunities to think, read, study and discuss and also suggested the broadcasting of lessons on Radio as well as other available aids (Kothari Commission, 1964-66, p. 122). The National Education Policy (NPE), 1968 on the recommendation of the Kothari Commission, aimed at a radical reconstruction of education involving transformation of education system related to the context of the people, expansion of educational opportunities, improvement of educational excellence at all levels, development of scientific and technological knowledge and the cultivation of moral and social values (National Education Policy, 1968, p. 38). National Policy of Education (NPE), 1986 encouraged technology usage at all levels to make education universally available and recommended the enhancement of the new knowledge, skills and favorable attitudes among teachers to address the present needs. Technology such as Radio and Television transmission, integration of computer-education modules in professional and general courses and other audio and video media were recommended. The policy further suggested that "educational technology will influence not only methodologies of teaching-learning process but also the contents and their design" (National Education Policy, 1986, p. 180). National Curriculum Framework for School Education (NCFSE), 2000 recognised the impact of technology on the ability of both the teachers and the students to think and learn. It further emphasized that both pre-service courses and in-service teacher training or orientation programmes must help teachers "acquire skills of using information technology as well as making the best use of computer technology in curriculum transaction" (NCFSE-2009, p. 114). The National Curriculum Framework (NCF), 2005 emphasized on a major shift in Teacher Education Programme, particularly in appreciating the learner as an active participant "through experience, making and doing things, experimentation, reading, discussion, asking, listening, thinking and reflecting and expressing oneself in speech, movement or writing- both individually and with others" (National Curriculum Framework, 2005, p. 15). Therefore, the framework emphasized the need to prepare the teacher for the roles of being an "encouraging, supportive and humane facilitator in teaching-learning situations…" (National Curriculum Framework, 2005, p. 107). To

improve quality in the profession, it further recommended the sensible use of technology to increase accessibility, address specific learning requisites, support pedagogy, improve classroom learning, self-learning, sharing of information, meet educational needs of differently abled children (National Curriculum Framework, 2005, p. 121). National Curriculum Framework for Teacher Education (NCFTE), 2009 had criticized the ICT usage in the school education as "not more than cosmetic" and therefore suggested the necessity to orient and "sensitize the teacher to distinguish between critically useful, developmentally appropriate and the detrimental use of ICT" (National Curriculum Framework for Teacher Education, 2009, p. 14). It encouraged the ICT application for acquiring and wider spread of information; provide opportunities to teachers to connect with other professionals in education together with pure academic disciplines in order to break the isolation of teachers (National Curriculum Framework for Teacher Education, 2009, p. 68). National Education Policy (NEP), 2020 has recommended "extensive use of technology in teaching and learning" (National Education Policy, 2020, p. 5); it encouraged online teacher preparation programmes and also for their continuous professional development; to create, develop and upload high-quality online contents at various levels of education to facilitate optimal learning environment; the National Educational Technology Forum is to be established where innovative ideas on use of technology to enhance learning can be deliberated upon. Additionally, it envisions that techno-enabled teachers and students will impact education in multiple ways. "....educational software and hardware will not just change what students learn in the classroom but how they learn and thus these areas and beyond will require extensive research both on the technological as well as educational fronts" (National Education Policy, 2020, p. 56). With the shift from conventional teaching-learning process to e-learning, it is hoped to bring about quality improvement and efficiency in the academic performance of the student-teachers; enhance educational access and provide support to Divyang students. However, with the rapid advancement of e-learning, the academic stress of the "student-teachers" cannot be ignored. NEP-2020, further emphasized research and pilot studies on digital learning in order to formulate guidelines for e-learning to be followed by States, Boards, Schools, Higher Education Institutions, etc. Therefore, based on the educational recommendations, commissions and policies of the country; education is rapidly moving towards large scale utilization of technologies in the teaching-learning process. e-learning has become a crucial and an inevitable part in the present educational context. Student-teachers have come to rely much on e-resources for their assignments,

projects, examination purposes and other academic references due to its easy and quick accessibility and availability.

1.1.1. A brief history of the evolution of the term e-learning

Isaac Pittman pioneered distance education in 1840 by teaching shorthand through correspondence (Kentnor, 2015). He mailed the assignment tasks to his students and received it through mail. This is recognized as the first distance learning course. The notion of distance education remained the same though the mode through which it is delivered multiplied as a consequence of development in technology (Bezhovski & Poorani, 2016). In 1920, Sidney Pressey introduced the idea of 'teaching machine'. This idea was promulgated and invented by B.F. Skinner called "GLIDER" in 1954, which empowered schools to direct programmed instruction to their students (Niaz et al., 2021). Computer based training (CBT) was considered as the first form of electronic education which could transfer primary data through software over internet or intranet (Bezhovski & Poorani, 2016). In the 1960s, Programmed Logic for Automated Teaching Operation (PLATO), a computer assisted instruction system was created by Prof. Don Bitzer which was regarded as the base of online conference and message system (Hubackova, 2015). Woolley, 1994 stated "the PLATO system pioneered online forums and message boards, email, chat rooms, instant messaging, remote screen sharing and multiplayer games leading to the emergence of the world's first online community" (as cited in Bezhovski & Poorani, 2016). With rapid progress and development in technology, Murray Turoff, regarded as the father of computer conferencing developed the first computer conferencing system named Delphi System in 1971. The first web-based Learning Management System (LMS), a software application named Cecil was launched in 1996 (Bezhovski & Poorani, 2016). The World Wide Web (www) was invented around 1998 which helped students to access materials on the web (Niaz et al., 2021). However, Elliott Masie was credited with coining the phrase 'eLearning' as a professional context in 1999, at his TechLearn Conference at Disneyland. In 2001, an open source Learning Management System called Modular Object-Oriented Dynamic Learning Environment (MOODLE) was developed by Martin Dougiamas. It is an open source and free software developed to assist educators in creating online courses focusing on interaction. Such as web conferencing, chat forums, blogs, etc. (Bezhovski & Poorani, 2016). In this way, the concept of e-learning gradually evolved which made synchronous learning possible. In 2005, Javed Karim, Steve Chen and Chad Hurley together founded the YouTube which was initially created for sharing

videos and later on acquired by Google to aid its search data. In 2008, George Siemens and Stephen Downes introduced the term Massive Open Online Courses (MOOCs) describing the open access and self-learning platform. Even after going through so many transformations, e-learning is still evolving alongside the development in technology (Niaz et al., 2021).

The definition of e-learning is broad, varied and dynamic according to the different authors and contexts. It is difficult to define e-learning as there is no single definition of the term on which there is a common consensus. Nevertheless, some of the definitions given by notable authors based on their research studies are as follows:

Sangra et al. (2012) defined e-learning as "an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning."

"e-learning is the delivery of a learning, training or education programme by electronic means" (Li et al., 2009). "e-learning is education using ICTs and teaching using ICTs and learning using ICTs" (Sara & Rachid, 2018). "A learning system based on formalised teaching but with the help of electronic resources is known as E-learning. While teaching can be based in or out of classrooms, the use of computers and the internet forms the major component of e-learning. e-learning can also be termed as a network enabled transfer of skills and knowledge, the delivery of education is made to a large number of recipients at the same or different times" (The Economic Times, 2022). "By e-learning is meant any form of learning or training (either formal and informal education, distance education, virtual classroom, CBT -Computer-based Training, and WBT -Web-based Training), which is partially or totally delivered through an electronic way, either via a Web browser in an Intranet or Internet, or through multimedia platforms like CD-ROM, DVD or video" (Covella & Olsina, 2002). From the above definitions, in simple words, e-learning can mean the use of digital device(s), with or without internet, enabling students and teachers to access diverse resources for facilitating "teaching and learning" regardless of time and space.

1.1.2. Characteristics of e-learning

In recent years, e-learning has seen a growth in industry and educational fields. Some basic characteristics of e-learning are as follows:

- Anytime, anywhere, anyone: The e-learning services can be synchronously or asynchronously accessed by anyone from anywhere. It provides flexibility in terms of time limit, age barrier and the opportunity for 'lifelong learning'.
- Personalized learning: e-learning gives importance to individual learner and his/her needs. It is self-paced and learners can access the contents and also control or customize their learning.
- Friendly and easy to use: e-learning enables learners to navigate/browse for what they need. Learners can access the sources at their convenience.
- Includes all educational activities: e-learning basically incorporates all educational activities undertaken by individuals or groups, be it online or offline.
- Eco-friendly: e-learning is a highly eco-friendly way of learning as it encourages paperless learning.
- It is dynamic: e-learning is dynamic as it keeps progressing and enhancing with the ever developing technological advancement.
- Learning services: Accessibility, navigability, online searching, online evaluation support, collaborative and controlled learning services, etc is provided in a context of a high degree of independence of time-distance-platforms dimensions (Covelle & Olsina, 2002).
- Saves time: e-learning reduces the time in locating information as it offers access to e-resources, data bases, periodicals, journals and other materials which may not be accessible from a library. In this way, it is also affordable.

1.1.3. Types of e-learning

e-learning may "include the use of web-based teaching materials and hypermedia in general, multimedia CD-ROMs, websites, discussion boards, collaborative software, e-mail, blogs, wikis, test chat, computer aided assessment, educational animation, simulations, games, learning management software, electronic voting machines, etc with possibly a combination of different methods being used" (Behera et al., 2016).

e-learning can be basically divided into three types:

i. Asynchronous e-learning: "Asynchronous e-learning makes it possible for learners to log on to an e-learning environment at any time and download or send messages to teachers or peers" (Hrastinski, 2008). This type of e-learning is flexible as learning is usually facilitated through emails, PDF, PowerPoint, Canvas, Moodle or Google Classroom. One need not be online simultaneously as learners can log in at anytime and anyplace. They can download documents or audio or videos at their own convenience. They can even submit their tasks and assignments through the asynchronous learning platforms. The teachers can communicate feedbacks and comments with the students about their tasks and progress.

ii. Synchronous e-learning: Synchronous e-learning is facilitated through platforms such as Google meet, Zoom meeting or Webex meeting. Teaching-learning takes place in real time. "Synchronous e-learning, commonly supported by media such as videoconferencing and chat, has the potential to support e-learners in the development of learning communities" (Hrastinski, 2008, p. 52).

iii. Blended learning: This is a combination of the synchronous and asynchronous e-learning. "Blended learning is a combination of face-to-face and technology mediated instructional forms and practices" (Rao, 2019). It is a teaching-learning approach that incorporates both traditional classroom face-to-face methods along with computer mediated instructional activities.

Teaching-learning can now take place anytime and anywhere in three ways- Synchronous, Asynchronous and blended mode. The method an individual select to obtain information depends on the category to be used.

1.1.4. Benefits of e-learning

The use of e-learning in education has many advantages as supported by several researchers and authors from their research findings. Some of the benefits comprised of the following:

1. "The benefits of e-learning are many including cost-effectiveness, enhanced responsiveness to change, consistency, timely content, flexible accessibility and providing costumer value" (Sanderson, 2002). The student-centric learning is a major benefit of e-learning.

2. e-learning is cost effective. It provides flexible learning with reduced travel needs for students. It provides opportunities for maximum numbers of students to learn (Zhang et al., 2006 as cited in Arkorful & Abaidoo, 2014).
3. e-learning assists in connecting people worldwide and allow enhanced communication between students and instructors. Singh (2003) revealed that e-learning improved communication between and among students and faculty.
4. e-learning helps teachers and students develop their creativity and innovative abilities. (Zare et al., 2016) indicated that e-learning is effective for knowledge and creativity acquisitions.
5. George (2020) and Mothibi (2015) inferred that the achievement level of e-learning students higher than that of the traditional learning students irrespective of gender differences and location.
6. With e-learning, people with special needs can now have access to continuing education from the comforts of their homes.
7. e-learning helps teachers connect with their students, furnishes diverse resources, gives teachers the liberty to explore with innovative and creative ideas, designs and devises teaching-learning materials, allows teachers to provide additional support to their students even after class hours and also receive constant and immediate feedback from students and colleagues.
8. e-learning allows teachers as well as students to enhance their knowledge and improve their proficiency as lifelong learners.
9. As teaching-learning materials are made available in electronic format, it is environment friendly.
10. Learners, including both teachers and students can stay connected with colleagues and peers all over the world as well as to share ideas and gain inspiration; and analyse and reflect on their teaching and learning. (Stoeva, 2018).

Thus, there has been much research conducted into e-learning and its benefits from the perspectives of education. However, e-learning can be of great benefit to us only when it is employed and applied in appropriate ways.

1.1.5. Challenges of e-learning

Despite significant benefits of e-learning adopted in education, supported by findings of research studies, yet several challenges are also being encountered in education. The disadvantages faced are also supported by research findings. Some of the most prominent drawbacks are as follows:

1. The absence of essential personal and social interactions among learners and between instructors and learners is the most obvious drawback of e-learning. This may have a negative impact on the social skills such as communication and interaction skills.
2. Technologies such as broadband internet connections and high-resolution screens tend to be difficult to find especially in remote rural areas. This may have worsened the disparities between "have and "have not's" among the youth particularly in remote areas. This can be felt when teachers and peers expect everyone to have technology tools and internet access at home, whereas not having it can impact self-esteem and personal perceived value and cause undue stress.
3. The negative effect of long time use of electronic devices on one's physical and mental health is proven by research studies. In online mode, Ramane et al. (2021) found that physical health issues like computer eye syndrome, headache, backache, shoulder pain and neck pain, etc were prom inent and psychological pressures like fear of isolation, discomfort, irritation, fatigue and sleeplessness were also experienced by learners.
4. The frequent fluctuation of internet connectivity and irregular power supply often interrupts the teaching-learning process. As such, valuable time is lost in trying to fix the network related issues.
5. Not all fields or disciplines can employ e-learning. For instance, the purely scientific subjects require a certain degree of hands-on practical experience and so cannot be properly studied through e-learning. Researchers have argued that e-learning is more appropriate in social sciences and humanities than the fields such as medical sciences and pharmacy (Arkorful &Abaidoo, 2014). However, even in social sciences and humanities, many teachers choose to focus only on the theoretical knowledge, rather than the practical skills.
6. Even in this day and age, there are still few teachers and students who are yet to have the basic knowledge and skills of using the digital forms of teaching and learning. Few do not have the essential resources for the conduct of online classes.

As a result, it becomes difficult to integrate technology in the teaching-learning process.

1.1.6. e-learning Platforms

The MHRD along with UGC released a list of ICT initiatives on its official portal which is accessible by students, teachers, research scholars and any interested learners. The ten (10) online learning platforms published in Times of India dated April 3rd, 2020 are as follows:

1. SWAYAM Online Course: Study Webs of Active-learning for Young Aspiring Minds (SWAYAM) is a MOOCs platform and a programme initiated and designed by the "Government of India" (GOI). It aims to achieve the three fundamental principles of education policy- access, equity and quality. This platform provides courses from class 9 to PG, prepared by specially selected teachers from across the nation. The courses are interactive and are accessible by any learner without registration fee. However, those wanting a certificate need to pay a small fee and attend in-person at designated centres on specified dates.
2. UG/PG MOOCs: Massive Open Online Course (MOOCs) is a free web-based learning programme that is designed for large numbers of geographically dispersed students. It provides archived courses or learning materials of the SWAYAM Undergraduate (UG) and Postgraduate (PG). MOOCs are free online courses available for anyone to enrol.
3. e-Pathshala: e-Pathshala has been developed by National Council of Educational Research and Training (NCERT) to show and disseminate all scholarly e-resources including textbooks, audio, video, periodicals and a variety of other print and non-print materials through websites and mobile apps. It provides high quality curriculum based interactive e-contents in disciplines of Social Sciences, Arts, Fine Arts and Humanities, Natural and Mathematical Sciences.
4. e-Content Courseware in Undergraduate Subjects: This portal hosts 87 undergraduate courses and as many as 24,110 e-content modules.
5. SWAYAMPRABHA: It is a group of 32 DTH Channels providing high quality curriculum based course contents from different disciplines accessible to all teachers, students and citizens across the country interested in lifelong learning. These channels are also accessible through cable operator. The telecasted videos/ lectures are archived on the portal.

6. CEC-UGC YouTube channel: The Consortium for Educational Communication (CEC) is an Inter University Centre set up by UGC. CEC MOOCs offered on GOI's SWAYAM platform is a mode of learning where a student can virtually attend digital higher education courses. One can access unlimited scholarly curriculum based lectures from this portal without any cost.
7. National Digital Library (NDL): NDL is a virtual repository of learning resources, sponsored and mentored by Ministry of Education, GOI. It provides access to an immense collection of academic content in diverse formats. It also provides an interface support for leading Indian languages at all levels including researchers and lifelong learners, all disciplines, all popular forms of access devices and differently abled learners.
8. Shodhganga: It is a digital repository platform of Indian Electronic Theses and Dissertations set up by the INFLIBNET Centre. It provides a platform for research scholars to deposit their Ph. D. theses and makes it available to the entire scholarly community in open access.
9. e-Shodh Sindhu: In this portal current and archived core and peer-reviewed journals are available for access. Member institutions and Centrally funded technical institutions are provided access to bibliographies, citations and factual databases in different disciplines from a large number of publishers and aggregators.
10. Vidwan: This portal permits access to a database of experts, to peers, prospective collaborators, policy makers, funding agencies and research scholars in the country.

1.1.7. Mobile Applications

Many teachers and students use mobile applications (apps) in order to teach and learn. Mobile apps are helping students effectively learn the different subjects from the best teachers across the country. The top ten (10) e-learning mobile applications in India as given by Reji (2021) are as follows:

1. Byju's: This app offers the best teachers using state of the art technology for visualization like videos, interesting and original content, quizzes, animations, interactive simulations, etc. It provides access to the best learning experience that allows an individual to learn concepts from Kindergarten to High School to preparation of competitive examinations.

2. Vedantu: It is an interactive real-time app for both students and teachers. It is one of India's largest tutoring apps, where students learn online with some of the experienced teachers. The app caters to online classes for grades 6-12, competitive examinations and co-curricular courses as well.
3. Meritnation: It provides online tuitions, study materials, complete homework guide and exam preparation with sample papers, revision notes and more to students of class 1-12. It also has an extensive personality development section to help students identify and enhance their soft skills for holistic development.
4. Unfold U: This is not only an app but also a tool which uses different methods and approaches such as learning via engaging videos, practice questions, revision based MCQs, etc. The queries raised by students are addressed by expert teachers and even students are able to help each other. An important aim of the app is to offer equal education and competitive exam preparation for all.
5. Toppr: Live classes in real time for class 5-12 are offered through this app. It provides a time table for students so that they can be aware of the class timings. It believes in making learning more personalized and helps students clear their doubts and queries and prepares for various competitive exams.
6. Unacademy: This app is empowering individuals to prepare for competitive exams by providing online lessons and specialized courses in multiple languages with some of the top educators so it can reach even the remotest corners of the country.
7. Udemy: Another educational app is the Udemy, an American Online Learning Platform particularly for professional learners. This is a global brand for learning and is helping individuals and also companies to be prepared for the ever-evolving future of work.
8. Duolingo: It is a unique learning app that helps individuals to learn different languages. One can also improve one's writing and communication skills through games and fun activities. It is a free app which can be downloaded from play store.
9. Khan Academy: This is a personalized learning app that empowers learners to study at their own pace in and out of classroom. It provides practice exercises, instructional videos, etc. in many school subjects from K-14 and also provides test preparation contents.
10. Learning radius: It is an effective learning app specially designed to provide comprehensive and appropriate current affairs notes to UPSC and other

administrative service aspirants. It not only provides currents affairs but also offers a last minute revision to recent developments.

1.1.8. Social Media Tools

Apart from the above mentioned platforms and apps, social media tools are also important as teaching and learning resources. Adoption of social media tools in education is a way of enhancing and providing learners the possibility of becoming independent learners. Frequently used social media tools, according to Liu (2009) were "Facebook, Forum, Blogging, YouTube, Podcasting, Twitter and Wiki". Integrating the emerging social media tools for teaching-learning purpose can make learning more accessible, interesting, engaging and interactive. "The future technology integration in education should focus on what students use instead of what the school wants them to use to guarantee maximum efficiency" (Liu, 2009, p. 113).

Technology plays an integral part of students' daily life and teachers will need to find ways of implementing these technologies into their classrooms.

1.2. Relevance of e-learning in teaching-learning process

In today's fast evolving knowledge economy, learning through technology is needed to face the present and the future challenges. e-learning is applied in education to enhance the quality of teaching and learning experiences of both the teachers and the learners. It provides learners the option for active participation. Technology plays a significant role in education and helps make instructional delivery effective and efficient, thus, ensuring effective learning outcomes. Gone are the days when having a computer with internet facility was considered a luxury. In the current context, it has become a necessity.

With rapid improvement and advancement of technology, careful selection and execution of emerging technology is required to engage learners for teaching and learning. e-learning is an alternative for educational delivery, specifically in the era of technological advancement and the unceasing quest for educational pursuit by students and teachers alike. The improvement of internet in India offered opportunities to learners as well as lifelong learners to access e-resources in various apps and platforms according to their specific needs. Teachers need to upgrade their skills and proficiency and develop desired attitude towards emerging educational technology. e-learning has become a major trend in learning and its appropriate use would determine learners' needs, desired learning

outcomes and lead to improvement in learners' academic performance and make radical changes in the traditional teaching-learning process. e-learning helps learners and instructors by providing well designed learning materials and accessible delivery method. As such, with e-learning, student-teachers have equal access to e-resources which aid in improving their teaching-learning competencies and technological skills and transforming the education process. It enhances the application of learner-centric teaching-learning methods and techniques. Through e-learning, teachers are able to assist their students with supplementary instructions outside the classroom. In doing so, teachers can deepen their own knowledge as lifelong learners.

1.3. Pandemic and e-learning

When schools were shut down due to COVID-19 Pandemic, most of the educational institutions turned to online classes for continuation of learning through ZOOM, Google Meet and other alternatives. It had undoubtedly been a difficult time for both teachers and students.

During the dark period of COVID-19, when educational institutions came to a halt and when teaching-learning process transitioned to online from face-to-face mode, it exposed the unfair technological disparity in education. Inequalities were seen in "the capacity of teachers, learning outcomes, digital infrastructure provided by the government and access to technology" (UNICEF & UNESCO, 2021, p. 14). Regardless of all the hardships faced, teachers have taken up the challenging role with the support from various stakeholders to continue learning.

Though the effort to expand and increase access to e-learning is impressive, yet several government school teachers and students lack the tools, infrastructure and capacity to be a part of the digitalization process, which are further hindered by poor electricity and poor network connection. According to the UNICEF study conducted in India in the year 2020, the top challenges experienced by teachers in online classes during the pandemic are as follows:

- 75% faced the inability to reach their students.
- 51% faced the problem of lack of discipline in online class.
- 12% were found to be lacking in e-skills.

- 7% spent additional expenditure.
- 8% of the teachers do not have a personal smart phone or laptop.
  (Source: UNICEF & UNESCO: India case study, 2021, p. 38)

Notwithstanding all the hurdles faced, majority of the teachers displayed their ability to quickly adopt and adapt technology-based teaching solutions and developed innovative ways to reach their learners. The invaluable role of teachers for wholesome development of students is acknowledged and therefore they must be trained and provided with all the required tools, knowledge and skills to carry out their responsibilities effectively. To address the complexity of remote learning, MHRD now called Ministry of Education, has initiated the PM eVidya to assist students, teachers, scholars as well as lifelong learners to pursue continuous education through digital/online/on-air education platforms. Teacher training courses, the Continuous Professional Development courses and enhancing pedagogical knowledge and skills can be accessed from the portal. Ministry of Education created a repository of learning content through implementation of EdTech to increase access to digital learning. Notable government e-learning platforms include Digital Infrastructure for Knowledge Sharing (DIKSHA), e-Pathshala, SWAYAM and the National Repository of Open Educational Resources (NROER) (UNICEF & UNESCO, 2021, p. 43). The e-learning platforms are for anyone, anywhere and anytime. Many of the apps, tools and platforms had been in use in education even before the Pandemic of COVID-19. However, the "Pandemic" had accelerated the usage of e-learning in "teaching and learning" process.

1.4. e-learning during the Pandemic in Nagaland

Along with the rest of the country, Nagaland also experienced the impact of COVID-19 Lockdown on education. The Department of School Education (DoSE) under the initiative of MHRD launched the Online Digital Education to ensure continuity of education during the lockdown. Initially pre-recorded lessons were broadcasted daily through Doordarshan and All India Radio (AIR). Moreover, all the videos that were telecasted were shared through YouTube channel and the Facebook page of the department (India Report: Digital Education, 2020, p. 127). The DoSE further developed the "Online Students Evaluation Portal" for which Nagaland is considered to be the first Indian state to introduce it for upper primary and secondary levels, to encourage students with continuous learning and not for formal evaluation (India Report: Digital Education, 2020, p. 128). Further, online

admissions in all the Government Higher Secondary Schools were also adopted. The department made efforts to face the various challenges during the lockdown by utilizing the services of few of the best teachers and making it available to all students across the State. This initiative has opened the avenue for sharing of knowledge between students from rural and urban areas in the State. It is worth mentioning that Nagaland is the 14th State in India to launch the Tele/Online education programme during the COVID-19 lockdown (India Report: Digital Education, 2020, p. 129). Even after lifting of the lockdown, the department proposes to carry forward these initiatives in future.

1.5. A brief profile of Nagaland

Nagaland is the 16th State of the Indian Union, inaugurated on 1st December, 1963 with its capital at Kohima. It is bounded by Assam on the West, Myanmar on the East, Arunachal Pradesh and part of Assam on the North and Manipur on the South. Nagaland has 16 administrative districts namely, Chumoukedima, Dimapur, Kiphire, Kohima, Longleng, Mokokchung, Mon, Niuland, Noklak, Peren, Phek, Shamator, Tseminyu, Tuensang Wokha and Zunheboto (as shown in Figure No.). The 16 districts are inhabited by 17 major tribes including Angami, Ao, Chakhesang, Chang, Kachari, Khiamniungan, Konyak, Kiki, Lotha, Phom, Pochury, Rengma, Sangtam, Sumi, Tikhir, Yimkhiung and Zeliang along with other sub-tribes. Each tribe has its own distinct characteristics in terms of customs, language and the intricately designed traditional attires and jewelleries (Profile of Nagaland, 2021). The districts of Nagaland are shown in Figure No. 1(b).

Based on the 2011 Census of Nagaland, the state is the most linguistically diverse state in India with 14 languages and 17 dialects. The State has an agrarian economy and practices both Jhum and Terrace cultivation. Nagaland's climate is pleasant with moderate and temperate climate throughout the year.

The total area of the State is 16,579 Sq. Kms with a total population of 19,78,502 as per the 2011 Census of India out of which 48.21% of the total population comprised of female and 51.69% are male. The sex ratio is 931 females per 1000 males.

As shown in Table No. 1.1 the Literacy rate of the State as per the 2011 Census of India is 79.55% with 82.75% male literacy rate and 76.11% female literacy rate (Statistical Handbook of Nagaland, 2016).

Table No. 1.1: LITERACY RATE OF NAGALAND AS PER 2011 CENSUS WITH RESPECT TO GENDER

Literacy Rate (Percentage %)	
Male	82.75%
Female	76.11%

(Source: Statistical Handbook of Nagaland, 2016)

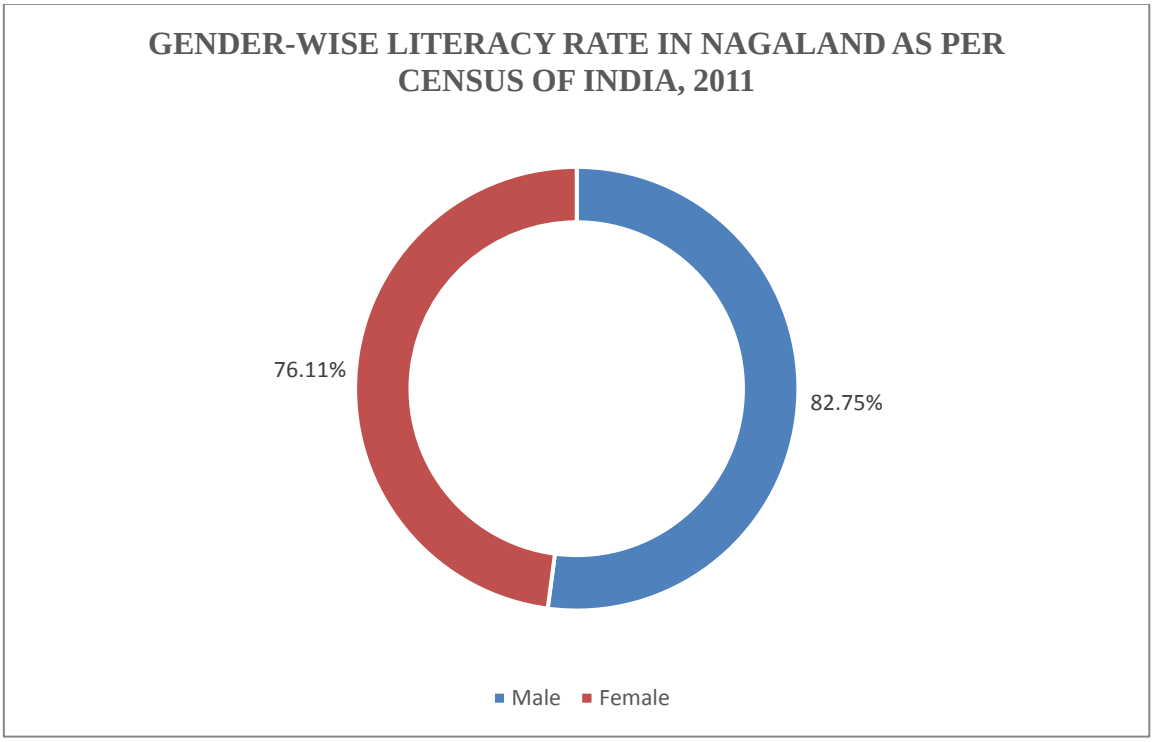

Figure 1(a). Gender-wise literacy rate in Nagaland as per Census of India, 2011.

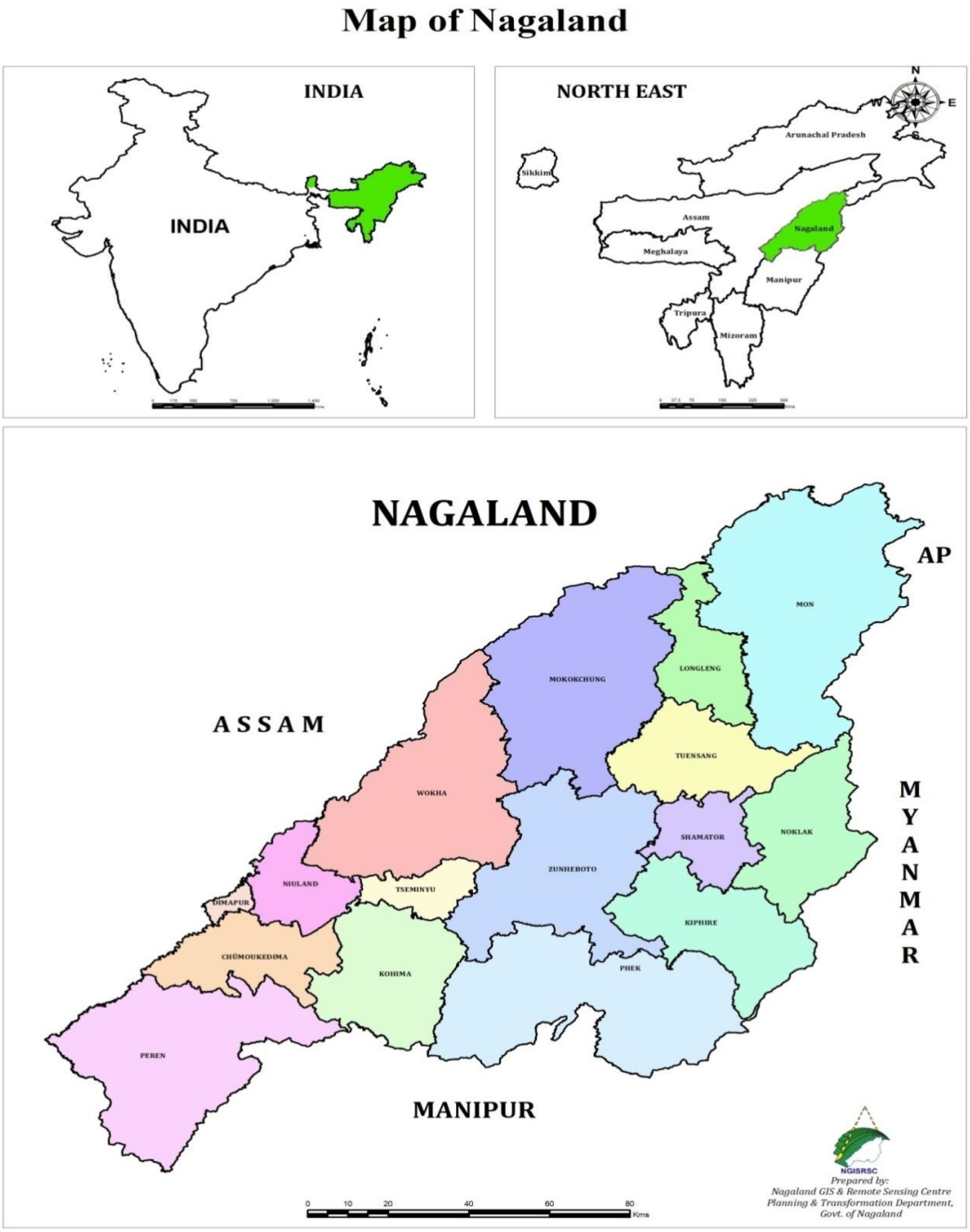

Figure No. 1(b): Map of Nagaland. (Source: Nagaland GIS & Remote Sensing Centre, Planning & Transformation Department, Kohima Nagaland).

1.6. Establishment of Teacher Education Colleges in Nagaland

Nagaland College of Education was the first teacher education institution established in 1975 at Kohima. The college, later called Nagaland College of Teacher Education-Kohima, was affiliated to North Eastern Hill University (NEHU) and offered B.Ed as well as Undergraduate Teacher Training (UGTT) courses. It was in 1995 that the affiliation was transferred to Nagaland University (NU) and in the year 1996, it was recognised by NCTE and was upgraded to the college of teacher education. The college was named State College of Teacher Education-Kohima in 2013. Salt Christian College of Teacher Education, Dimapur was the first private B.Ed. college that was established in 1995. Shortly afterwards, private colleges were established, affiliated to NU. At present, there are 2 Government B.Ed. colleges and 6 Private B.Ed. colleges. In the initial years, the B.Ed. course was of 1 year duration. And it was in 2015-16 that NCTE granted recognition for conducting B.Ed. programme of 2 years duration. The total lists of B.Ed. colleges of teacher education in Nagaland with the year of establishment and intake capacity per college are shown in Table No. 1.2. The locations of the B.Ed. Colleges are shown in Figure No. 1 (c).

Table No. 1.2: YEAR OF ESTABLISHMENT AND TYPE OF TEACHER EDUCATION COLLEGESS IN NAGALAND

Sl. No.	Name of the college	Year of establishment.	Type - Government/ Private
1.	State College of Teacher Education-Kohima	1975	Government
2.	Salt Christian College of Teacher Education	1995	Private
3.	Bosco College of Teacher Education	2003	Private
4.	Unity College of Teacher Education	2012	Private
5.	Sazolie College of Teacher Education	2010	Private
6.	Modern College of Teacher Education	2009	Private
7.	Mokokchung College of Teacher Education	2012	Government
8.	Mt. Mary College of Teacher Education	2016	Private

(Sources: i) Government Colleges-Department of Higher Education, Nagaland, Kohima

ii) Recognised Private Colleges-Department of Higher Education).

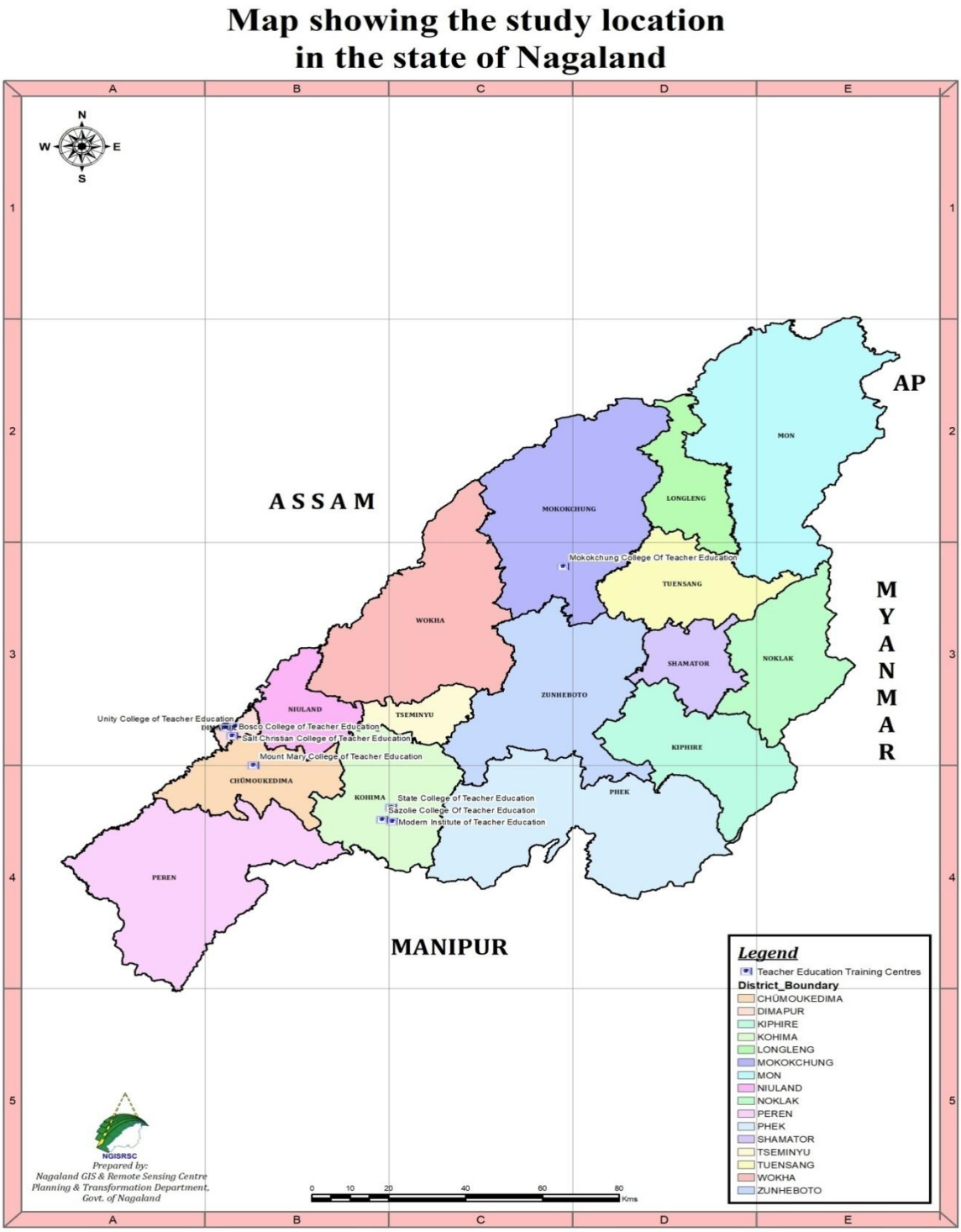

Figure No. 1 (c): Map showing the study location in the state of Nagaland. (Source: Nagaland GIS & Remote Sensing Centre, Planning & Transformation Department, Kohima Nagaland).

Table No. 1.3: NUMBER OF TRAINED AND UNTRAINED TEACHERS IN NAGALAND DURING THE YEAR 2013-2014

Category		Central Government	State Gover-nment	Private unaided	Total	Grand total (%)
Trained	Diploma (2 years)	7	1917	261	2185	8780 (30%)
	D.E1.Ed.	16	436	162	614	
	B.Ed.	175	1540	709	2424	
	M.Ed.	22	74	91	187	
	Others	25	2026	884	2935	
	Special Education	9	285	141	435	
Untrained	-	146	12140	8050	20336	20336 (70%)
		400	18418	10298	29116	29116 (100%)

(Source: Statistical Handbook of Nagaland, 2016)

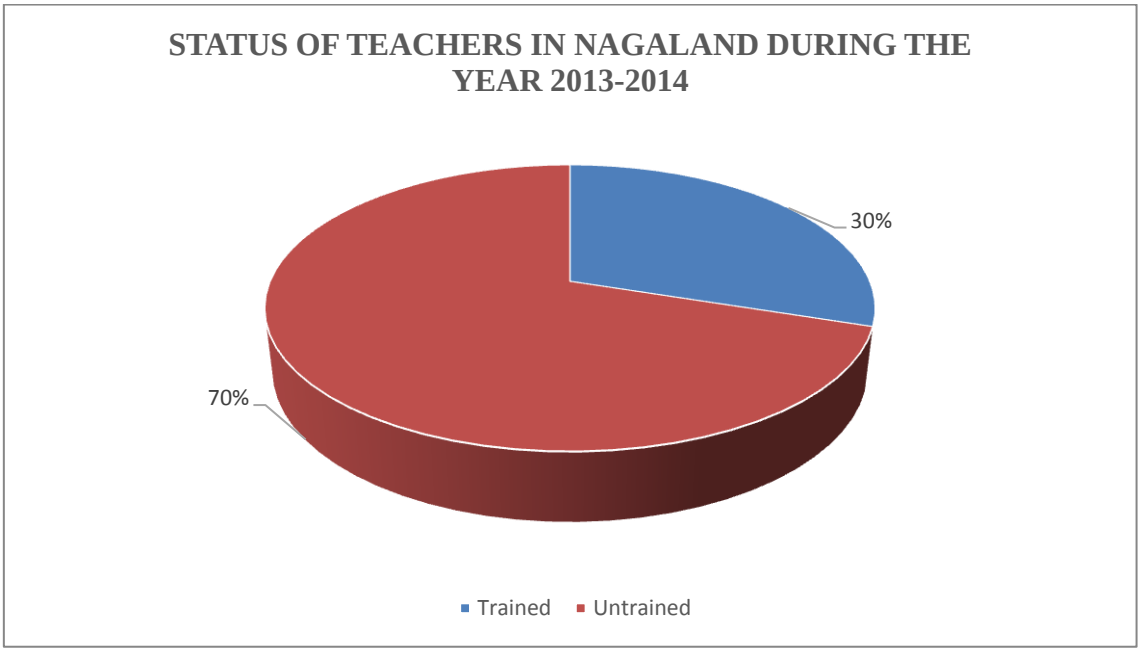

Figure No. 1 (d): Status of teachers in Nagaland during the year 2013-2014.

An analysis of the data given in Table No. 1.3 showed that still many teachers (70%) have to be trained and the teacher education institutions are not able to take in beyond the maximum number of seats allotted for each institution. In such a situation, e-learning comes to play a crucial role in organizing and planning programmes for training of teachers. Moreover, the NEP, 2020 had emphasized the use of technology platforms such as SWAYAM/DIKSHA for online training of in-service teachers. With the help of technology, standardized training programmes can be administered to large number of teachers within a short span of time (National Education Policy, 2020, p. 43). With the shift from conventional teaching-learning process to e-learning, it is hoped to bring about quality improvement and efficiency in the academic performance of the student-teachers. Teachers today need to have knowledge of ICT and technology for the classroom teaching-learning process and for their continuing professional development. Teachers now have to be e-capable and e-confident.

1.7. Attitude towards e-learning

Realizing the critical role of e-learning in the field of education in general and teacher-education in particular, it is essential to analyse the student-teachers' attitude towards it. Attitude is defined as a "tendency to react in a certain way towards a designed class of stimuli" (Anastasi, 1957 as cited in Ravikumar & Rajasekhar, 2017, p. 66).

"Attitude has been defined as a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's response to all objects and situations with which it is related" (Allport, 1935, as cited in Ravikumar & Rajasekhar, 2017, p. 66). "Attitude denote the sum total of a man's inclinations and feelings, prejudices or bias, pre-conceived notions, ideas, fears, threats and convictions about any specific topic" (Thrustone, 1974, as cited in Ravikumar & Rajasekhar, 2017, p. 66).

The three characteristics of attitude according to Altmann (2008) are:

- A mental state – conscious or unconscious;
- A value – belief and feeling; and

- A predisposition to behaviour or action.

These characteristics come under the three domains, that is, an attitude has a cognitive, affective and behavioural component. She further defined it as, "the critical attributes of an attitude are that it has a cognitive, affective and behavioural component; it is bipolar; and is a response to a stimulus" (Altmann, 2008, p-148). One can find a strong relationship between attitude and behaviour of an individual. There is a possibility that an individual's attitude would lead him/her to adopt certain behaviour whether positive or negative (Bertea, 2009). For a teacher to be e-capable and e-confidant, one must develop a positive attitude towards e-learning.

1.8. Academic Achievement

Academic achievement denotes performance outcomes that imply "the extent to which a person has accomplished specific goals that were the focus of activities in instructional environments, specifically in school, college and university" (Steinmayr et al., 2014). "Academic achievement is defined as the knowledge attained of skills developed in the school subjects, usually determined by test scores or marks assigned by teachers" (Dictionary of Education by Carter, 1959 as cited in Bhardwaj & Bhat 2014, p. 93). Educational or academic achievement is further defined as "specified level of attainment or proficiency in academic work as evaluated by the teachers, by standardized tests or by a combination of both" (Dictionary of Psychology by Chaplin 1959 as cited in Bhardwaj & Bhat 2014, p. 93). Academic achievement is also defined as "the extent to which a learner is profiting from instructions in a given area of learning, that is, achievement is reflected by the extent to which skill and knowledge has been imparted to him" (Crow & Crow, 1969 as cited in Chattopadhyay & Ghosh, 2018, p. 2083).

Academic achievement occupies an essential place in the area of education that indicates the current progress and level of a students' learning. By measuring and testing the academic achievement, it provides information about how far an individual student is progressing in his/her academic performance. It is regarded as the core of the education system since the academic accomplishment or failure of the students determines the quality and prestige of any academic institution. Walberg's research identified nine key factors that affect academic achievement: student ability, motivation, age/developmental level, instruction quantity, instruction quality, classroom climate, home environment, peer

group and exposure to mass media outside of school (Walberg et al., 1986 as cited in Subramaniam & Yasin, 2022); learning facilities, communication skills and proper guidance from parents are found to impact the academic performance of the students (Singh et al., 2016).

1.8.1. Types of Academic Achievement Tests

1. Standardized tests: A standardized test is any form of test that requires all test takers to answer the same questions, in the same way and is scored in a 'standard' or consistent manner, which makes it possible to compare the relative performance of individual student or group of students (The Glossary of Education Reform, 2015).
2. Teacher-made-tests: Teacher-made-tests are normally prepared and administered for testing classroom achievement of students, evaluating of method of teaching adopted and other curricular programmes of the school.

Standardized Test and Teacher-made-tests differ in the quality of test items, the reliability of test measures, the procedures for administering and scoring and interpretation of scores. No doubt, standardized tests are better in quality, more reliable and valid. However, a classroom teacher cannot always depend on it as they may not suit to the local needs, may not be readily available, may be costly and may also have different objectives.

1.8.2. Impact of e-learning on Academic Performance

Several studies revealed that e-learning tools and platforms enhances the academic performances of students as they are able to access global resources for their studies which makes their study "easier, comfortable and flexible" (Balakamakshi & Savithri, 2021). Zolochevskaya et al., (2021) confirmed that e-learning has beneficial impact on academic success of students as it provides better learning resources and facilities. Banda et al., (2021) concluded that e-learning have a positive impact on the students' academic performance as it is learner-centric and as such the students are motivated. E-learning not only helps improve academic performance but also offers an immense chance to learn at one's own pace and is possibly affordable and convenient than the conventional way of thinking.

1.9. Academic Stress

Academic stress as a result of e-learning has become a major concern in the academic community. Students as well as teachers are facing challenges to cope with stress related to e-learning. Recently, students and teachers have experienced the teaching-learning process through e-learning platforms worldwide due to the COVID-19 Pandemic. Even with the re-opening of educational institutions after the lockdown, e-learning is here to stay. It is essential, therefore, to understand academic stress in relation to e-learning.

Sathish & Subramanian (2021) asserted academic stress as a mental distress arising due to academic failure or some anticipated fear of academic failure among the students. Kadapatti & Vijayalaxmi (2012) defined academic stress as "a combination of academic-related demands that exceed the individual's adaptive resources". However, the stressors alone are not the single reason leading to stress; rather the combination of stressors and the person's approach and attitude to it usually causes stress. Moawad (2020) and Samudra & Matulessy (2021) agreed that sudden changes in the educational system can cause intense academic stress on students. Apart from the stress caused by e-learning, other academic stress namely, examinations, assignments, participation in extracurricular activities, pressure from teachers and parents to get good grades, peer pressure, lack of proper support from parents, teachers and peers, etc. add much pressure on the students.

Most often stress is considered bad, but the right amount of stress helps in sharpening the mind and reflexes. Mild stress is always essential for effective and efficient working. It can help one to meet daily challenges and can motivate students to reach their goals. Selye (1956) considered that the absence of stress in life is not good and that it is also has an active function (Lin & Chen, 2009). As such, stress can be divided into four major categories (Lin & Chen, 2009, p. 157):

i. Over stress: When the individual adjustment ability is outstripped, then overstress is produced.
ii. Under stress: Inefficient needs cause individual under stress and this lacks self-achieving desires.
iii. Good stress: Under the reaction to certain stress, individuals have a happy and satisfactory feeling

iv. Distress: this occurs often and easily causes illness. Individuals develop an unhappy feeling.

1.9.1. Impact of e-learning on Academic Stress

When stress due to e-learning is ignored for an extended period, it can lead to physical exhaustion, headaches, severe fatigue, etc. It can also cause computer eye syndrome, backache, shoulder pain, etc (Ramane et al., 2021). Continued e-learning stress can also harm mental health and lead to depression and anxiety, nervousness and trauma. 'Digital Fatigue', according to Dianne (2021) is linked to a lack of or inability to concentrate, lowering academic performance and data retention. Furthermore, when combined with tension and stress, it can lead to self isolation and poor social skills. AlAteeq et al. (2020) found that female and University students had a high level of stress due to attending virtual classrooms during COVID-19 outbreak. Kabir et al. (2021) revealed that majority of the students had moderate to high level of e-learning stress and higher level of e-learning readiness. Therefore, prolonged stress due to online learning can lead to academic stress in student-teachers.

1.10. Need and Significance of the Study

The role of e-learning in the academic field in general and in the teacher education programme in particular, cannot be evaded anymore. e-learning has gained an important place in the teaching-learning process and has provided opportunities and possibilities to both the teachers and the students to enhance their profession and academic career. Student–teachers now have to be well acquainted with the use of technologies. In order to do so, the attitude towards e-learning plays a major role in developing interest and motivation to effectively use new technologies in the profession. Moreover, the study of the attitude of student-teachers towards e-learning has become very important to gain valuable insights and understanding about its influence on the academic performance and academic stress among them. In doing so, the researcher hopes to enlighten the experiences of the student-teachers about the shift from conventional classrooms to the e-learning platforms. When the student-teachers are able to equip themselves with the knowledge and skills of technology based instruction and learning, it is believed that it may bring about significant positive changes and development in education.

1.11. Statement of the Problem

By investigating the attitude of student-teachers towards e-learning and the influence on their academic performance and academic stress in the context of Nagaland, the researcher hopes to find suggested solutions for improvement in Teacher Education Programme. Thus, the problem is stated as **"Attitude towards e-learning in relation to Academic Performance and Academic Stress among Student-Teachers of Nagaland"**

1.12. Operational Definition of the Terms Used

1. Attitude: An attitude is the tendency to react favourably or unfavourably towards a stimulus. In this study, it means the favourable or unfavourable reaction of student-teachers towards the use of e-learning in the B.Ed. colleges.
2. Student-teacher: Student-teacher includes the pre-service and in-service teachers undergoing Secondary Teacher Education course in the B.Ed colleges.
3. e-learning: e-learning is considered as an electronic based instruction and learning, giving opportunity to the learner(s) to learn anytime and anywhere.
4. Academic performance: Academic performance refers to stating or expressing the 4th Semester student-teacher's achievement or performance in the achievement test prepared by the researcher.
5. Academic stress: Academic stress is the mental and physical stress caused due to a shift from conventional classroom to e-learning platforms for instruction and learning among student-teachers.

1.13. Objectives of the Study

The following are the objectives of the present study:

1. To determine the significant difference among the student-teachers of Nagaland on attitude towards e-learning with respect to gender (male and female) and educational qualification (graduate and postgraduate).
2. To determine the significant difference in attitude of student-teachers toward e-learning with respect to the different pedagogy opted (language, social sciences, science and mathematics).
3. To assess the influence of attitude towards e-learning on academic performance of student-teachers of Nagaland.

4. To assess the influence of attitude towards e-learning on academic stress of student-teachers of Nagaland.
5. To determine the relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.
6. To determine the relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender, educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.
7. To determine the relationship between academic performance and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.
8. To determine the relationship among attitude towards e-learning, academic performance and academic stress of student-teachers of Nagaland.
9. To determine the interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.
10. To determine the interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.
11. To determine the interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

1.14. Hypotheses of the Study

The following hypotheses are formulated for the present study:

1. There is no significant difference in the attitude of student-teachers towards e-learning with respect to gender (male and female) and educational qualification (graduate and postgraduate).

   1.1. There is no significant difference in the attitude of student-teachers toward e-learning with respect to gender (male and female).

   1.2. There is no significant difference in the attitude of student-teachers toward e-learning with respect to educational qualification (graduate and postgraduate).
2. There is no significant difference in attitude of student-teachers toward e-learning with respect to the different pedagogy opted (language, social sciences, science and mathematics).
3. There is no significant influence of attitude towards e-learning on academic performance of student-teachers of Nagaland.
4. There is no significant influence of attitude towards e-learning on academic stress of student-teachers of Nagaland.
5. There exists no relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

   5.1. There exists no relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female) separately and of the total sample.

   5.2. There exists no relationship between attitude towards e-learning and academic performance of student-teachers with respect to educational qualification (graduate and postgraduate) separately.

   5.3. There exists no relationship between attitude towards e-learning and academic performance of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately.
6. There exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender (male and female), educational

qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

6.1. There exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender (male and female) separately.

6.2. There exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to educational qualification (graduate and postgraduate) separately.

6.3. There exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately.

7. There exists no relationship between academic performance and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

   7.1. There exists no relationship between academic performance and academic stress of student-teachers with respect to gender (male and female) separately.

   7.2. There exist no relationship between academic performance and academic stress of student-teachers with respect to educational qualification (graduate and postgraduate) separately.

   7.3. There exists no relationship between academic performance and academic stress of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately.

8. There exists no relationship among attitude towards e-learning, academic performance and academic stress of student-teachers of Nagaland.

9. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate), pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

   9.1. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female) separately and of the total sample.

   9.2. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) separately and of the total sample.

9.3. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

9.4. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female) and educational qualification (graduate and postgraduate) separately and of the total sample.

9.5. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

9.6. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

9.7. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

10. There is no significant interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate), pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

10.1. There is no significant interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female) separately and of the total sample.

10.2. There is no significant interactional effect on academic performance of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) separately and of the total sample.

10.3. There is no significant interactional effect on academic performance of student-teachers of Nagaland with respect to pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

10.4. There is no interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female) and educational qualification (graduate and postgraduate) separately and of the total sample.

10.5. There is no interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

10.6. There is no interactional effect on academic performance of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

10.7. There is no interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

11. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate), pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

    11.1. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female) separately and of the total sample.

    11.2. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) separately and of the total sample.

    11.3. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

    11.4. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female) and educational qualification (graduate and postgraduate) separately and of the total sample.

    11.5. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

    11.6. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to educational qualification (graduate and

postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

11.7. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

1.15. Delimitation of the Study

The present study is delimited to

1. Student-teachers of B.Ed. colleges of Nagaland.
2. The 4th Semester student-teachers.

1.16. Variables of the Study

The variables of the present study included the attitude towards e-learning, academic performance and academic stress. These variables were studied with regard to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics).

CHAPTER II

REVIEW OF RELATED LITERATURE

2.1. Introduction

Review of literature helps the researcher to carry out research investigation on the right track, organize the knowledge of the previous research done and integrate this knowledge to provide the rationale and justification for the current study. Review of literature "establishes the background in the field for the researcher and provides the reader a summary of the thinking and research necessary for them to understand the study" (Jha, 2011).

The investigator reviewed the related literature for the present study under three broad categories as given below:

i) Studies related to attitude towards e-learning.

ii) Studies related to attitude towards e-learning in relation with academic performance.

iii) Studies related to attitude towards e-learning in relation with academic stress.

2.2. Studies related to Attitude towards e-learning.

Merha & Omidian (2010) examined 400 postgraduate students' attitude towards adopting e-learning from the Punjab University. The technology acceptance model was employed to collect data. The study revealed that most of the students' attitude towards e-learning was positive. They also perceived e-learning to be useful and intended to adopt e-learning in the learning process.

Kumari (2013) studied the attitude towards ICT of the secondary school science teachers in Shillong with respect to gender. The sample included 52 secondary school teachers selected through random sampling technique and data was gathered through self constructed attitude scale. The findings depicted no significant variation in the attitude towards ICT between male and female science teachers. Science teachers had positive attitude towards ICT and were also found confident in using the tools. When ICT tools were applied in the science class, the teaching-learning process was found to be effective.

Srivastava (2013) measured the attitude towards e-learning of 100 B.Ed. students of Varanasi. Experiences with and perceptions of ICT and e-learning survey for students was

employed for data collection. The findings revealed that B.Ed. students had high and positive attitude towards e-learning and it did not differ between male and female B.Ed. students.

Kar et al. (2014) measured 308 university students' attitude towards e-learning in West Bengal in respect to gender and stream of study. It also analyzed the interactional influence of the variables. The e-learning attitude scale self-constructed by the researcher was administered for data collection. The result revealed high attitude level among the students towards e-learning. Further, no significant difference was indicated in gender and stream in the attitude towards e-learning. The mean scores of female students had marginally higher attitude level than the male students; science students had higher attitude towards e-learning then arts students; and gender and stream had no interactional influence on the attitude towards e-learning.

Rhema & Miliszewska (2014) studied the overall attitude of engineering students towards e-learning based on gender differential. The sample included 348 and data was collected through a paper-based questionnaire developed by the researchers. The research indicated that overall, the students had positive attitude towards e-learning, and believed in its benefits. Though satisfaction with technology was low due to serious disruptions in the educational infrastructure, yet they expressed interest in studying courses that use e-learning. The study further did not find noteworthy difference between male and female students in the levels of attitude towards ICT and e-learning.

Subramani (2014) examined the differences in attitude of 700 higher secondary teachers towards e-learning with regard to gender and stream. Attitude towards e-learning Scale developed by Suresh and Ananthi (2012) was applied for data collection. Male and female teachers did not differ significantly in their attitude towards e-learning. Slightly higher attitude among male teachers towards e-learning was found compared to female teachers. Considerable difference between science and arts teachers in their attitude towards e-learning was indicated. Science teachers' attitude towards e-learning was found higher than arts teachers.

Basu & Ahmad (2016) compared 60 higher secondary school teachers' attitude towards ICT based on the different subjects taught. The researcher's self constructed tool was used and established that science teachers had higher favourable attitude towards using new technology than the arts teachers.

Behera et al. (2016) studied the attitude of B.Ed. students of Purulia district of West Bengal towards e-learning. Purposive sampling technique was deployed to select the B.Ed.

colleges and stratified random sampling for selecting 230 B.Ed. student-teachers. An Attitude scale was utilized for data collection. The study depicted moderate level of attitude towards e-learning among B.Ed. student-teachers. No difference in attitude towards e-learning was reported between male and female as well as arts and science student-teachers.

Kant (2016) investigated the attitude of 60 secondary school teachers towards the use of new technology with respect to gender and it influence on teaching effectiveness. Attitude towards using new technologies scale designed by Dr. S. Rajasekhar was administered for the study. The researchers observed no gender difference. Nevertheless, male teachers indicated higher attitude and positive relationship between use of new technology and teaching effectiveness as compared to their female counterpart. The relationship between attitude towards use of new technology and teaching effectiveness among teachers showed no difference.

Kumar (2017) conducted a study in Punjab and examined 100 teacher educators' attitude towards e-learning with respect to gender. A self-prepared questionnaire was administered. The findings concluded that teacher educators had positive attitude towards e-learning. Additionally, the gender-wise comparison of attitude of teacher educators did not differ towards e-learning.

Thakkar & Joshi (2017) investigated the diploma engineering students' attitude towards e-learning. 56 students were the respondents selected with the help of self prepared online survey questionnaire. The findings depicted that there was a high positive attitude towards the usage of e-learning. Additionally, the attitude was not affected by differences in gender of students.

Gupta (2018) studied the attitude of 400 secondary school students and 200 teachers towards ICT and its influence on the learning styles. The tools used for the investigation were self prepared Attitude Scale related to ICT for teachers and students. The study concluded that ICT based projects have affected the process of education, made curriculum transaction more effective by using interactive whiteboards and technology integrated content delivery in the classroom. The attitude of teachers towards using ICT was found favourable but a good percentage of teachers' attitudes are still average or low. Lack of proper training facilities, insufficient infrastructure for ICT and absence of well defined policies regarding the use of ICT projects promotes unfavourable attitude towards use of ICT among teachers and students. However, the teachers unanimously agreed that ICT based projects have positively affected various domains of teaching-learning styles.

Kumar (2018) examined the attitude of 600 B.Ed. students towards ICT with respect to gender and its relationship with academic achievement. A modified tool on B.Ed. student-teachers' Attitude towards New Technology was developed for the study. The study inferred that B.Ed. student teachers have positive attitude towards ICT. Gender had significant variation in attitude towards ICT. Female student teachers were found to have higher positive attitude towards ICT and higher academic achievement as compared to male student teachers. Significant positive correlation was also established between academic achievement and attitude towards ICT of B.Ed student teachers for the total sample. Positive and significant relationship between academic achievement and attitude towards e-learning among male as well as female student teachers was depicted.

Madhusudhan (2019) analyzed the attitude of postgraduate students on cyber resources on the basis of gender. Descriptive survey method was made use of for studying 441 postgraduate students. The study employed Attitude towards cyber resources standardized by Dr. Rajasekhar (2010). The findings concluded that the postgraduate students have neutral attitude and interest towards cyber resources and often utilize the cyber resources. Gender differed considerably in the attitude towards e-learning. The Female students had high positive attitude towards cyber resources than male students.

Sarkar (2019) compared the perception of secondary teachers towards use of ICT as an instructional tool with regard to gender and subject streams. The research design adopted was survey method. 168 teachers were taken as sample by the multi-stage stratified random sampling technique. Teachers' ICT perception tool was constructed by the researchers to collect the data for the study. The findings indicated that the Secondary teachers' perception towards use of ICT did not differ significantly with respect to gender and subject streams (science, social sciences and language). High level of appreciation for ICT use was observed among the teachers.

Mahapatra (2021) analyzed the attitude towards e-learning among 30 postgraduate students with respect to gender and stream. The researcher used descriptive research design and a Study of e-learning Scale self-developed by the researcher was administered for collecting the data. The result showed no difference in attitude towards e-learning with respect to gender and between science and arts postgraduate students. However, the mean scores indicated that the male postgraduate had higher attitude towards e-learning than the female postgraduate students.

Mahato et al. (2021) carried out an investigation in Purulia district in West Bengal and analyzed 148 postgraduate students' attitude to blended learning. A self-constructed

questionnaire, The Attitude towards Blended Learning was used. The findings inferred that the postgraduate students' attitude was moderate towards blended learning. No variation was observed between male and female postgraduate students in their attitude towards blended learning. Science students were found to have more positive attitude as compared to students belonging to arts stream.

Thirumoorthy & Arun (2021) examined the attitude of 186 B.Ed. and M.Ed. students in Coimbatore towards e-learning with respect to gender, educational qualification (postgraduate and graduate) and faculty (science and arts). A simple normative sampling technique and snow ball sampling technique were applied. The Test of e-learning Related Attitudes Scale developed and standardized by Kisanga and Ireson (2016) was utilized. The result revealed that both the B.Ed. and M.Ed. student teachers have favourable attitude towards e-learning. No distinguished difference was observed in the attitude of student teachers towards e-learning in relation to gender, educational qualification and faculty.

Kripalani & Nagar (2023) explored the influence of stream and their interaction on attitude towards e-learning among higher secondary school teachers. The study concluded that the teachers of stream did not vary significantly in their attitude towards e-learning.

Talluri (2023) assessed 100 B.Ed. students' attitude towards e-learning with respect to gender and subject. A self-prepared questionnaire was administered for the study. The result showed that gender and stream differed significantly in their attitude towards e-learning. Male B.Ed. student teachers had higher attitude towards e-learning than the female student teachers. Moreover, arts student teachers had higher attitude towards e-learning than the science student teachers.

Hamzaoui (2024) examined the impact of e-learning on 30 students' academic performance in English as a Foreign Language. This investigation made use of a case study method. The researcher self-constructed an online questionnaire to gather the perception of the students towards use of e-learning and its effects on the academic performance. The findings confirmed that academic performance of the students was positively influenced by e-learning. e-learning was depicted as a better option than traditional learning in fulfilling the academic success of the students.

Panda & Neha (2024) investigated the attitude of 100 secondary school teachers towards bichronous online learning in relation to gender. An Attitude Scale for collecting the data was constructed. The results established a considerable difference in attitude towards bichronous online learning between male and female teachers. Attitude of male teachers towards bichronous learning was depicted to be higher than the female teachers.

This confirmed that attitude of teachers towards bichronous leaning was strongly influenced by gender difference.

Sattanathan (2024) analyzed the attitude of 200 B.Ed. trainees towards e-learning with respect to gender, educational qualification and subject. A self developed questionnaire Attitude towards e-learning Scale was used for the study. The study indicated no noteworthy difference in attitude towards e-learning between male and female trainees. Male trainees had higher attitude than female trainees towards e-learning. Notable variance was observed between undergraduate and postgraduate trainees and also among language, arts and science trainees' attitude towards e-learning. Undergraduate trainees had higher attitude than postgraduate trainees towards e-learning. Science trainees' attitude towards e-learning was found to be higher than the language and arts trainees.

Table No. 2.1: SUMMARY OF RESEARCH STUDIES ON ATTITUDE TOWARDS e-LEARNING

Sl. No.	Researcher(s) and Year	Major Focus	Major Findings
1.	Merha & Omidian (2010)	Postgraduate students' attitude towards adopting e-learning.	Found to have positive attitude in adopting e-learning.
2.	Kumari (2013)	Science teachers' attitude towards ICT on the basis of gender.	Positive attitude towards ICT was observed. No difference in attitude was observed in terms of gender towards ICT.
3.	Srivastava (2013)	B.Ed. students' attitude towards e-learning.	High and positive attitude was observed. No difference between male and female students in their attitude towards e-learning.
4.	Kar et al. (2014)	University students' attitude towards e-learning on the basis of gender, stream of study and their interactional influence.	High attitude level towards e-learning among students. Female students had higher attitude towards e-learning than male students.

			Science students had higher attitude than arts students towards e-learning.
5.	Rhema & Miliszewska (2014)	Attitude towards e-learning on the basis of gender.	Revealed overall positive attitude towards e-learning. Male and female students did not differ in their attitude towards e-learning Notable variation in levels of attitude towards e-learning was not shown.
6.	Subramani (2014)	Attitude of higher secondary teachers towards e-learning on the basis of gender and stream.	Attitude towards e-learning did not differ between male and female teachers. Significant difference was indicated between arts and science teacher. Science teachers had higher attitude than arts teachers towards e-learning.
7.	Basu & Ahmad (2016)	Subject-wise secondary school teachers' attitude towards ICT.	Science teachers' attitude was higher than arts teachers' towards e-learning.
8.	Behera et al. (2016)	B.Ed. students' attitude towards e-learning based on gender and subjects.	Moderate attitude level towards e-learning. No significant difference in attitude towards e-learning among gender and subjects.
9.	Kant (2016)	Gender differential in Secondary school teachers' attitude towards use of new technology and its influence on teaching effectiveness.	Attitude towards use of new technology did not have significant gender variations. Male teachers possessed higher attitude than female teachers

			towards new technology and teaching effectiveness. No significant relationship between attitudes towards use of new technology and teaching effectiveness among teachers.
10.	Kumar (2017)	Gender differential of teacher educators' attitude towards e-learning.	Found positive attitude towards e-learning. No gender difference in the attitude of teacher educators towards e-learning.
11.	Thakkar & Joshi (2017)	Attitude towards e-learning with respect to gender.	High positive attitude towards e-learning was indicated. Attitude did not differ by gender.
12.	Gupta (2018)	Secondary school students and teachers' attitude towards use of ICT and its influence on teaching-learning styles.	Favourable attitude towards use of ICT among students and teachers. Positive influence of ICT on teaching-learning process.
13.	Kumar (2018)	Gender differential in B.Ed. students' attitude towards ICT in relation to academic achievement.	Attitude towards ICT was found positive. Higher attitude was indicated in female B.Ed. students. Positive relationship was established between ICT and academic achievement.
14.	Madhusudhan (2019)	Postgraduate students' attitude towards cyber resources with regard to gender.	Postgraduates had neutral attitude towards cyber resources. Considerable gender difference in attitude was indicated

			towards cyber resources. Female postgraduates had high attitude towards cyber resources than male students.
15.	Sarkar (2019)	Perception of secondary teachers towards use of ICT with regard to gender and stream.	Gender and stream did not differ in the perception of ICT.
16.	Mahapatra (2021)	Attitude of postgraduate students towards e-learning on the basis of gender and stream of study.	Significant variation in gender and stream of study was not found in the attitude towards e-learning. Male students had marginally higher attitude towards e-learning than female students.
17.	Mahato et al. (2021)	Attitude of postgraduate students towards blended learning.	Attitude towards blended was moderate. Difference in attitude towards blended learning was not established in gender. Science students had higher attitude towards blended learning than arts students.
18.	Thirumoorthy & Arun (2021)	B.Ed. and M.Ed. students' attitude towards e-learning with regard to gender, educational qualification and stream.	Favourable attitude was found towards e-learning. Noteworthy difference in attitude was not depicted towards e-learning on terms of gender, educational qualification and stream.
19.	Talluri (2023)	Attitude towards e-learning of B.Ed. students on gender and	Male student teachers had higher attitude towards e-

		subject basis.	learning than female student teachers. Arts student teachers had higher attitude than science student teachers towards e-learning.
20.	Kripalani & Nagar (2023)	Influence of stream and their interaction on attitude of higher secondary school teachers towards e-learning.	Stream did not have influence on attitude towards e-learning.
21.	Hamzaoui (2024)	Influence of e-learning among English as a Foreign Language students' academic performance.	Academic performance was positively influenced by e-learning. e-learning was accepted as a better method than the traditional learning in improving academic performance.
22.	Panda & Neha (2024)	Attitude of secondary school teachers towards bichronous online learning.	Favourable attitude towards bichronous online learning was revealed. Gender differed notably on bichronous learning. Male teachers had higher "positive attitude" than female teachers towards bichronous learning.
23.	Sattanathan (2024)	Attitude of B.Ed trainees towards e-learning with respect to gender, educational qualification and subject.	Male and female trainees did not differ in their attitude towards e-learning. Undergraduate trainees had higher attitude towards e-learning than postgraduate

			trainees. Science trainees had higher attitude towards e-learning than language and arts trainees.

Table No. 2.1 indicated that a considerable amount of studies have been carried out on the attitude towards e-learning. It was inferred that maximum studies were conducted to find out the level of attitude towards e-learning based on gender differential; some studies were on both gender and stream; and a few studies were on gender, stream and educational qualification. Only a few studies were undertaken to find out the interactional effect between attitude towards e-learning and academic performance and attitude towards e-learning and academic stress.

Survey research method was used most often in the studies. The most widely applied sampling techniques were the simple random, purposive and stratified sampling techniques. The greater number of the research instrument administered was the self-prepared questionnaire. All the findings from the review showed positive attitude towards e-learning. Studies carried out by Kumari (2013), Srivastava (2013), Kar (2014), Rhema & Miliszewska (2014), Subramani (2014), Behera et al. (2016), Kant (2016), Kumar (2017) Thakkar & Joshi (2017), Sarkar (2019), Mahapatra (2021), Mahato et al. (2021), Thirumoorthy & Arun (2021) and Sattanathan (2024) depicted no significant differences in gender influencing the attitude towards e-learning. However, in contradiction to these findings, researches conducted by Kumar (2018), Madhusudhan (2019), Talluri (2023) and Panda & Neha (2024) established significant differences in gender.

Studies done by Kumari (2013), Kar (2014), Behera et al. (2016), Sarkar (2019), Mahapatra (2021) and Thirumoorthy & Arun (2021) indicated no significant differences in the stream in their attitude towards e-learning. Whereas, researches carried out by Subramani (2014), Mahato et al (2021), Kripalani & Nagar (2023), Talluri (2023) and Sattanathan (2024) showed notable differences in stream on the attitude towards e-learning.

The result of Thirumoorthy & Arun (2021) revealed that educational qualification did not differ in the attitude towards e-learning. In contradiction, Sattanathan (2024) established significant variation in attitude towards e-learning with regard to educational qualification.

2.3. Studies related to Attitude towards e-learning in relation to Academic Performance

Assumi (2014) investigated the attitude of 377 secondary school students towards computer education in relation to the academic achievement. The respondents were selected from Dimapur through simple random and stratified sampling technique. A standardized Computer Attitude Scale constructed by Dr. Tahira Khatoon and Manika Sharma was employed. The study revealed no gender-wise differences in their attitude towards computer education or in their academic achievement.

Neema-Abooki & Kitawi (2014) conducted an investigation among 50 students at Strathmore University, Kenya. The researchers examined the effectiveness of e-learning strategies on academic performance of the students. Longitudinal survey method was utilized and the respondents were engaged through self prepared Online Statistics on Usage of e-learning questionnaire for gathering data. For the academic performance, the examination result for the same semester was used. The results inferred that e-learning contributed to positive improvement of students' academic performance; motivated teaching and learning, although it still required room for improvement; and aided in successfully achieving the course objectives.

Mothibi (2015) assessed the impact of e-learning on the students of higher education's academic achievement. A meta-analysis methodology was adopted and systematic sampling technique with 15 research studies conducted during 2010 and 2013 were chosen. The study indicated that e-learning has a positive impact on students' overall academic achievement. The study further revealed that adequate and sufficient ICT facilities can facilitate improved learning and lead to success in academic achievement.

Basundhara (2017) adopted experimental methodology to study the relationship between pedagogy of chemistry and students' achievement outcome. 141 students were randomly chosen for the sample. Computer Simulation Chemistry Modules, Achievement Tests and Attitude Scale were tools self-developed by the researcher. The results found that learners had positive attitude towards computer simulation in learning chemistry, which increased their academic achievement. The study also concluded that integrating

computer simulation with traditional Chemistry, especially with practical Chemistry, is a better Pedagogical Approach for Higher Secondary teaching-learning Chemistry.

Shakuntala (2017) explored the relationship between availability of assistive technology and academic achievement; between teachers' awareness of assistive technology and academic achievement; and between usage of assistive technology and academic achievement among hearing impaired students. The research work adopted the descriptive method and 113 teachers and 864 students were selected. Self constructed test of Teachers' Awareness of Assistive Technology for Hearing Impaired School Teachers was distributed for data collection. The result revealed a positive and high correlation between availability of assistive technology and academic achievement; between teachers' awareness of assistive technology and academic achievement; and between usage of assistive technology and academic achievement among hearing impaired students. Therefore, the availability, teachers' awareness and usage of assistive technology positively impact the academic achievement of hearing-impaired students.

Alsamadani (2018) investigated the effectiveness of students' writing skills through online blogging. An experimental method was employed consisting of 40 male undergraduates for sample. The respondents were exposed to blogging materials to test their writing skills. The findings concluded that Blogging-based writing practice is more participatory and interactive and effectively improved the students' writing skills.

Jan & Mattoo (2018) measured the attitude of 450 research scholars from University of Kashmir towards e-learning. Attitude towards e-learning Scale standardized by Dimpal Rani 2016) was made use of for the study. The researchers concluded that research scholars have high attitude towards e-learning. However, male and female research scholars do not have significant influence on attitude towards e-learning. Scholars from arts, science and social sciences had significant influence on the attitude towards e-learning yet the Post hoc analyses found no difference of influence on attitude towards e-learning of the research scholars. Nevertheless, e-learning profoundly enhanced the performances of the research scholars by helping them do more research activities in less time.

Pratiksha & D'Souza (2018) examined the effect of academic stress on academic achievement of 110 school students from Mysuru, Karnataka. Academic stress Inventory constructed by Lin and Chen (2009) was administered and for the achievement scores, the students' marks were used. The researcher established that stress was negatively related to achievement of the students. It was observed that when the stress level increased, the

academic achievement of the students decreased. There was no notable variation with respect to gender on the academic stress.

Blihi (2019) studied the effectiveness of blended learning on written expressions and achievement in English grammar on 80 randomly selected students with respect to gender. The experimental design was adopted. The Written Expression Test and The Test of Achievement in English Grammar were self-prepared by the researcher. The results found that Blended Learning approach was more effective than traditional method in improving written expressions and enhancing achievement in English Grammar and also in enhancing interest in English, irrespective of gender among the Undergraduate students.

George (2020) compared the influence of e-learning and traditional learning on the academic performance of 466 students from 11^{th} standard with respect to method of teaching and gender. A study material and an achievement test on 11^{th} standard physics were developed. The findings concluded that the achievement level of e-learning students was more than the traditional learning students irrespective of gender differences. There was interactional effect of the methods of learning (traditional learning and e-learning) on academic performance. Male students preferred traditional learning while female students preferred e-learning.

Jawad & Shalash (2020) assessed the influence of e-learning on the academic performance among 382 Al-Quds Open University students. The students' GPA in the first and second semesters was taken to determine their academic achievement status. The analysis revealed that the implementation of e-learning strategy had a significant and positive impact on students' academic achievement between male and female students. It showed that academic achievement of male students was higher than female students when e-learning was adopted.

Udayakumar (2020) analyzed the views of teachers in using e-lesson packages and determined the influence of e-lessons on the pass percentage of students. The survey method was employed and 911 students and 85 faculty were taken for the sample through the purposive sampling technique. Two self-developed questionnaire separately for students and faculty were designed. The study inferred that the students could better comprehend the lessons due to animation and visual effects in e-lessons. The students could contact their teachers even after class hours to clear their doubts. e-lessons could stimulate the students' interest; improve attention span; the students were satisfied with the e-contents and also highlighted that e-courses are clearly outlined in the syllabus. It was further showed that e-lessons could help students do better in the examination. The study

further indicated that the faculty agreed on the relevance, logic, confidence, adequacy and convenience in handling e-lessons. The faculty found e-resources sufficient, user-friendly and helpful in effectively transacting lessons.

Balalakhsmi & Savithri (2021) highlighted the impact of e-learning on the college students' academic performance. The methodology adopted for the study was empirical in nature. 250 female students were chosen following the convenient sampling technique. The tool administered was a self constructed pre tested structured questionnaire. The study indicated that e-learning provides for effective time management and motivates students to learn independently. e-learning also helps students to access unlimited resources at affordable costs.

Davis (2021) studied the attitude towards ICT usage among 300 students, 150 teachers and 10 principals. The researcher constructed three questionnaires, one each for the students, teachers and principals. The findings depicted that ICT utilization enhanced learning and led to enhancement of academic performance. The students and teachers had positive attitude towards use of ICT. It was also found that the male students and teachers use ICT more than the female students and teachers.

Gautam et al. (2021) explored the level of stress among the undergraduate students from medical college. A cross-sectional web-based online survey method was adopted and a sample comprising of 100 students was employed through convenient sampling technique. Responses were gathered through a self designed questionnaire. The result established that online teaching was more helpful in learning physiology theory than practical. The students experienced stress due to internet connectivity and the pandemic affecting their regular life. However, most students felt that online classes have helped them remain positive and motivated to study.

Parveen (2021) highlighted a comparative study on the opinion of the secondary students with regard to smart classroom and traditional classroom and its effect on their academic performance. Purposive sampling technique was utilized for selecting the 1181 representatives for the sample. The tools self developed by the researcher were the Perception Scale of Smart Classroom and Perception Scale of Traditional Classroom. The findings observed higher understanding level and higher academic achievement scores among students in smart classroom as compared to the students in traditional classroom. As for the academic achievement scores among the students of smart classroom, no gender difference was indicated. However, among the students of the traditional classroom, female students had higher academic achievement scores than the male students.

Bhurisrestha & Sharma (2022) explored the influence of e-learning among 100 higher secondary students' academic performance based on gender. A self prepared questionnaire on the impact of e-learning on the academic achievement was administered for data collection. The result established that male higher secondary students had higher attitude towards e-learning and higher academic achievement as compared to their female counterpart. Moreover, e-learning had a positive impact on the academic achievement of the students. The study further revealed that the impact of e-learning on academic achievement was observed more on male students than the female students.

Charles et al. (2022) assessed the effect of e-learning on the academic performance of students at the Open University of Tanzania. The researchers utilized the convergent method and included 262 students, 30 teachers and 1 director of quality assurance, 1 director of examination syndicate and 5 instructional designers as representative sample by the stratified simple random sampling and purposive sampling techniques. Research tools consisted of interview guides and document analysis schedule. Result showed that e-learning negatively influenced the academic performance of the students. Academic performance and e-learning did not differ.

Khanam (2022) analyzed ICT utilization and its impact on the learning effectiveness in the B.Ed. colleges. The study made use of descriptive survey method and a sample of 269 students and 60 teachers were selected using simple random and purposive sampling techniques. Two self designed questionnaires on the use of ICT in the course were employed, one for the students and another for the teachers. The study established that using ICT made learning easy and effective, could update knowledge and improved academic achievement. However, negative effects like inadequate infrastructural facilities, lack of technical support and insufficient trained teachers, inaccessibility to ICT tools and the excessive technology usage reportedly led to health issues.

Maharani et al. (2022) investigated the influence of e-learning on 50 students' academic performance in Indonesian Language subject. As for the research instrument, the Technology Acceptance Model theory was administered. The findings revealed that students' academic performance was positively influenced by online learning. The relationship between e-learning and academic performance was also found to be positive.

Sikder et al. (2022) measured the level of attitude of students towards e-learning, compared it with regard to gender and stream of study. It further analyzed the influence of academic achievement and the attitude towards e-learning. The survey method was applied and 300 respondents were chosen by employing the purposive sampling technique.

Notable variation was observed between male and female students in their attitude towards e-learning. The researchers inferred that male learners had higher attitude than female learners. The study also revealed that science learners had significantly higher attitude towards e-learning than the arts learners. Noteworthy relationship was indicated between learners' academic achievement and attitude towards e-learning. It was clearly depicted that higher the attitude towards e-learning, better the academic performance of the learners.

Suresh et al. (2022) studied the undergraduates at Nankai University in China and explored the impact of e-learning on their academic achievement. The descriptive method of research was employed and responses were taken from 361 students who were purposively engaged and administered self developed questionnaire. The researchers inferred that e-learning is positively and significantly associated with academic performance of the undergraduates. The study also revealed that the improvement in e-learning efficiency increased the academic performance, learning process and self-advancement of the students.

Kevin (2023) analyzed the influence of e-learning among the school students of Uganda on academic performance. For the particular study, the researcher adopted the desktop research methodology. For data collection procedure, it relied on published studies, reports and statistics. The findings established that e-learning had quite an influence on academic performance of the school students. It enhanced students' motivation and engagement, improved critical thinking and problem solving skills and communication skills of the students. Therefore, e-learning improved the academic performance of the students to a large extent.

Soh et al. (2024) assessed the perception of undergraduate students on learning performance, flexibility and study-life balance. A survey method was deployed and a sample of 207 students was engaged through purposive sampling technique. A survey developed by Abdullah et al. (2020) was administered to the respondents for gathering data. The results showed high relationship between learning performance and flexibility; between learning performance and study-life balance; and flexibility and study-life balance. The study further established a strong relation between learning performance with flexibility and study-life balance.

Table No. 2.2: SUMMARY OF RESEARCH STUDIES ON ACADEMIC PERFORMANCE

Sl.No.	Researcher(s) and Year	Main Focus	Major Finding(s)
1.	Assumi (2014)	Effect of attitude towards computer education on academic performance among secondary school students.	Positive relationship was observed between attitude towards computer education and academic performance. No gender variation was indicated in the attitude towards computer education and academic performance.
2.	Neema-Abooki (2014)	Effectiveness of e-learning strategies on academic performance.	Positive influence of e-learning on academic performance was established.
3.	Mothibi (2015)	Influence of e-learning on the higher education students' academic performance.	e-learning had positive influence on students' academic performance.
4.	Basundhara (2017)	Impact of attitude towards computer simulation on academic achievement.	Computer simulation increased the academic achievement.
5.	Shakuntala (2017)	Availability, teachers' awareness and usage of assistive technology in relation to academic performance of hearing impaired students.	Positive and strong correlation was indicated in the availability, awareness and usage of assistive technology by teachers on academic performance of students.
6.	Alsamadani (2018)	Effectiveness of online blogging on writing skills.	Blogging based writing improved writing skills.
7.	Jan & Mattoo (2018)	Attitude of research scholars towards e-learning with	High level of attitude towards e-learning was observed.

		respect to gender and subject.	Male and female scholars did not differ in their attitude. Considerable influence was indicated among arts, science and social sciences scholars in their attitude.
8.	Pratiksha & D'Souza (2018)	Influence of academic stress on academic performance.	Academic stress had negative influence on academic performance. No gender differential was indicated on academic stress.
9.	Blihi (2019)	Effectiveness of blended learning on achievement in English grammar on the basis of gender.	Effective in improving the achievement in English grammar irrespective of gender.
10.	George (2020)	Comparison of e-learning and traditional learning method on academic performance in reference to gender.	Irrespective of gender differences, the achievement level was higher in e-learning method than the traditional learning method. Interactional effect was found in method of learning on the academic performance.
11.	Jawad & Shalash (2020)	Impact of e-learning on academic performance.	Observed positive impact of e-learning on academic performance. Male students' performance was higher than the female performance when e-learning was adopted.
12.	Udayakumar (2020)	Teachers' perception on e-lesson packages and its influence on academic	Teachers found e-resources effective in transacting lessons. Student did better in

		performance of students.	examination with the help of e-lessons.
13.	Balalakhsmi & Savithri (2021)	Impact of e-learning on college students' academic achievement.	e-learning positively impacts academic achievement of college students.
14.	Davis (2021)	Teachers and students' attitude towards use of ICT.	Use of ICT improved academic achievement.
15.	Gautam et al. (2021)	Undergraduate students' level of academic stress.	Undergraduates experienced stress due to online learning, yet it improved academic achievement.
16.	Parveen (2021)	Compared the impact of smart and traditional classrooms on academic performance.	Students in smart classroom indicated higher academic performance than those in traditional classroom. Gender difference had no impact on the achievement scores in the smart classroom. Female students had higher achievement scores in traditional classroom then male students.
17.	Bhurisrestha & Sharma (2022)	Effect of e-learning on higher secondary students' academic performance based on gender.	Academic achievement was positively influenced by e-learning. Impact of e-learning on academic achievement was depicted as high in male students than the female students.
18.	Charles et al. (2022)	Impact of e-learning on academic performance.	Academic performance and e-learning did not vary among the students.

			Academic performance was negatively influenced by e-learning.
19.	Khanam (2022)	Effect of use of ICT on B.Ed. students' learning outcome.	Use of ICT improved academic performance.
20.	Maharani et al. (2022)	Influence of attitude towards e-learning on students' academic performance.	Positive and significant impact of e-learning on students' academic performance. e-learning and academic performance had positive relationship.
21.	Sikder et al. (2022)	Students' attitude towards e-learning and its impact on academic performance on the basis of gender and stream.	Positive attitude towards e-learning was revealed. Male students had higher attitude than female students. Science students had higher attitude than arts students. Attitude towards e-learning had positive impact on academic performance.
22.	Suresh et al. (2022)	Effectiveness of e-learning on academic achievement of undergraduate students.	Significant and positive relation between e-learning and academic achievement was found.
23.	Kevin (2023)	Influence of e-learning on academic performance among school students.	e-learning had significant influence on academic performance. Application of e-learning improved academic performance.
24.	Soh et al. (2024)	Relationship between learning performance with	Strong and high relationship between learning performance

		flexibility and study-life balance.	with flexibility and study-life balance was depicted.

From Table No. 2.2 it is clearly observed that e-learning had high relationship and therefore, positively impact the academic performance of students. However, the investigation of Charles et al. (2022) found a negative relationship between e-learning and academic performance among students. Students who used e-learning were reported to have improved academic outcomes. Studies done by Assumi (2014), Jan & Mattoo (2018), Pratiksha (2018), Blihi (2019), George (2020) and Parveen (2021) indicated no noticeable difference between male and female in the effect of e-learning on their academic performance. Nevertheless, research findings of Jawad & Shalash (2020), Bhurisrestha & Sharma (2022), Sikder et al. (2022) revealed significant difference in e-learning and its impact on academic performance between male and female students.

Significant variation in the subject stream in relation to influence of e-learning on academic performance was concluded in the study of Jan & Mattoo and Sikder et al. (2022). From the review, it was indicated that educational qualification was not included in any of the studies to determine the influence of e-learning on the academic outcome of the students. The frequently used research design was the survey method and the most widely applied sampling technique was the simple random sampling technique. Self-prepared questionnaire was the greatest number of the research instrument administered in the review studies.

2.4. Studies related to Attitude towards e-learning in relation to Academic Stress

Pal (2017) explored the effect of academic stress on academic achievement of 400 undergraduate students and the relationship between the two with respect to gender and stream. To conduct the investigation, a factorial research design was adopted. The instruments consisted of Students' Stress Scale standardized by Dr. P. K. Chakraborty and Ranjita Dutta (2004) and the students' total marks scored in the first year university final examination to test their academic performance. The result revealed that most of the Undergraduate students suffered from psychological, educational and social problems. However, male and female did not differ significantly in terms of academic stress. The

girls and humanities students were found to have higher psychological and educational stress according to the mean scores, while male and science students faced higher academic stress. However, there was no significant correlation between academic stress and academic achievement among the students.

Girija & Geetha (2019) examined 100 B.Ed. students' academic stress level and academic performance with respect to gender. The researcher made use of normative survey method. A standardized tool developed by R Balaji Rao on Academic Stress Scale was administered for gathering data. The result revealed that the B.Ed college students have moderate level of academic stress irrespective of gender. Comparatively, male students had higher academic stress than female students.

Al Ateaq et al. (2020) surveyed the students' stress level and academic performance on the basis of gender and educational level. A cross-sectional survey methodology was utilized for the particular study. For sampling, a non probability convenient sampling technique was used. For the research tools, the Perceived Stress Scale standardized by Sheldon Cohen (1983) and a qualitative exploratory question were adopted. The study indicated that university students had moderate to high level of stress as compared to students from intermediate and secondary schools. Also, comparatively female students were reported to have considerably higher level of stress than the male students.

Malik (2020) examined the effects of use of social media on the academic performance and academic anxiety among the pre service teachers. The researcher adopted descriptive survey method including both qualitative and quantitative approach. Random sampling technique was utilized to select 221 pre service teachers. The tools included self designed Use of Social Media Inventory and Sinha's Comprehensive Anxiety Test SCAT-SS. To assess the academic performance, total marks secured in the semester end examination were taken. The findings indicated that the pre service teachers had positive attitude towards the use of social media. The result also revealed that social media made learning effective, improved language skills, academic work and completed assignments. However, no notable impact of use of social media was observed on the academic achievement that led to improved grades. The pre service teachers experienced academic stress due to usage of social media which had negatively affected their anxiety level.

Moawad (2020) analyzed the academic stress among the students of King Saud University and the impact of online learning. Content analysis method was applied for the investigation and a self prepared questionnaire was made use of for data collection. The researcher identified that the highest stressor affecting the university students is the

uncertainty about exams and assessment followed by increased course work and weak signals in network among others. Only a minimum 3% of the student found learning through online platforms suitable and comfortable. The COVID-19 induced online learning had a negative impact on the mental health of the students and it also negatively affected the academic performance.

Elashry et al. (2021) examined the effects of online learning on perceptions and academic stress of adolescents in Egypt. The design of the study was based on the descriptive survey method. The respondents consisted of 1,100 adolescents selected through multistage random sampling technique. Self developed tools on the method of online learning and online learning perception scale and a standardized tool on Educational Stress Scale foe adolescents by Sunet et al. (2011) were administered for data collection. The finding depicted average perception towards online learning. The adolescents were found to have high level of academic stress. The study further recorded a negative relationship between perception towards online learning and the adolescents' academic stress.

Samudra & Matulessy (2021) analyzed the impact of online learning on academic stress among undergraduate students across Java Island. The researchers administered the Educational Stress Scale for Adolescents on 237 participants. It concluded that online learning caused academic stress in students. Additionally, the unpreparedness of students to participate in the learning process, overloaded assignments and insufficient explanation by teachers increased the academic stress among students.

Borah et al. (2022) investigated the relation between academic stress and academic achievement among university students based on gender. The descriptive survey method was employed and a sample of 120 students was engaged by random sampling technique. To gather the data, the Academic Stress Scale designed by Rajendran and Kaliappan (1990 was administered. The result indicated a positive correlation between academic stress and academic performance of university students. However, no significant difference was found between male and female students in the academic stress.

Kumari & Singh (2022) explored the difference of academic stress among students in relation to gender and stream. The descriptive survey methodology was applied for the study. A sample of 120 students was engaged by purposive random sampling technique. The standardized Academic Stress Scale of Dr. Uday Kumar Sinha (2020) was utilized. The result showed that female students have notably higher academic stress than male

students. However, no notable difference was found among students based on science, arts and commerce stream.

Setiakarnawijaya et al. (2022) explored the experiences of sports science students in Jakarta about the effects of online learning on their academic stress. 91 respondents were selected through purposive sampling technique. The researchers constructed the Perception of Academic Stress Scale for gathering the data. The study concluded that students studying sports science experienced moderate level of academic stress. Students had positive attitude towards continuation of online learning. Significantly notable difference was confirmed between online learning and academic stress. It was established that students who had pleasant experience during online learning had lower academic stress and vice versa. Additionally, students with high academic stress disagreed to continue with online learning.

Akanpaadgi et al. (2023) examined the effect of stress on academic performance among the Bolgatanga Technical students. Self constructed questionnaire was used for data collection from 140 purposive sample and analysed using Relative Importance Index. The study inferred that students having high stress level could experience negative physical and mental health conditions which affect their academic performance. Moreover, the students' failure to manage stress led to poor academic performance.

Anzures (2023) investigated the college students' academic stress level in flexible learning. The sample consisted of 282 college students selected through simple and purposive random sampling. An adapted questionnaire from the study of Daza (2020) and a self developed questionnaire were employed as tools. The study concluded that the flexible learning method adopted was moderately stressful to the students. Male students had considerably higher stress level compared to the female students. Moreover, the stress level was found to be notably higher among the students enrolled in the College of Education than from other courses. It was also revealed that the higher the stress level, the lower was the coping mechanism among the students.

Mahapatra et al. (2023) found that among the 273 postgraduate students, majority had moderate level of techno stress. The Techno Stress Scale developed by Upadhya and Vrinda (2021) was administered to the participants for collecting data. Boys and girls did not differ significantly in techno stress; yet the boys had slightly higher techno stress than girls; arts students had high techno stress and the science students had low techno stress comparatively. Furthermore, positive but negligible correlation between techno stress and

academic achievement was revealed among science and commerce students, whereas, arts students had negative correlation.

Fayda-Kinik (2023) measured the undergraduate students' level of academic stress. For data collection, 147 students were selected through a non probability and convenience sampling technique. The research instrument employed was The Perception of Academic Stress Scale designed by Bedewy and Gabriel (2015). The study found that the overall academic stress of the university students was moderate and there was no significant difference between academic stress and gender. However, male students had slightly higher academic stress than the female students.

Hernandez Jr (2023) conducted a research on 392 high school students' academic stress in relation to academic performance. A self developed questionnaire was deployed. The overall academic stress level was found to be moderate. Academic stress and academic performance was depicted as having negligible correlation, where high academic stress led to poor academic outcomes. Female students were shown to have significantly higher academic stress than male students.

Li et al. (2023) investigated the impact of academic stress on the Malaysian university students' academic performance. The study utilized the digital survey method and focused on 200 students by stratified random sampling technique as samples. The perceived Stress Scale was employed for gathering data. The findings found observed negative relationship between academic stress and academic performance. The study inferred that those students who had higher academic stress level indicated lower academic performance.

Ma (2023) assessed the effect of academic stress of the students on their academic performance. This particular study was based on the data from the personal database of Chinese Family Panel Studies, 2018 survey data. The result revealed that suitable level of stress can improve the academic performance of students; yet, excessive stress had negative impact on their academic performance. Female students had lower tolerance to stress and more vulnerable to stress in contrast to male students.

Mohi-ud-Din (2023) explored the adolescent students' attitude towards online learning and compared its influence on academic anxiety in relation to gender and academic stream. The mixed method was adopted for the investigation. A total of 736 students were. The researcher developed tools for data collection consisting of Attitude towards Online Learning Scale, Academic Anxiety Scale and Interview Schedule. The findings observed that male and female as well as arts and science students did not differ significantly on their attitude towards online learning. However, the female students had slightly higher

attitude then male students and science student had marginally higher attitude towards online learning. The overall anxiety level of the students was moderate. Nevertheless, higher anxiety was indicated among male students, but no notable difference in anxiety between arts and science students was observed.

Nath & Yadav (2023) assessed the impact of online learning among 212 undergraduate students of Assam on their academic stress. The instruments for the investigation comprised of self constructed Academic Stress Scale and Online Learning Scale. The study found negative but negligible correlation between online learning and academic stress among college students of Assam.

Patwardhan (2023) examined perception, experiences and issues related to e-learning among postgraduate students. The research adopted an exploratory method of research design. The non probability and snowball sampling technique to select 359 responses. Self constructed questionnaire were used for data collection. The investigation showed that the postgraduate students had positive attitude towards e-learning and MOOCs. Synchronous method of learning was the most preferred learning method among the postgraduate students and was willing to adopt e-learning along with traditional learning method even after the classes resumed in the traditional learning method. However, the students experienced moderate stress due to e-learning because of the sudden shift to online learning during the pandemic.

Polisetty & Pothu (2023) studied the effect of academic stress of 200 students on the academic achievement with regard to gender. The instrument used was the Academic Stress Scale standardized by Sreenivas and Kumar (1999). The result established that academic stress did not vary between male and female students. The mean scores indicated a slightly higher academic stress in male students than female students. The study also found negative correlation between academic stress and academic achievement. As such, with the increase in academic stress level, there was decrease in academic achievement.

Rani (2023) carried out a study among the postgraduate students from cluster university of Jammu on their attitude towards e-learning with regard to gender and streams. The investigator made use of the descriptive survey methodology and 200 respondents were randomly selected as samples. An attitude scale prepared by the investigator was employed for data collection. The result depicted no difference in attitude towards e-learning between male and female as well as social sciences and pure science postgraduate students. Additionally, there was no influence of gender and subject stream in attitude of postgraduate students towards e-learning.

Owusu et al. (2024) investigated distance education students' academic stress and burnout at the University of Education, Winneba, Cape Coast Study Centre. The researcher utilized a descriptive cross-sectional survey method for this study. 312 students were selected through the census method. Two standardized tools namely, Academic Stress Inventory: by Arip et al (2015) and Copenhagen Burnout Inventory student version were employed for gathering the data. The findings inferred a moderate academic stress and burnout levels, yet no significant variation was indicated in academic stress and burnout on gender. Programme of study had notable difference in students' academic stress and burnout. Additionally, gender and programme of study had no interactional effect on students' academic stress and burnout.

Table No. 2.3: SUMMARY OF RESEARCH STUDIES ON ACADEMIC STRESS

Sl. No.	Researcher(s) and Year	Major Focus	Major Findings
1.	Pal (2017)	Effects of stress on academic performance with respect to gender and stream.	Psychological and educational stress was experienced more by female students and students from humanities, while male and science students had higher academic stress. No notable difference between academic stress and academic achievement was observed.
2.	Girija & Geetha (2019)	Status of B.Ed. students' academic stress.	Academic stress status was moderate. Male students had higher stress than female students.
3.	Al Ateaq et al. (2020)	Students' stress level in relation to gender and education levels.	University students had the highest stress level as compared to intermediate and secondary level students. Female students had higher stress than male students.

4.	Malik (2020)	Pre service teachers' use of social media and its influence on academic performance and anxiety.	Positive attitude towards use of social media was depicted. Use of social media did not distinctly improve academic achievement. Academic stress due to use of social media adversely affect academic anxiety.
5.	Moawad (2020)	Academic stressors of online learning and its impact on academic performance among university students.	Uncertainty about examination and assessment were the highest stressors followed by increased work, weak signal COVID-19 induced learning negatively influenced the mental health and academic performance.
6.	Elashry et al. (2021)	Effects of online learning on perception and academic stress among adolescents.	Perception towards online learning was average. Academic stress level was high. Negative relationship between perception towards online learning and academic stress.
7.	Samudra & Matulessy (2021)	Effect of online learning on academic stress of undergraduates.	Students experienced academic stress due to online learning.
8.	Borah et al. (2022)	Academic stress related to academic achievement based on gender and schools.	Postgraduates had negative correlation between academic stress and academic achievement. Difference in academic stress between male and female students was insignificant. Academic stress did not differ in the School of Engineering, School of Humanities and school of

			Sciences.
9.	Kumari & Singh (2022)	Academic stress in relation to gender and stream.	Female students had higher stress as compared to male students. Students from arts, science and commerce stream did not differ in their academic stress level.
10.	Setiakarnawijaya et al. (2022)	Effects of online learning on academic stress of sports science students.	Average level of academic stress was experienced. Noticeable difference was observed between online learning and academic stress.
11.	Akanpaadgi et al. (2023)	Relationship between stress and academic performance.	High stress had negative effect on academic performance.
12.	Anzures (2023)	Academic stress level of college students in flexible learning on the basis of gender and course of study.	Average stress level was indicated. Female students had lower stress level as compared to male students. Students from College of Education had higher stress level than students from other courses.
13.	Mahapatra et al. (2023)	Relationship between techno stress and academic achievement with regard to gender and stream.	Postgraduate students had moderate level of stress. Boys and girls had no notable significance in techno stress. Boys had marginally higher stress than girls. Negligible positive correlation between techno stress and academic achievement among science and commerce students and negative correlation in arts students was observed.

14.	Fayda-Kinik (2023)	Level of academic stress among undergraduate students.	Undergraduate students' overall stress level was average. Male and female students had no noticeable difference in academic stress. Male students had marginally higher stress than female students.
15.	Hernandez Jr (2023)	High school students' academic stress in relation academic performance.	Moderate stress level was inferred. Correlation between academic stress and academic performance was negative. Academic stress was found to be higher in female students as compared to male.
16.	Li et al. (2023)	Effect of academic stress on academic performance.	Academic stress had negative impact on academic performance.
17.	Ma (2023)	Impact of academic stress on students' academic achievement.	High stress had negative impact on the academic achievement. Female students' stress was higher than male students.
18.	Mohi-ud-Din (2023)	Adolescents' attitude towards online learning and its impact on academic anxiety with reference to gender and stream.	No distinct difference in attitude towards online learning was found in relation to gender and stream. Female students had slightly higher attitude towards online learning than male and science students' attitude was higher than arts students. Anxiety level was average. Arts and science students did not differ in their anxiety level.
19.	Nath & Yadav	Influence of online	Negative and negligible influence

	(2023)	learning on academic stress of undergraduates.	between online learning and academic stress was revealed.
20.	Patwardhan (2023)	Postgraduate students' perception of e-learning and its influence on academic stress.	Positive attitude towards e-learning was indicated. Moderate stress was experienced by postgraduate students.
21.	Polisetty &Pothu (2023)	Effect of academic stress on academic achievement with regard to gender.	Male students had higher academic stress than female students. Academic stress and academic achievement had negative relationship.
22.	Rani (2023)	Postgraduate students' attitude towards e-learning in relation to gender and stream.	No distinguished difference in male and female and social sciences and pure science students in their attitude towards e-learning. No impact of gender and stream was revealed on attitude towards e-learning.
23.	Owusu et al. (2024)	Academic stress and burnout among university students.	An overall moderate level of academic stress and burnout was observed. Male and female postgraduates did not differ in their academic stress and burnout. Notable variation was indicated in students' academic stress and burnout in relation to their programme of study. Gender and programme of study had no noticeable influence on academic stress and burnout.

From Table No. 2.3, it is established that students and teachers with positive attitude towards e-learning had generally lower level of academic stress and those with lower

attitude towards e-learning were found to have higher academic stress. The analysis of the studies conducted by Pal (2017), Girija & Geetha (2019), Borah et al. (2022), Mahapatra et al. (2023), Fayda-Kinik (2023), Mohi-ud-Din (2023), Polisetty & Pothu (2023), Rani (2023) and Owusu et al (2024) showed no significant difference in academic stress between male and female students. Yet gender differential in academic stress was recognised in the works of Al Ateaq et al. (2020), Kumari and Singh (2022), Anzures (2023) and Hernandez Jr (2023).

No significant variation in academic stress was witnessed with respect to stream in the results of the studies conducted by Kumari & Singh (2022), Mohi-ud-Din (2023) and Rani (2023). Considerable significant difference academic stress with regard to stream was revealed in the studies of Anzures (2023), Mahapatra et al. (2023) and Owusu et al. (2024). Further, Pal (2012) found no notable correlation between academic stress and students' academic performance. Notable difference was observed between online learning and academic stress in the findings of Setiakarnawijaya et al. (2022). Negative impact of e-learning on academic stress was highlighted in the result of Moawad (2020), Samudra & Matlessy (2021), Elashry et al. (2022), Akanpaadgi et al. (2023) and Nath & Yadav (2023). Negative correlation between academic stress and academic performance was inferred in the findings of Hernandez Jr (2023), Li et al. (2023) and Polisetty & Pothu (2023). Positive but negligible correlation between academic stress and academic performance was concluded in the studies of Ma (2023).

Survey research method was used most often in the review studies. The most widely applied sampling techniques were the random sampling techniques. The greater number of the research instrument administered was the self-prepared questionnaire.

2.5. Research Gap

Review of researches done indicated that a rich number of researches have been conducted on the attitude towards e-learning and its impact on either academic performance or academic stress respectively. Majority of the studies were carried out with respect to gender, a few on subject streams and a negligible number on educational qualification. However, no studies have so far been carried out on the interactional effects of student-teachers' attitude towards e-learning, academic performance and academic stress in the context of Nagaland. This indicates a clear gap for the present study and hence it is essential to conduct the research work accordingly.

CHAPTER III

METHODOLOGY

3.1. Introduction

The present chapter deals with the methodology for the research. It provides a simple description of the entire procedure of carrying out the research. It describes the population of the study, sample size, sampling technique, description of the tools used for data collection, data collection procedure and the statistical techniques applied to analyze the data.

3.2. Research Method

The descriptive method is perhaps the most popular and frequently used research method in the educational field. "Descriptive research studies are designed to obtain pertinent and precise information concerning the current status of phenomena and, wherever possible, to draw valid general conclusions from the facts discovered" (Koul, 1984). For the present study, Descriptive Survey Method was used to explore the attitude of student-teachers toward e-learning in relation to academic performance and academic stress.

3.3. Population of the Study

Best & Kahn (1995) defined population as "any group of individuals that have one or more characteristics in common that are of interest to the researcher".

The total population of the present study included all the student-teachers of Nagaland from all the eight (8) teacher education colleges. The detail of the population for study is shown in Table No. 3.1.

Table No. 3.1: INTAKE CAPACITY OF TEACHER EDUCATION COLLEGES IN NAGALAND

Sl. No.	Name of the college	Intake capacity
1.	State College of Teacher Education-Kohima	50
2.	Salt Christian College of Teacher Education	100
3.	Bosco College of Teacher Education	100
4.	Unity College of Teacher Education	100
5.	Sazolie College of Teacher Education	50
6.	Modern College of Teacher Education	100
7.	Mokokchung College of Teacher Education	50
8.	Mt. Mary College of Teacher Education	100
	Total	650

(Source: Enrollment status as per the college records, 2021-2023)

3.4. Sample of the Study

"A sample is a small proportion of a population selected for observation and analysis" (Best & Kahn, 1995, p. 13). It is a process of selecting comparatively small representation of individuals in order to study and analyze the entire population. Sampling, in simple words means studying a portion of the total population, thereby, deriving useful information from the resulting sample and developing generalizations about the population.

Out of the total 650 population, the researcher had selected 400 student-teachers from the 8 teacher education colleges in Nagaland as sample for the present study. The distribution of the sample based on gender is shown in Table No. 3.2. Male sample consists of 100 (25%) and female sample consists of 300 (75%).

Table No. 3.2: GENDER-WISE DISTRIBUTION OF THE SAMPLE

Variable	Group	Number	Percentage (%)
Gender	Male	100	25%
	Female	300	75%
	Total	400	100%

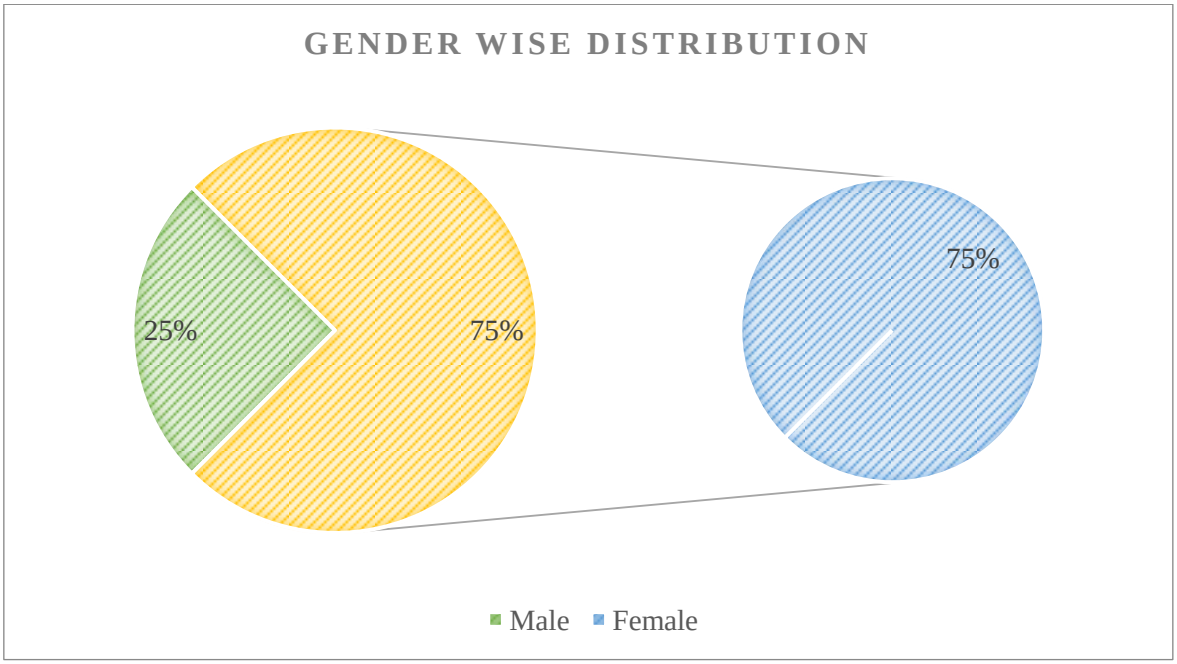

Figure No. 3 (a): Gender-wise distribution of sample.

Table No. 3.3: DISTRIBUTION OF THE SAMPLE WITH RESPECT TO EDUCATIONAL QUALIFICATION

Variable	Group	Number	Percentage (%)
Educational Qualification	Graduate	184	46%
	Postgraduate	216	54%
	Total	400	100%

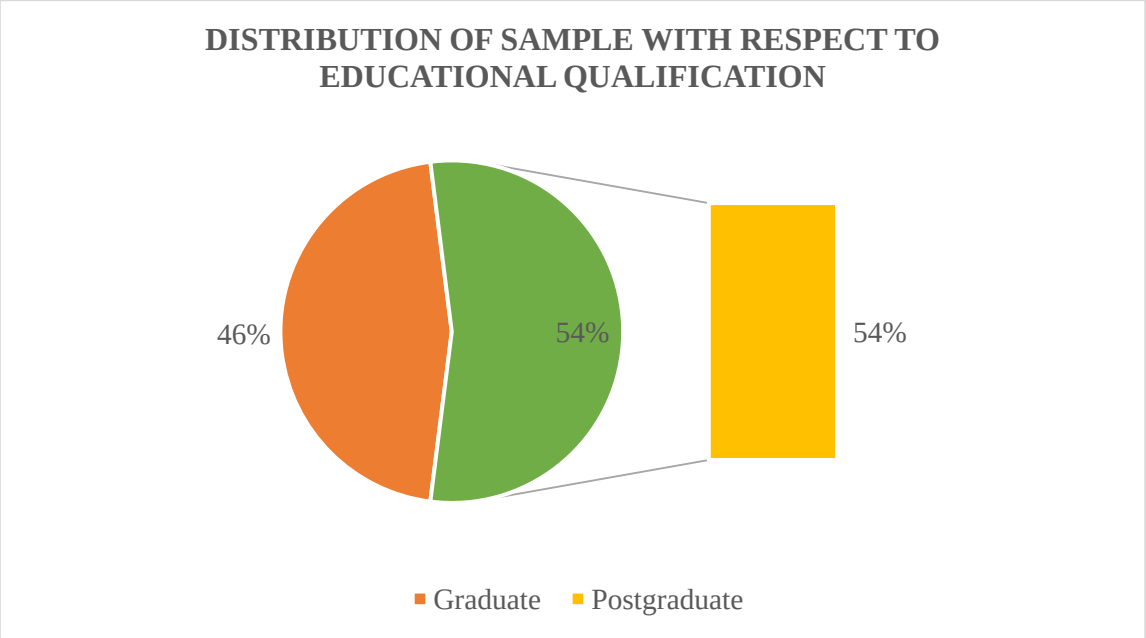

Figure No. 3 (b): Distribution of sample with respect to educational qualification.

Table No. 3.3 shows the distribution of sample based on educational qualification. 184 (46%) graduate students and 216 (54%) postgraduate student-teachers were selected for the present study.

Table No. 3.4: DISTRIBUTION OF SAMPLE BASED ON PEDAGOGY OPTED

Variable	Group	Number	Percentage (%)
Pedagogy Opted	Language	127	32%
	Social Sciences	163	41%
	Science	61	15%
	Mathematics	49	12%
	Total	400	100%

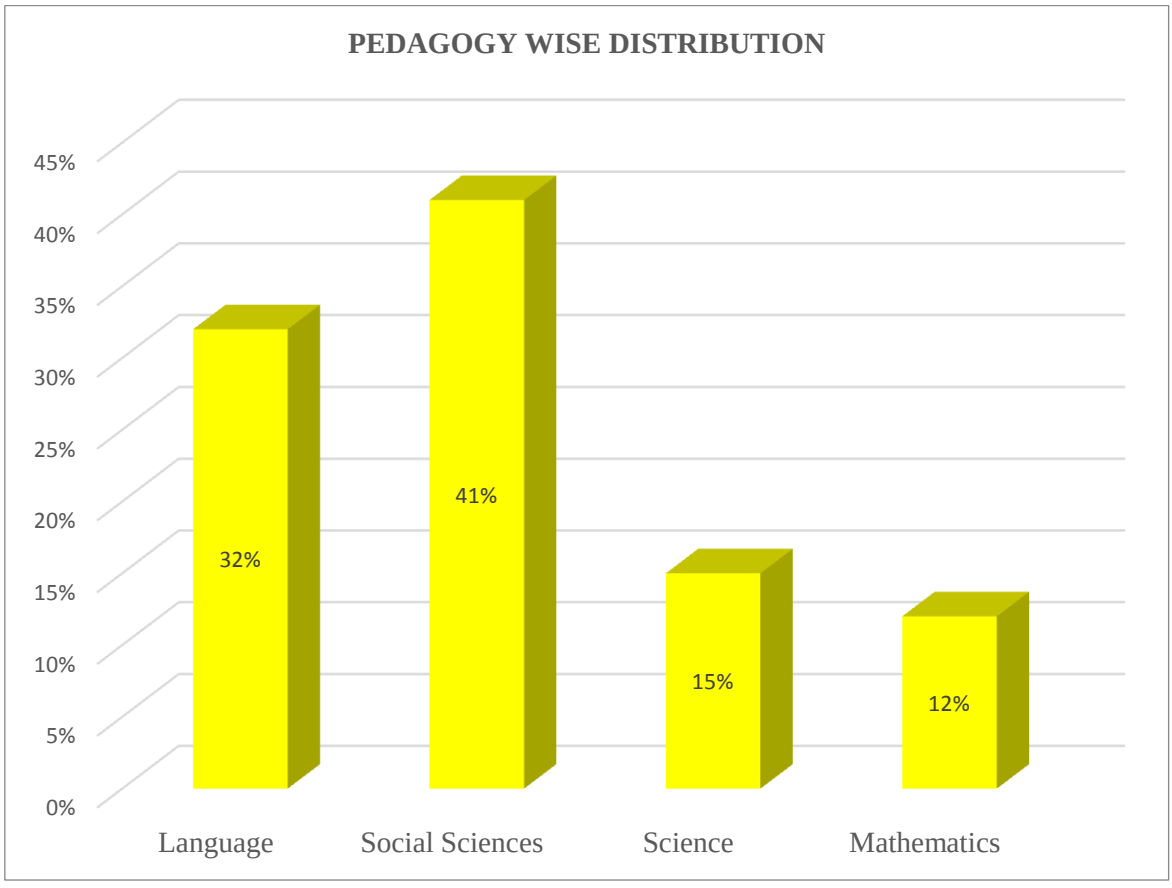

Figure No. 3 (c): Distribution of sample based on pedagogy opted.

Table No. 3.4 presents the sample distribution on the basis of pedagogy opted by the student-teachers. 127 (32%) from language pedagogy, 163 (41%) from social sciences pedagogy, 61 (15%) from science pedagogy and 49 (12%) from mathematics pedagogy comprised the samples for the present study.

3.5. Sampling Technique

As per the nature of the study, the researcher adopted Simple Random Sampling Technique. In this sampling technique, "each unit of the population is given equal chance of being selected" (Koul, 1984).

3.6. Tools Used

Tools or instruments are used for gathering of data or information which may "vary in their complexity, design, administration and interpretation" (Koul, 1984, p. 234). The selection of the tool or the instrument is therefore, a critical step in research. Jha (2011) has rightly stated that "the utility and importance of any study depend upon the findings which in turn depend upon the collected information and the instrument through which the data is collected".

The following tools were employed for the collection of data for the present study:

1. Attitude towards e-learning Scale constructed and standardized by Dimple Rani (2016). (Appendix – 1)
2. Achievement Test constructed by the researcher. (Appendix – 2)
3. Academic e-learning Stress Scale constructed by the researcher. (Appendix – 3)

3.6.1. Attitude towards e-learning Scale constructed and standardized by Dimple Rani (2016).

i) Purpose

e-learning has brought about huge changes in education. Several e-learning applications are made use of for the teaching-learning situations, viz., Web-Based learning, Computer-based learning, Online learning, Virtual learning and m-learning. Knowledge and information conveyed to the learners are fast-paced, self-paced and saves the learners from traveling distances.

The scale was developed to analyze the attitude towards e-learning of adolescents aged 14 years and above. Though the scale is for the adolescents, yet the statements framed by the author were relevant and appropriate for the student-teachers alike.

ii) Procedure

Initially, 140 items were framed and experts' views were taken on the criteria that the items must be simple, clear and understandable, relevant to the topic, express a single idea and avoid ambiguity. Following the feedback given by the experts, some items were modified and few were removed. The revised items consist of 112 statements.

iii) Tryout

The first tryout on the revised scale consisting of 112 items was administered to 200 adolescent students from five schools of Ludhiana District, Punjab. The distribution of the sample for tryout was made on the basis of gender, locality and access to e-learning.

iv) Scoring

The responses were based upon the five-point Likert Scale with Weightage as follows: Strongly Agree- 5, Agree- 4, Undecided- 3, Disagree- 2 and Strongly Disagree- 1 for the positive items and the reverse for the negative items.

v) Item analysis

For the process of item analysis, the scores of the 200 samples were arranged in ascending order and 27% higher and 27% lower scores were selected. A t-ratio was calculated to find out the items' discriminating power. Accordingly, 47 items were removed because they did not discriminate at 0.05 level of confidence. Therefore, the final scale had 65 items with 38 positive and 27 negative items.

vi) Area-wise Distribution of Items

Four major areas were identified for the scale, viz., 1. e-learning Interest 2. Usefulness 3. Ease of e-learning and 4. e-learning confidence.

Area-wise distributions of the selected items are given in Table No. 3.5.

Table No. 3.5: AREA-WISE DISTRIBUTION OF ITEMS

Sr. No.	Area	Nature of Items	No. of Items	Total No. of items	Total
I	e-learning interest	Positive	1, 7, 21, 25, 40, 44, 50, 59	08	13
		Negative	14, 18, 24, 29, 35	05	
II	Usefulness	Positive	6, 8, 9, 12, 13, 16, 20, 26, 28, 30. 37, 45, 47, 51, 52, 60, 65	17	26
		Negative	4, 11, 17, 22, 23, 42, 54, 56, 59	09	
III	Ease of e-learning	Positive	5, 10, 27, 36, 49, 55,61	07	15
		Negative	15, 33, 41, 43, 46, 48, 57, 64	08	
IV	e-learning Confidence	Positive	3, 19, 31, 32, 62,63	06	11
		Negative	2, 34, 38, 39, 53	05	
Positive item= 38 + Negative Items= 27				**Total Items**	**65**

(Source: Rani, 2016)

vii) Standardization of the Scale

The final draft of the scale was administered for the second time on 200 senior secondary students randomly selected from Ludhiana District, Punjab.

The scoring system is given in Table No. 3.6.

Table No. 3.6: SCORING SYSTEM

SL. No.	Type of Items	Strongly Agree	Agree	Undecided	Undecided	Strongly Disagree
I	Positive	5	4	3	2	1
II	Negative	1	2	3	4	5

The minimum and maximum possible scores are 65 to 325.

viii) Reliability

Test-Retest method was made use of to find out the reliability of the scale. 100 boys and girls, aged 14+ were administered the final draft. After a gap of one month, the same samples were re-administered the scale. The coefficient of correlation found was -0.87 which was significant at 0.01 level of confidence.

ix) Validity

Content validity was ensured by the technology experts and teachers. For construct validity, correlation between the total scores and item scores were calculated.

x) Norms

Norms for interpretation of the attitude level of e-learning is given in Table No. 3.7.

Table No. 3.7: NORMS FOR INTERPRETATION OF THE LEVEL OF e-LEARNING

Sl. No.	**Range of z-Scores**	**Grade**	**Level of E-learning**
1.	+2.01 and above	**A**	**Extremely High**
2	+1.26 to +2.00	B	High
3	+0.51 to +1.25	C	Above Average
4	-0.50 to +0.50	**D**	**Average**
5	-1.25 to -0.51	E	Below Average
6	-2.00 to -1.26	F	Low
7	**-2.01 and below**	**G**	**Extremely Low**

(Source: Rani, 2016)

3.6.2. Achievement Test for Student-Teachers

i) Introduction

Academic performance refers to the progress made by students in the academic area over a period of time. Knowing the performance of the individual student is important as it provides information concerning the progress made in his/her academic achievement. Academic achievement is defined as "specified level of attainment or proficiency in academic work as evaluated by the teachers or by standardized tests or by a combination of both" (Chaplin, 1959 as cited in Bhardwaj & Bhat, 2014). Walberg et al. (1986) identified nine key variables that influence educational outcomes viz., student ability/prior achievement, motivation, age/developmental level, quality of instruction, quality of interaction, classroom climate, home environment, peer group and exposure to mass media outside of school (as cited in Rugutt & Chemosit, 2005).

ii) Measuring Academic Performance

A diverse range of tools and techniques are available to measure the academic performance of students according to the needs, levels and objectives. A common measuring technique of the students' performance is through the previous year's result as was used by Narad & Abdullah (2016); Borah et al., (2022) and Mahapatra et al., (2023). An achievement test is essential for assessing the learning objectives of the students. It measures how successfully the students have progressed in the academic area. Achievement tests measure the present proficiency, mastery and understanding of general and specific areas of knowledge and usually measures the effectiveness of instruction and learning (Kerlinger, 2019). The most common type of achievement test is the uniform standardized test that can be administered to a large number of students.

iii) Purpose of construction of Achievement Test

The achievement test for the student-teachers was constructed as there was no standardized test developed based on the B.Ed. syllabus of Nagaland to measure the academic performance of the student-teachers apart from the results of the semester examinations. Therefore, this achievement test was developed to assess the performance of the student-teachers based on the B.Ed. IVth semester syllabus covering all the units of all the papers offered in B.Ed. course of Nagaland.

iv) Procedure

Keeping the objectives of the study in view, the researcher constructed the achievement test based upon the 4th semester B.Ed. syllabus of Nagaland. An extensive review of literature was done and several discussions with the respective subject experts were carried out. The objectives of the test included **Knowledge, Comprehension and Application** levels from the Cognitive Domain of Bloom's Taxonomy (Bloom, et al., 1956). A draft of 100 questions with varied types of objective type question was developed, viz., Multiple Choice Questions, Fill in the Blanks, Match the Following and True or False type of questions were prepared. Question items 1-80 were compulsory for all student-teachers to answer, while 81-100 each were to be answered pedagogy-wise. All the items carry 1 mark each. The full mark was 100, which were to be answered within 3 hours (maximum). The steps for construction of achievement test were followed, viz., Question Design, Blueprint, Writing Test Items, Scoring Key, Marking Scheme and Question-wise Analysis. The draft of 100 items were given to the experts for validation of the items' relevance and clarity, particularly to the teacher educators of pedagogy courses, the teacher education courses as well as general education teachers. The valuable suggestions given by the experts were incorporated and the items were reframed and rephrased accordingly.

v) Tryout

The revised test was administered to 50 student-teachers randomly selected from two teacher education colleges in Kohima District (1 Government and 1 Private college each). The sample distribution was made on the basis of gender (male and female), educational qualification (graduate and postgraduate) and pedagogy (language, social sciences, science and mathematics) as shown in Table No. 3.8.

Table No. 3.8: **DISTRIBUTION OF SAMPLE ON THE BASIS OF GENDER, EDUCATIONAL QUALIFICATION AND PEDAGOGY OPTED**

Groups		N		Percentage (%)	
Gender	Male	22		44%	
	Female	28	50	56%	100%
Educational Qualification	Graduate	19		38%	
	Postgraduate	31	50	62%	100%
Pedagogy opted	Language	9		18%	
	Social Sciences	21	50	42%	100%
	Science	12		24%	
	Mathematics	8		16%	

vi) Age group

The achievement test is applicable for all student-teachers who are 21 years and above, ie. student-teachers undergoing B.Ed. course in Nagaland.

vii) Item Analysis

The results of the samples were used to analyze the difficulty index and discrimination index of the test items. For item analysis, the total scores of the 50 student-teachers were first arranged in ascending order and 27% upper and 27% lower scores were selected. Then, the difficulty and discrimination indices developed by Padua and Santos (1997) were applied to find out the difficulty and discriminating power of each of the item. Accordingly, 70 test items were selected for the final achievement test. The range and interpretation for difficulty index and discrimination index developed by Padua and Santos are given in Table No. 3.9.

Table No. 3.9: THE INDEX OF DIFFICULTY AND INDEX OF DISCRIMINATION USED IN ITEM ANALYSIS ADOPTED FROM PADUA AND SANTOS (1997)

Index of Difficulty	Index of Discriminating				
	Questionable (-1.00– -0.60)	**Not Discriminating (-0.59– -0.21)**	**Moderately Discriminating (-0.20–0.20)**	**Discriminating (0.20–0.60)**	**Very Discriminating (0.61–1.00)**
Very Difficult (0.00–0.20)	Reject	Reject	Reject	Reject	Reject
Difficult (0.21–0.40)	Reject	Reject	May Revise	Retain	Reject
Moderately Difficult (0.41–0.60)	Reject	Revise	Retain	Retain	Reject
Easy (0.61–0.80)	Reject	Reject	Revise	Retain	Reject
Very Easy (0.81–above)	Reject	Reject	Reject	Reject	Reject

(Source: as cited in Lasala, 2023, p. 94)

The difficulty index of the selected items and their interpretations are shown in Table No. 3.10.

Table No. 3.10: DIFFICULTY INDEX AND INTERPRETATION

Item No.	Difficulty Index	Interpretation
1.	0.57	Moderately Difficult Item
2.	0. 57	Moderately Difficult Item
3.	0.71	Easy Item
4.	0.64	Easy Item
5.	0.54	Moderately Difficult Item
6.	0. 57	Moderately Difficult Item
7.	0.71	Easy Item
8.	0.79	Easy Item
9.	0.54	Moderately Difficult Item
10.	0.43	Moderately Difficult Item
11.	0.79	Easy Item
12.	0.54	Moderately Difficult Item
13.	0.39	Difficult Item
14.	0. 57	Moderately Difficult Item
15.	0.5	Moderately Difficult Item
16.	0.71	Easy Item
17.	0.75	Easy Item
18.	0.64	Easy Item
19.	0.57	Moderately Difficult Item
20.	0.43	Moderately Difficult Item
21.	0.79	Easy Item
22.	0.29	Difficult Item
23.	0.57	Moderately Difficult Item
24.	0.71	Easy Item
25.	0.39	Difficult Item
26.	0.61	Moderately Difficult Item
27.	0.79	Easy Item
28.	0.5	Moderately Difficult Item
29.	0.79	Easy Item
30.	0. 57	Moderately Difficult Item

31.	0. 57	Moderately Difficult Item
32.	0.46	Moderately Difficult Item
33.	0.57	Moderately Difficult Item
34.	0.79	Easy Item
35.	0.57	Moderately Difficult Item
36.	0.75	Easy Item
37.	0.54	Moderately Difficult Item
38.	0.75	Easy Item
39.	0.39	Difficult Item
40.	0.79	Easy Item
41.	0.79	Easy Item
42.	0.71	Easy Item
43.	0.54	Moderately Difficult Item
44.	0.64	Easy Item
45.	0.57	Moderately Difficult Item
46.	0.39	Difficult Item
47.	0.5	Moderately Difficult Item
48.	0.75	Easy Item
49.	0.79	Easy Item
50.	0.71	Easy Item
51.	0.54	Moderately Difficult Item
52.	0.57	Moderately Difficult Item
53.	0.57	Moderately Difficult Item
54.	0.71	Easy Item
55.	0.71	Easy Item
56.	0.57	Moderately Difficult Item
57.	0.57	Moderately Difficult Item
58.	0.71	Easy Item
59.	0.79	Easy Item
60.	0.39	Difficult Item
61.	0.57	Moderately Difficult Item
62.	0.79	Easy Item

63.	0.39	Difficult Item
64.	0.54	Moderately Difficult Item
65.	0.75	Easy Item
66.	0.57	Moderately Difficult Item
67.	0.57	Moderately Difficult Item
68.	0.57	Moderately Difficult Item
69.	0.54	Moderately Difficult Item
70.	0.75	Easy Item

The discrimination index was calculated and its interpretation is given in Table No. 3.11.

Table No. 3.11: DISCRIMINATION INDEX AND INTERPRETATION

Question No.	Discrimination Index	Interpretation
1.	0.43	Discriminating Item
2.	0.14	Moderately Discriminating Item
3.	0.14	Moderately Discriminating Item
4.	0.29	Discriminating Item
5.	0.36	Discriminating Item
6.	0.43	Discriminating Item
7.	0.29	Discriminating Item
8.	0.29	Discriminating Item
9.	0.5	Discriminating Item
10.	0.29	Discriminating Item
11.	0.14	Moderately Discriminating Item
12.	0.21	Discriminating Item
13.	0.5	Discriminating Item
14.	0.29	Discriminating Item
15.	0.43	Discriminating Item
16.	0.43	Discriminating Item
17.	0.5	Discriminating Item
18.	0.57	Moderately Discriminating Item

19.	0.43	Discriminating Item
20.	0.29	Discriminating Item
21.	0.29	Discriminating Item
22.	0.14	Moderately Discriminating Item
23.	0.57	Discriminating Item
24.	0.57	Discriminating Item
25.	0.36	Discriminating Item
26.	0.21	Discriminating Item
27.	0.29	Discriminating Item
28.	0.43	Discriminating Item
29.	0.43	Discriminating Item
30.	0.57	Discriminating Item
31.	0.43	Discriminating Item
32.	0.36	Discriminating Item
33.	0.57	Discriminating Item
34.	0.14	Moderately Discriminating Item
35.	0.29	Discriminating Item
36.	0.5	Discriminating Item
37.	0.21	Discriminating Item
38.	0.5	Discriminating Item
39.	0.21	Discriminating Item
40.	0.43	Discriminating Item
41.	0.14	Moderately Discriminating Item
42.	0.29	Discriminating Item
43.	0.36	Discriminating Item
44.	0.14	Moderately Discriminating Item
45.	0.57	Discriminating Item
46.	0.21	Discriminating Item
47.	0.14	Moderately Discriminating Item
48.	0.43	Discriminating Item
49.	0.5	Discriminating Item
50.	0.43	Discriminating Item

51.	0.57	Discriminating Item
52.	0.5	Discriminating Item
53.	0.57	Discriminating Item
54.	0.29	Discriminating Item
55.	0.14	Moderately Discriminating Item
56.	0.57	Discriminating Item
57.	0.57	Discriminating Item
58.	0.43	Discriminating Item
59.	0.43	Discriminating Item
60.	0.5	Discriminating Item
61.	0.57	Discriminating Item
62.	0.14	Moderately Discriminating Item
63.	0.5	Discriminating Item
64.	0.5	Discriminating Item
65.	0.5	Discriminating Item
66.	0.57	Discriminating Item
67.	0.43	Discriminating Item
68.	0.14	Moderately Discriminating Item
69.	0.36	Discriminating Item
70.	0.5	Discriminating Item

The description of the selected items for achievement test is given in Table No. 3.12.

Table No. 3.12: DESCRIPTION OF THE ACHIEVEMENT TEST ITEMS

Sl. No.	Objectives	Items
1.	Knowledge	1, 2, 3, 4, 16, 17, 18, 23, 24, 25, 26, 27, 39, 40, 41, 42, 43, (i), (ii), (iii) & (iv) – 57, 58, 64, 68
2.	Understanding	5, 6, 7, 8, 9, 10, 19, 20, 21, 28, 29, 30, 31, 32, 33, 44, 45, 46, 47, 48, 49, 50, (i), (ii), (iii) & (iv) – 59, 60, 65, 66, 69, 70
3.	Application	11, 12, 13, 14, 15, 22, 34, 35, 36, 37, 38, 51, 52, 53, 54, 55, 56, (i), (ii), (iii) & (iv) – 61, 62, 63, 67
Total items		70 items

viii) Reliability

The reliability of the achievement test was found out using the Split-Half Method. According to the Split-Half Method of testing the reliability, the scores were first divided into two equal halves and the scores of the items from both the halves were correlated. The test was then estimated by Spearman-Brown Prophecy formula. "This method of reliability measures the internal reliability of the test, and if the two halves do not correlate highly, it suggests that they are not measuring the same thing" (Koul, 2019).

For this particular test, it was administered only once and the co-efficient of co-relation found was .79, which is high positive significant at both levels of significance. The reliability coefficient of correlation of Achievement Test for the student-teachers is shown in Table No. 3.13.

Table No. 3.13: RELIABILITY OF ACHIEVEMENT TEST

Achievement test for student-teachers	Spearmen-Brown Coefficient	Cronbach's Alpha	Guttman Split-half Coefficient
	.79	.87	.79

ix) Validity

Best & Kahn (1995) defined content validity as "the degree to which the test actually measures, or is specifically related to, the traits for which it was designed". It is to carefully scrutinize the course contents of the test by subject experts or subject matter specialists. For the present achievement test, content validity was ensured through careful scrutiny of the test items based on its relevance and clarity by the experts and subject matter specialists in and around Nagaland and one expert from outside the state. The valuable suggestions given by the experts were examined by the researcher and discussed with the supervisor. The constructive suggestions were incorporated and the items were modified, revised and reframed accordingly and the final 70 test items were finalized.

x) Scoring System

The final test items were of 70 items, each test item is of 1 mark for correct answers and 0 for wrong answers. The test is for 2 hours duration.

3.6.21. Question Design

The final achievement test along with the Question Design, Blueprint, Test Items, Scoring Key, Marking Scheme and Question-wise Analysis is given below:

I. QUESTION DESIGN

Subject: B.Ed Time: 2 Hours

Semester: 4th Semester Marks: 70

I.a) Weightage of objectives:

Objectives	Marks	Percentage
K	21	30%
U	28	40%
A	21	30%
	70	100%

I.b) Weightage to Forms of Questions:

Types of Question	Marks	Estimated Time (in minutes)	Percentage
Fill in the blanks	20	20	29%
Match the following	9	27	13%
Multiple choice questions	20	20	28%
True or False	21	21	30%
	70	Extra 12 minutes	100%

I.c) Weightage to Content:

Course	Title of the paper	Marks	Percentage
1	Childhood and Growing up	7	10%
2	Contemporary India and Education	7	10%
3	Language across the Curriculum	4	6%
4	Understanding disciplines and subjects	7	10%
5	Assessment of learning	7	10%
6	Learning and teaching	7	10%
7a	Pedagogy of school subjects: i) Methodology of teaching English ii) Methodology of teaching Social Sciences iii) Methodology of teaching Science iv) Methodology of teaching Mathematics	7	10%
8	Knowledge and Curriculum	7	10%
9	Gender, School and Society	5	7%
10	Creating an Inclusive school	5	7%
7b	Pedagogy of school subjects: i) Methodology of teaching English ii) Methodology of teaching Social Sciences iii) Methodology of teaching Science iv) Methodology of teaching Mathematics	7	10%
	Total	70	100%

Difficulty level: Difficult: 10% Average: 48% Easy: 42%

Abbreviations used:

For Objectives: K- Knowledge U- Understanding A- Application

For form of questions: FIB- Fill in the Blanks MTF- Match the Following

MCQ- Multiple Choice Question T/F- True or False

II. BLUEPRINT

Subject: B.Ed. Time: 2 hours

Semester: 4Th Semester Marks: 70

Sl. No.	Objectives / Form of questions / Course (Unit/Sub-unit)	Knowledge (21)				Understanding (28)				Application (21)				Total (70)
		FIB	MTF	MCQ	T/F	FIB	MTF	MCQ	T/F	FIB	MTF	MCQ	T/F	
1	Course 1	1(1)	1(1)		1(1)			1(1)		1(1)		1(1)	1(1)	7
2	Course 2	1(1)		1(1)	1(1)		1(1)		1(1)	1(1)		1(1)		7
3	Course 3				1(1)	1(1)		1(1)					1(1)	4
4	Course 4		1(1)	1(1)		1(1)		1(1)	1(1)			1(1)	1(1)	7
5	Course 5	1(1)		1(1)		1(1)	1(1)	1(1)	1(1)				1(1)	7
6	Course 6	1(1)	1(1)	1(1)				1(1)	1(1)	1(1)		1(1)		7
7	Course 7a (i), (ii), (iii) & (iv)	1(1)				1(1)		1(1)	1(1)	1(1)	1(1)	1(1)		7
8	Course 8				1(1)	1(1)		1(1)	1(1)	1(2)		1(1)		7
9	Course 9				1(1)	1(1)			1(1)		1(1)		1(1)	5
10	Course 10			1(1)		1(1)	1(1)		1(1)				1(1)	5
11	Course 7b (i), (ii), (iii) & (iv)	1(1)		1(1)	1(1)	1(1)		1(1)	1(1)		1(1)			7
	Sub Total	6	3	6	6	8	3	8	9	6	3	6	6	70
	Total	21				28				21				

- Figures within brackets indicate the number of questions and figures outside the brackets indicate marks.

Abbreviations used:

For Objectives: K- Knowledge U- Understanding A- Application

For form of questions: FIB: Fill in the Blanks MTF: Match the Following MCQ: Multiple Choice Questions T/F: True or False

For difficulty level of questions: A- Difficult B- Average C: Easy

III. <u>Writing test Items</u> (Appendix – II)

IV. <u>Scoring Key</u>

Q. No.	Key	Marks	Total Marks
16	ii	1	= 7
17	iv	1	
18	i	1	
19	i	1	
20	iii	1	
21	iv	1	
22	ii	1	
23	d	1	= 16
24	d	1	
25	d	1	
26	b	1	
27	c	1	
28	a	1	
29	d	1	
30	c	1	
31	a	1	
32	a	1	
33	a	1	
34	c	1	
35	d	1	
36	b	1	
37	a	1	
38	a	1	
i)62	i	1	= 2
63	iii	1	
64	a	1	= 4
65	c	1	
66	d	1	
67	c	1	

ii)62	ii	1	
63	i	1	= 2
64	b	1	
65	c	1	= 4
66	d	1	
67	a	1	
iii) 62	iii	1	
63	iv	1	= 2
64	c	1	
65	c	1	=4
66	b	1	
67	a	1	
iv) 62	iii	1	
63	i	1	= 2
64	c	1	
65	d	1	=4
66	b	1	
67	c	1	

V. Marking Scheme

Q. No.	Value Points	Marks	Total Marks
1	Authoritative	1	= 15
2	Social justice	1	
3	Psychosocial	1	
4	Learning	1	
5	Oral	1	
6	Scientific temper	1	
7	Constructivist	1	
8	Reason	1	
9	RTE 2009	1	
10	Inclusive	1	
11	Mental	1	
12	Instruction	1	
13	Defense mechanism	1	
14	Sociological	1	
15	Posteriori	1	
39	T	1	= 18
40	F	1	
41	T	1	
42	F	1	
43	T	1	
44	T	1	
45	T	1	
46	F	1	
47	F	1	
48	F	1	
49	F	1	
50	F	1	
51	T	1	
52	T	1	

53	F	1	
54	F	1	
55	T	1	
56	F	1	
i) 57	Direct	1	
58	Literature	1	
59	Informal	1	= 5
60	Poetry	1	
61	English	1	
68	F	1	
69	F	1	= 3
70	T	1	
ii) 57	Paulo Freire	1	
58	Information Processing	1	
59	Secondary	1	= 5
60	Pedagogical	1	
61	Social Constructivist	1	
68	F	1	
69	F	1	= 3
70	T	1	
iii)57	Scientific Method	1	
58	J.S. Bruner	1	
59	Scientific attitude	1	= 5
60	Pedagogical	1	
61	Physics		
68	T	1	
69	F	1	= 3
70	T	1	
iv)57	Heuristic	1	
58	Kinesthetic	1	
59	Mathematical proposition	1	= 5
60	Pedagogical	1	

61	Venn diagram	1	
68	F	1	= 3
69	T	1	
70	T	1	

VI. Question-wise Analysis

Q. No.	Objective	Course/Unit	Form of question	Marks alloted	Estd. Time (in minutes)	Estd. Difficulty level
1	K	1/III	FIB	1	1	B
2	K	2/III	FIB	1	1	B
3	K	5/III	FIB	1	1	C
4	K	6/I	FIB	1	1	C
5	U	3/IV	FIB	1	1	B
6	U	4/II	FIB	1	1	B
7	U	5/I	FIB	1	1	C
8	U	8/I	FIB	1	1	C
9	U	9/II	FIB	1	1	B
10	U	10/II	FIB	1	1	B
11	A	1/IV	FIB	1	1	C
12	A	2/I	FIB	1	1	B
13	A	6/V	FIB	1	1	A
14	A	8/III	FIB	1	1	B
15	A	8/I	FIB	1	1	B
16	K	1/II	MTF	1	3	C
17	K	4/I	MTF	1	3	C
18	K	6/II	MTF	1	3	C
19	U	2/IV	MTF	1	3	B
20	U	5/I	MTF	1	3	B
21	U	10/II	MTF	1	3	C
22	A	9/IV	MTF	1	3	A

23	K	2/I	MCQ	1	1	B
24	K	4/III	MCQ	1	1	C
25	K	5/V	MCQ	1	1	A
26	K	6/III	MCQ	1	1	B
27	K	10/III	MCQ	1	1	C
28	U	1/III	MCQ	1	1	B
29	U	3/I	MCQ	1	1	C
30	U	4/IV	MCQ	1	1	B
31	U	5/II	MCQ	1	1	B
32	U	6/V	MCQ	1	1	B
33	U	8/IV	MCQ	1	1	B
34	A	1/II	MCQ	1	1	C
35	A	2/V	MCQ	1	1	B
36	A	4/I	MCQ	1	1	C
37	A	6/IV	MCQ	1	1	B
38	A	8/II	MCQ	1	1	C
39	K	1/I	T / F	1	1	A
40	K	2/II	T / F	1	1	C
41	K	3/III	T / F	1	1	C
42	K	8/III	T / F	1	1	C
43	K	9/I	T / F	1	1	B
44	U	2/I	T / F	1	1	C
45	U	4/III	T / F	1	1	B
46	U	5/I	T / F	1	1	A
47	U	6/I	T / F	1	1	B
48	U	8/I	T / F	1	1	C
49	U	9/V	T / F	1	1	C
50	U	10/IV	T / F	1	1	C
51	A	1/I	T / F	1	1	B
52	A	3/II	T / F	1	1	B
53	A	4/V	T / F	1	1	B
54	A	5/IV	T / F	1	1	C

55	A	9/III	T / F	1	1	C
56	A	10/V	T / F	1	1	B
i)57	K	7a(i)/III	FIB	1	1	B
58	K	7b(i)/VI	FIB	1	1	C
59	U	7a(i)/V	FIB	1	1	C
60	U	7b(i)/VII	FIB	1	1	A
61	A	7a(i)/II	FIB	1	1	B
62	A	7a(i)/IV	MTF	1	3	C
63	A	7b(i)/X	MTF	1	3	A
64	K	7b(i)/X	MCQ	1	1	B
65	U	7a(i)/I	MCQ	1	1	C
66	U	7B(i)/IX	MCQ	1	1	B
67	A	7a(i)/V	MCQ	1	1	B
68	K	7b(i)/X	T / F	1	1	B
69	U	7a(i)/I	T / F	1	1	B
70	U	7b(i)/VIII	T / F	1	1	C
ii)57	K	7a(ii)/III	FIB	1	1	B
58	K	7b(ii)/VII	FIB	1	1	C
59	U	7a(ii)/I	FIB	1	1	C
60	U	7b(ii)/VIII	FIB	1	1	A
61	A	7a(ii)/V	FIB	1	1	B
62	A	7a(ii)/I	MTF	1	3	C
63	A	7b(ii)/VI	MTF	1	3	A
64	K	7b(ii)/VI	MCQ	1	1	B
65	U	7a(ii)/II	MCQ	1	1	C
66	U	7b(ii)/VII	MCQ	1	1	B
67	A	7a(ii)/IV	MCQ	1	1	B
68	K	7b(ii)/X	T/F	1	1	B
69	U	7a(ii)/IV	T/F	1	1	B
70	U	7b(ii)/IX	T/F	1	1	C
iii)57	K	7a(iii)/III	FIB	1	1	B
58	K	7b(iii)/VII	FIB	1	1	C

59	U	7a(iii)/III	FIB	1	1	C
60	U	7b(iii)/VIII	FIB	1	1	A
61	A	7a(iii)/V	FIB	1	1	B
62	A	7a(iii)/I	MTF	1	3	C
63	A	7b(iii)/VIII	MTF	1	3	A
64	K	7b(iii)/VI	MCQ	1	1	B
65	U	7a(iii)/II	MCQ	1	1	C
66	U	7b(iii)/VI	MCQ	1	1	B
67	A	7a(iii)/I	MCQ	1	1	B
68	K	7b(iii)/X	T/F	1	1	B
69	U	7a(iii)/IV	T/F	1	1	B
70	U	7b(iii)/IX	T/F	1	1	C
iv)57	K	7a(iv)/V	FIB	1	1	B
58	K	7b(iv)/IX	FIB	1	1	C
59	U	7a(iv)/I	FIB	1	1	C
60	U	7b(iv)/VI	FIB	1	1	A
61	A	7a(iv)/I	FIB	1	1	B
62	A	7a(iv)/V	MTF	1	3	C
63	A	7b(iv)/VI	MTF	1	3	A
64	K	7b(iv)/VII	MCQ	1	1	B
65	U	7a(iv)/II	MCQ	1	1	C
66	U	7b(iv)/X	MCQ	1	1	B
67	A	7a(iv)/IV	MCQ	1	1	B
68	K	7b(iv)/VIII	T/F	1	1	B
69	U	7a(iv)/III	T/F	1	1	B
70	U	7b(iv)/IX	T/F	1	1	C

Abbreviations used:

For Objectives: K – Knowledge U – Understanding A – Application

For Form of Questions: FIB – Fill in the blanks MTF – Match the following

MCQ – Multiple Choice Questions (Tick the correct answer)

T / F – True or False

For difficulty level of questions: A – Difficult B – Average C – Easy

- Estd. - Estimated Time: 2 hours (120 minutes)
- 118 minutes for answering the questions.
- 12 minutes for writing the details and reading the instructions.

3.6.3. Academic e-Learning Stress Scale

i) Introduction

Academic stress due to e-learning is a real and serious concern faced by students and is increasing at an alarming rate. It is experienced intensely by the 21st Century students as a result of the current condition of ambitious academic competitions and high expectations from every corner. With the transition from traditional teaching-learning settings to e-learning settings (synchronous, asynchronous or blended), learners face certain amount of academic stress. Tus (2020) defined stress as "anything that poses a challenge or a threat to the wellbeing of a person". According to Li et al. (2023) "Stress can be broadly defined as the response of the body when one cannot adapt to a situation when they feel under pressure or tension".

ii) Academic Stress

Academic stress is described by Borah et al. (2022) as "stressful psychological circumstances caused by educational demands from parents, teachers, family members and peers as well as parental pressure for academic achievement and the examination system". Yang et al. (2021) observed that "academic stress is a common problem for students at all levels of schooling, even at the college level". Academic stress caused by e-learning can have both positive and negative consequences if it is not managed well. It is perceived that positive stress promotes and increases the learning ability of a student, whereas, negative stress impaired the learner's ability to learn. In the same way, though e-learning may cause negative stress to some extent, yet, it also has its positive side. e-learning can help improve academic performance of the student-teachers as they are exposed to a wide range of e-resources that are available, thereby decrease academic stress.

A study of literature review revealed various stress scales related to e-learning with different dimensions. The Perceived Stress Scale (PSS) by Sheldon Cohen et al. (1983) had 10 items and was widely used to study stress related to e-learning in research. The Academic Stress Scale adapted by Rajendran & Kaliappan (1990) comprised of 40 items, classified into 5 areas viz., personal inadequacy, fear of failure, interpersonal difficulties with teachers, teacher-pupil relationship/teaching methods and inadequate study facilities. Perceptions of Academic Stress Scale (PAS) developed by Bedewey & Gabriel (2015) was of 18 items on a 5 point Likert Scale based on four dimensions- pressure to perform; perceptions of workload and examinations; self- perceptions; and time constraints. Lin &

Chen (2009) constructed the Academic Stress Inventory with 34 items comprised of 7 domains- stress from teachers; stress from results; stress of studying in a group; stress from the test; self-inflicted stress; peer stress; and stress of time management. The Academic Stress Scale developed and standardized by Anupama & Sarada (2018) consisted of 40 items with 5 domains namely, Cognitive, Affective, Behavioral, Physical and Social. An outline of the brief review indicated that different academic stress scales developed were mostly focused on the academic stress in general and not specific to e-learning. Moreover, even if it did study the academic stress related to e-learning, the tools were mostly carried out for the study during the pandemic lockdown period. Most of the scales did not include the continued e-learning mode of learning after the lockdown.

iii) Purpose of the Study

e-learning has come to play a indispensable role in education and therefore its effects on academic stress need to be examined. It is essential to understand academic stress in relation to e-learning. The present study will help to comprehend how the student-teachers experience academic stress caused by e-learning. The "Academic e-learning Stress Scale" was developed as there is no standardized test that is relevant to measure the stress experienced by the student-teachers due to e-learning.

iv) Procedure

Prior to the construction of the scale, the researcher carried out a comprehensive literature review and a preliminary draft of 70 items was prepared and distributed to experienced experts for validation of the items' relevance and clarity. Taking into account the suggestions given by the experts, the items were reframed and ambiguous words, double negative and double barreled items were avoided and language was corrected. The revised scale consisted of 56 items having both positive and negative statements.

v) Dimensions of the Academic e-learning Stress Scale

In the current scale, three components of academic stress have been modified and adapted, (viz., Psychological Stress, Academic Stress and Personal Stress) on a five point Likert Scale

1. **Psychological Stress:** Psychological stress refers to "a particular kind of relationship between person and environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being" (Lazarus & Folkman, 1984). The first dimension aimed to measure how e-learning

affects the psychological stress of the student-teachers. The investigator sought to measure the psychological stress under 4 sub-dimensions:–

i. Handling e-learning applications;

ii. Learning through e-learning;

iii. Utilizing e-learning resources; and

iv. Access to technology.

2. **Academic Stress**: Prabu (2015) defined academic stress as "the anxiety and stress that comes from schooling and education". The second dimension is the academic stress which aimed to measure how e-learning affects the academic demands of the student-teachers. The sub-dimensions included stress caused due to:-

   i. Preparation for examination;

   ii. Quality of academic work;

   iii. Quality of interaction;

   iv. Competition among peers; and

   v. Access to e-resources.

3. **Personal Stress:** The third dimension is the personal stress. It aimed to measure how use of e-learning affects the personal health, finance and pressure to adapt to technological innovations and developments. The sub-dimensions are:-

   i. Health concerns;

   ii. Financial pressure;

   iii. Time management;

   iv. Learning environment; and

   v. Adaptability towards e-learning innovations.

vi) Tryout

The revised scale was administered to 50 student-teachers randomly selected from two teacher education colleges in Kohima District (1 government and 1 private college each). The sample distribution was made on the basis of gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) as shown in Table No. 3.14.

Table No. 3.14: DISTRIBUTION OF SAMPLE ON THE BASIS OF GENDER, EDUCATIONAL QUALIFICATION AND PEDAGOGY OPTED.

Groups		N		Percentage	
Gender	Male	22		44%	
	Female	28	50	56%	100%
Educational qualification	Graduate	19		38%	
	Postgraduate	31	50	62%	100%
Pedagogy opted	Language	8		16%	
	Social sciences	21	50	42%	
	Science	9		18%	100%
	Mathematics	12		24%	

vii) Age group

The Scale can be applied on all the student-teachers who are 21 years and above, ie. student-teachers undergoing B.Ed. courses.

Viii) Scoring System

Each response towards the statement is a Five-point Likert Scale with different Weightage as follows: Strongly Agree – 5, Agree – 4, Undecided – 3, Disagree – 2, Strongly Disagree – 1 for the positive statements and vice versa for the negative statements. The scoring system is given in Table No. 3.15.

Table No. 3.15: Scoring System

Sl. No.	Type of Item	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
I.	Positive	5	4	3	2	1
II.	*Negative*	1	2	3	4	5

The minimum and maximum possible scores are 50 to 250.

viii) Analysis of the Items

The statements were analyzed by using statistical technique such as One-Sample t-test and finding out the 't' value of each statement at the 0.05 level of significance. After analyzing each item, 50 items were accepted as shown in Table No. 3.16.

Table No. 3.16: SELECTED ITEMS FOR THE ACADEMIC e-LEARNING STRESS SCALE

Item No.	N	Mean	SD	Standard Error	t-value	Accepted/Rejected
1.	50	3.80	.81	.11	33.25	Accepted
2.	50	3.80	.78	.11	34.34	Accepted
3.	50	3.78	.71	.10	37.74	Accepted
4.	50	3.90	.79	.11	34.95	Accepted
5.	50	3.74	.88	.12	30.18	Accepted
6.	50	3.78	.82	.12	32.78	Accepted
7.	50	3.34	.87	.12	27.10	Accepted
8.	50	4.26	.57	.08	53.35	Accepted
9.	50	3.36	.78	.11	30.61	Accepted
10.	50	2.96	.78	.11	26.79	Accepted
11.	50	3.44	.86	.12	28.25	Accepted
12.	50	3.24	.85	.12	27.06	Accepted
13.	50	3.08	.92	.13	23.61	Accepted
14.	50	3.38	.73	.10	32.95	Accepted
15.	50	3.20	.64	.09	35.42	Accepted
16.	50	3.66	.72	.10	36.07	Accepted
17.	50	3.32	.82	.12	28.66	Accepted
18.	50	3.44	.91	.13	26.82	Accepted
19.	50	2.54	.95	.14	18.86	Accepted
20.	50	2.90	.84	.12	24.44	Accepted
21.	50	3.82	.63	.09	42.95	Accepted
22.	50	2.68	1.00	.14	18.97	Accepted
23.	50	3.34	.90	.13	26.40	Accepted

24.	50	2.80	1.09	.15	18.20	Accepted
25.	50	3.30	1.04	.15	22.54	Accepted
26.	50	2.84	1.17	.17	17.21	Accepted
27.	50	3.83	.69	.10	39.10	Accepted
28.	50	3.56	.73	.10	34.35	Accepted
29.	50	2.88	.85	.12	24.00	Accepted
30.	50	2.30	.86	.12	18.84	Accepted
31.	50	3.22	.82	.12	27.92	Accepted
32.	50	3.40	.70	.10	34.35	Accepted
33.	50	3.82	.60	.08	45.36	Accepted
34.	50	2.52	1.02	.14	17.56	Accepted
35.	50	3.58	.76	.12	33.38	Accepted
36.	50	3.52	.76	.11	32.65	Accepted
37.	50	4.10	.71	.10	41.00	Accepted
38.	50	3.58	.67	.10	37.65	Accepted
39.	50	2.74	.85	.12	22.72	Accepted
40.	50	2.96	1.01	.14	20.74	Accepted
41.	50	2.72	.90	.13	21.27	Accepted
42.	50	3.18	1.00	.14	22.40	Accepted
43.	50	3.48	.84	.12	29.33	Accepted
44.	50	3.32	.82	.12	28.66	Accepted
45.	50	3.50	.93	.13	26.57	Accepted
46.	50	3.72	.78	.11	33.57	Accepted
47.	50	3.02	.98	.14	21.81	Accepted
48.	50	3.96	.95	.13	29.58	Accepted
49.	50	3.96	.70	.10	40.08	Accepted
50.	50	3.12	.90	.13	24.64	Accepted

ix) Reliability

The reliability of the scale was found out using the Split Half method, in which the items were divided into two equal ‘halves’ and the scores on half of the items are correlated with the scores on the other half. The self-correlation of the whole items was then established by Spearman Brown Prophecy formula. This method of reliability measures the internal

reliability of the test (Koul, 1984). For this particular scale, the co-efficient of co-relation found was .71, which is high positive significant at the 0.05 level of significance as shown in Table No. 3.17.

Table No. 3.17: RELIABILITY OF ACADEMIC e-LEARNING STRESS SCALE

	Spearman-Brown Coefficient	Cronbach's Alpha	Guttman Split-Half Coefficient
Academic e-learning Stress Scale	.71	.78	.71

x) Validity

The researcher had taken content validity of all the items for all the dimensions. Content validity was ensured through rational and logical analysis with the experts in and around Nagaland and one expert from outside the state. Some experts' views were taken through email, which was examined by the researcher and discussed with the supervisor. The constructive suggestions were incorporated and the final 50 items were finalized.

xi) Final Draft of the tool

The final draft of the tool consists of 50 items with 25 negative and 25 positive items as given in Table No. 3.18.

Table No. 3.18: DIMENSION WISE DISTRIBUTION OF ITEMS

Sl.No.	Dimension	Nature of Items	No. of Items	Total No. of Items	Total
1.	Psychological Stress	Positive Items	1, 2, 4, 7, 10, 11, 13, 15	8	15
		Negative Items	3, 5, 6, 8, 9, 12, 14	7	
2.	Academic Stress	Positive Items	16, 17, 18, 22, 24, 26, 27, 28, 29, 32	10	18
		Negative Items	19, 20, 21, 23, 25, 30, 31, 33	8	
3.	Personal Stress	Positive Items	35, 36, 40, 41, 43, 47, 48	7	17
		Negative Items	34, 37, 38, 39, 42, 44, 45, 46, 49, 50	10	

xiii) Scoring system

The scale is a Five-point scale viz., **Strongly Agree, Agree, Undecided, Disagree and Strongly Disagree.** The scale has both positive and negative type items.

The scoring system is given in Table No. 3.19.

Table No. 3.19: SCORING SYSTEM

Sl. No.	Type of Items	Strongly Agree	Agree	Undecided	Disagree	Strongly Disagree
1.	Positive	5	4	3	2	1
2.	***Negative***	1	2	3	4	5

The minimum and maximum possible scores are 50 to 250.

xiv) Norms

Norms for Interpretation of the Level of Academic Stress is given in Table No. 3.20.

Table No. 3.20: NORMS FOR INTERPRETATION OF ACADEMIC STRESS LEVEL

Academic Stress Level	N	Cut off Score
Q1 (Low Academic Stress)	13	159 and below
Q2 (Average Academic Stress)	25	Between 160 and 179
Q3 (High Academic Stress)	12	180 and above

xv) Interpretation

It is suggested that scores 180 and above reflects high stress, scores between 160 and 179 reflects average stress and scores 159 and below reflects low stress.

3.7. Procedure of Data Collection

Prior permission from the principals and administrators of teacher education colleges was taken for collection of data. The data was collected from the 4^{th} semester student-teachers.

The researcher personally visited and administered the tools to the sample population to ensure prompt and complete return of the tools.

3.8. Statistical Techniques Used

Statistics is defined as "a body of mathematical techniques or processes for gathering, organizing, analyzing and interpreting numerical data" (Best & Kahn, 1995). Koul (1984) has suggested four basic purposes of statistics- i) reduction of large data into manageable and comprehensible form; ii) aid in the study of population and samples; iii) assist in decision making; and iv) help in generalization or making inferences from the data collected.

Therefore, to analyze the data collected, the researcher used Mean, Standard Deviation, t-test (C.R.), Post hoc t-test, Pearson's Product-Moment Correlation, Multiple Correlation and Analysis of Variance (ANOVA). The analysis was systematically carried out according to the objectives of the study.

3.9. Analysis of Data

The data collected were organized, classified, tabulated, analyzed and interpreted. The questionnaire of the respondents were thoroughly checked and edited for accuracy, usefulness and completeness. It was then classified into the different categories with respect to gender, educational qualification and pedagogy opted. The raw data thus classified were coded with numerical numbers and entered on MS Excel sheet. The statistical techniques were applied for analyzing and interpreting the numerical data gathered and organized with the help of SPSS V .20 (Statistical Package of Social Sciences) and represented through tables. Graphs were prepared with MS Excel for easy and simple understanding of the data tabulated. After the data analysis, the findings were interpreted and conclusions and generalizations were drawn by keeping the research objectives and hypotheses in mind.

CHAPTER-IV
DATA ANALYSIS AND INTERPRETATION

4.1. Introduction

A crucial step after the data collection in the process of research is the organization, analysis and interpretation of the data and formulating conclusion. The data collected is to be organized systematically, i.e. edited, classified and tabulated. Therefore, data collected for the study were analyzed and interpreted in the present chapter.

The data gathered for the present study were analyzed and presented in tables in terms of objectives and for testing the hypotheses. In the present study, the sample included 400 student-teachers, out of which 100 were male and 300 were female. The variables were attitude towards e-learning as the dependent variable and independent variables were academic performance and academic stress. The intervening variables included gender, educational qualification and pedagogy opted. The collected data were tabulated and analyzed using statistical techniques viz., Mean, Standard Deviation (SD), t-test Post hoc t-test, Pearson's Product-Moment Correlation, Multiple regression and Analysis of Variance (ANOVA).

4.1.1. Gender-Wise Status of Attitude towards e-learning, Academic Performance and Academic Stress among Student-Teachers of Nagaland

To understand the gender-wise status of student-teachers in their attitude towards e-learning, academic performance and academic stress, the researcher analyzed the data collected and the result was shown in Table No. 4.0.1.

Table No. 4.0.1: MEAN AND STANDARD DEVIATION OF ATTITUDE TOWARDS e-LEARNING, ACADEMIC PERFORMANCE AND ACADEMIC STRESS OF MALE AND FEMALE STUDENT-TEACHERS OF NAGALAND.

Variance	Group	N	M	SD	Minimum	Maximum
Attitude towards e-learning	Male	100	226.35	22.92	170	291
	Female	300	223.91	22.30	170	282
Academic performance	Male	100	50.37	7.95	28	65
	Female	300	52.70	7.73	28	66
Academic stress	Male	100	169.67	19.21	114	205
	Female	300	166.78	20.05	104	213

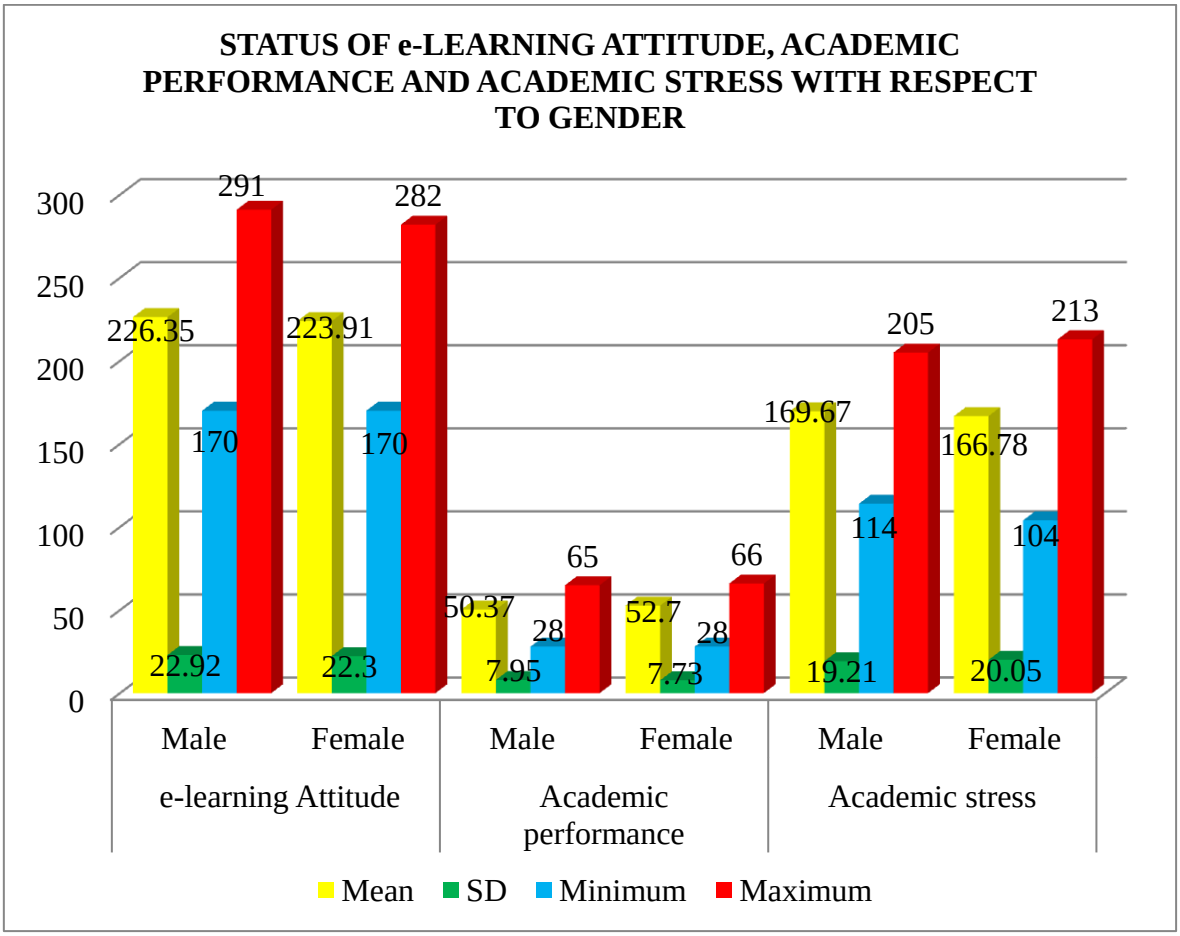

Figure No. 4 (a): Status of e-learning attitude, academic performance and academic stress with respect to gender.

Table No. 4.0.1 indicated that the mean scores of attitude towards e-learning of male and female student-teachers were 226.35 and 223.91 and the SD was 22.92 and 22.30

respectively. Therefore, it was established that the male student-teachers had higher positive attitude towards e-learning than the female student-teachers.

It was also inferred that the mean scores of the academic performance of the male and female student-teachers were 50.37 and 52.70 and the SD was 7.95 and 7.73 respectively. Therefore, it was depicted that the academic performance of the male student-teachers was lower than the female student-teachers.

The table further showed that the mean scores of academic stress of male and female student-teachers were 169.67 and 166.78 and the SD was 19.21 and 20.05 respectively. Therefore, it was observed that the academic stress of male student-teachers was higher than the female student-teachers.

4.1.2. Status of Attitude towards e-learning, Academic Performance and Academic Stress with respect to Educational Qualification among Student-Teachers of Nagaland

The status of student-teachers of Nagaland in their attitude towards e-learning, academic performance and academic stress with regard to their educational qualification was examined and the result was depicted in Table No. 4.0.2.

Table No. 4.0.2: MEAN AND STANDARD DEVIATION OF ATTITUDE TOWARDS e-LEARNING, ACADEMIC PERFORMANCE AND ACADEMIC STRESS OF GRADUATE AND POSTGRADUATE STUDENT-TEACHERS OF NAGALAND

Variance	Group	N	M	SD	Minimum	Maximum
Attitude towards e-learning	Graduate	184	222.96	22.46	170	283
	Postgraduate	216	225.86	22.41	170	291
Academic performance	Graduate	184	50.45	8.07	30	65
	Postgraduate	216	53.54	7.36	28	66
Academic stress	Graduate	184	169.34	18.46	114	213
	Postgraduate	216	165.94	20.89	104	205

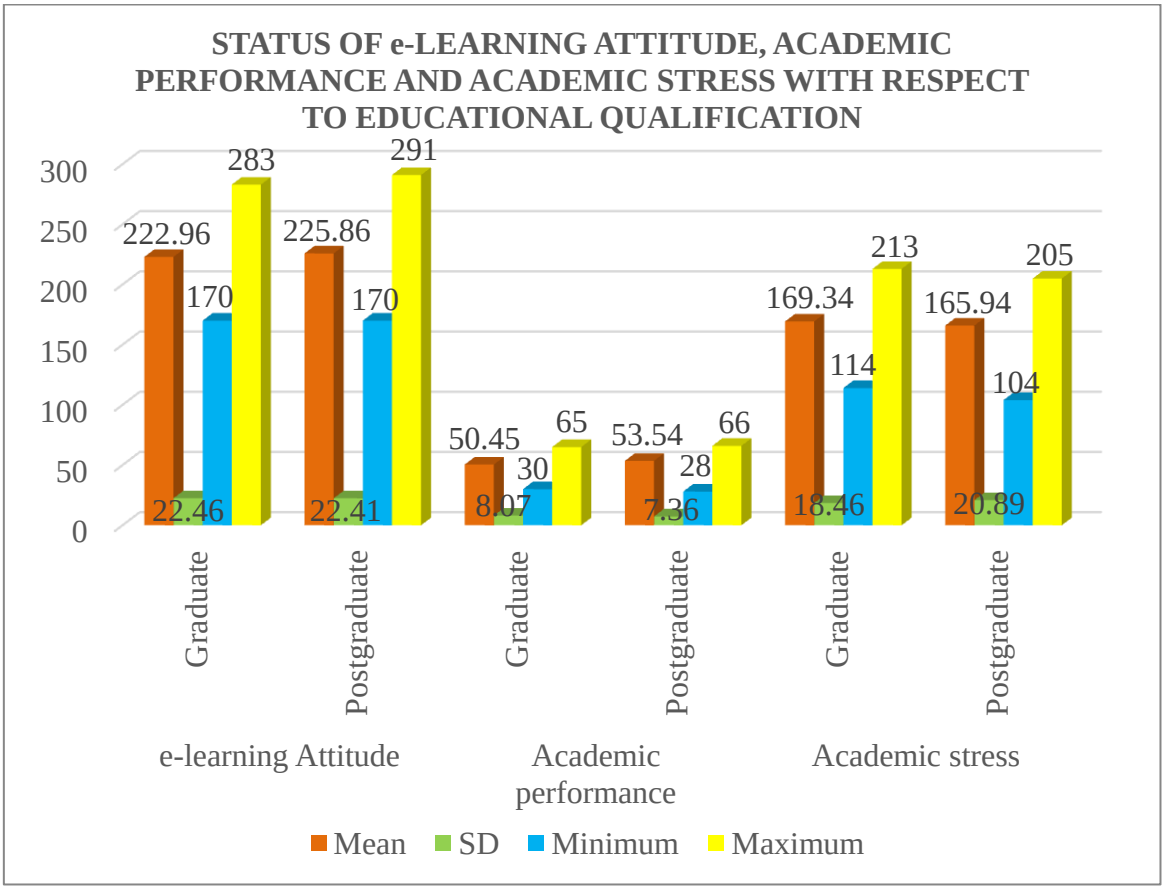

Figure No. 4 (b): Status of e-learning attitude, academic performance and academic stress with respect to educational qualification.

Table No. 4.0.2 indicated that the mean scores of attitude towards e-learning of graduate and postgraduate student-teachers were 222.96 and 225.86 and SD was 22.46 and 22.41 respectively. Analysis of the result revealed that postgraduate student-teachers had higher positive attitude towards e-learning as compared to the graduate student-teachers.

It was also found that the mean scores of the academic performance of graduate and postgraduate student-teachers were 50.45 and 53.54 and SD was 8.07 and 7.36 respectively. Therefore, it was inferred that the academic performance of the graduate student-teachers was lower than the postgraduate student-teachers.

The table further revealed that the mean scores of academic stress of graduate and postgraduate student-teachers were 169.34 and 165.94 and SD was 18.46 and 20.89 respectively. Therefore, the academic stress of graduate student-teachers was higher than the postgraduate student-teachers.

4.1.3. Status of Attitude towards e-learning, Academic Performance and Academic Stress with respect to Pedagogy opted among Student-Teachers of Nagaland

The status of student-teachers' attitude towards e-learning, academic performance and academic stress with regard to pedagogy opted was analyzed and the result was shown in Table No. 4.0.3.

Table No. 4.0.3: MEAN AND STANDARD DEVIATION OF ATTITUDE TOWARDS e-LEARNING, ACADEMIC PERFORMANCE AND ACADEMIC STRESS OF STUDENT-TEACHERS OF NAGALAND WITH RESPECT TO PEDAGOGY OPTED

Variance	Group	N	M	SD	Minimum	Maximum
Attitude towards e-learning	Language	127	227.50	23.01	170	291
	Social sciences	163	218.45	17.81	170	267
	Science	61	230.84	22.92	181	271
	Mathematics	49	229.14	29.20	170	291
Academic performance	Language	127	54.46	6.42	34	65
	Social sciences	163	48.41	8.32	28	64
	Science	61	55.38	5.87	37	66
	Mathematics	49	54.29	6.81	38	65
Academic stress	Language	127	165.46	20.30	107	202
	Social sciences	163	172.34	16.68	119	213
	Science	61	165.28	20.91	104	195
	Mathematics	49	159.45	23.40	107	193

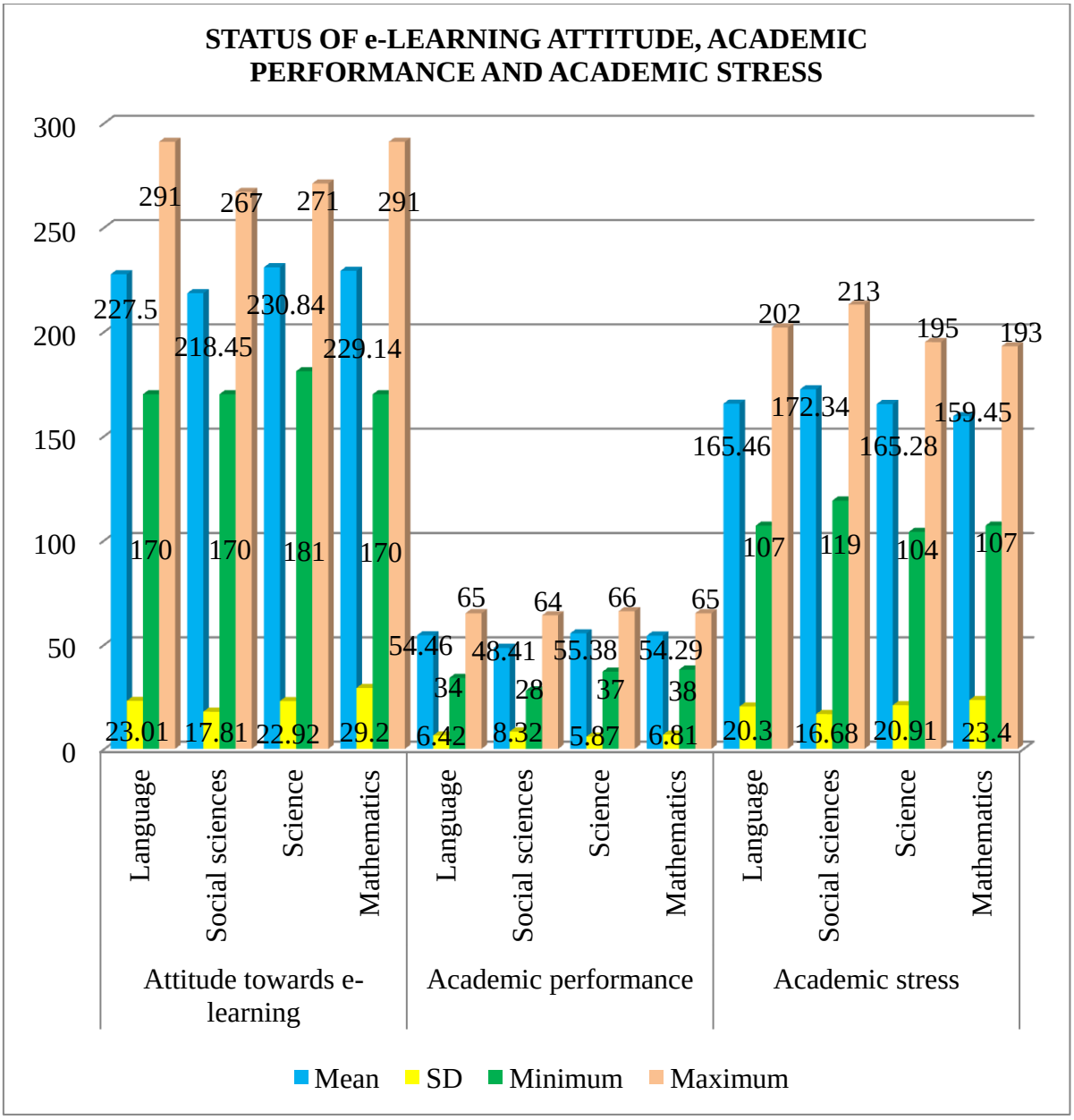

Figure No. 4 (c): Status of e-learning attitude, academic performance and academic stress with respect to pedagogy opted.

Table No. 4.0.3 indicated that the mean scores of attitude towards e-learning of language, social sciences, science and mathematics of student-teachers were 227.50, 218.45, 230.84 and 229.14 and the SD were 23.01, 17.81, 22.92 and 29.20 respectively. Analysis of the result revealed that the science student-teachers had the highest positive attitude towards e-learning in comparison to student-teachers who opted for language, social sciences and mathematics. It was also inferred that mathematics student-teachers had higher attitude towards e-learning as compared to language and social science student-teachers. Social sciences student-teachers were depicted to have the lowest attitude towards e-learning as

compared to other student-teachers who opted for language, science and mathematics pedagogy.

It was further indicated that the mean scores of academic performance of language, social sciences, science and mathematics of student-teachers were 54.46, 48.41, 55.38 and 54.29 and SD was 6.42, 8.32, 5.87 and 6.81 respectively. Analysis of the result revealed that the science student-teachers had the highest academic performance in comparison to student-teachers from language, social sciences and mathematics pedagogies. It was also inferred that social science student-teachers had the lowest academic performance as compared to the other pedagogy student-teachers. However, language and mathematics student-teachers had similar academic performance status.

The table further indicated that the mean scores of academic stress of language, social sciences, science and mathematics student-teachers were 165.46, 172.34, 165.28 and 159.45 and SD were 20.30, 16.68, 20.91 and 23.40 respectively. Analysis of the result revealed that the academic stress of social sciences student-teachers was highest in comparison to student-teachers belonging to language, science and mathematics pedagogies. It was further observed that mathematics student-teachers had lowest academic stress as compared to other student-teachers from language, social sciences and science pedagogy. Nevertheless, language and science student-teachers had almost the same academic stress.

4.1.4. Status of Academic Performance among Student-Teachers of Nagaland

To understand the academic performance status, the collected data were analyzed and the result was revealed in Table No. 4.0.4.

Table No. 4.0.4: ACADEMIC PERFORMANCE STATUS AMONG STUDENT-TEACHERS OF NAGALAND

Academic Performance	Score	N	Percentage (%)
Q1 (low)	48-28	108	27%
Q2 (average)	49-57	189	47.25%
Q3 (high)	58-66	103	25.75%
	Total	N = 400	100%

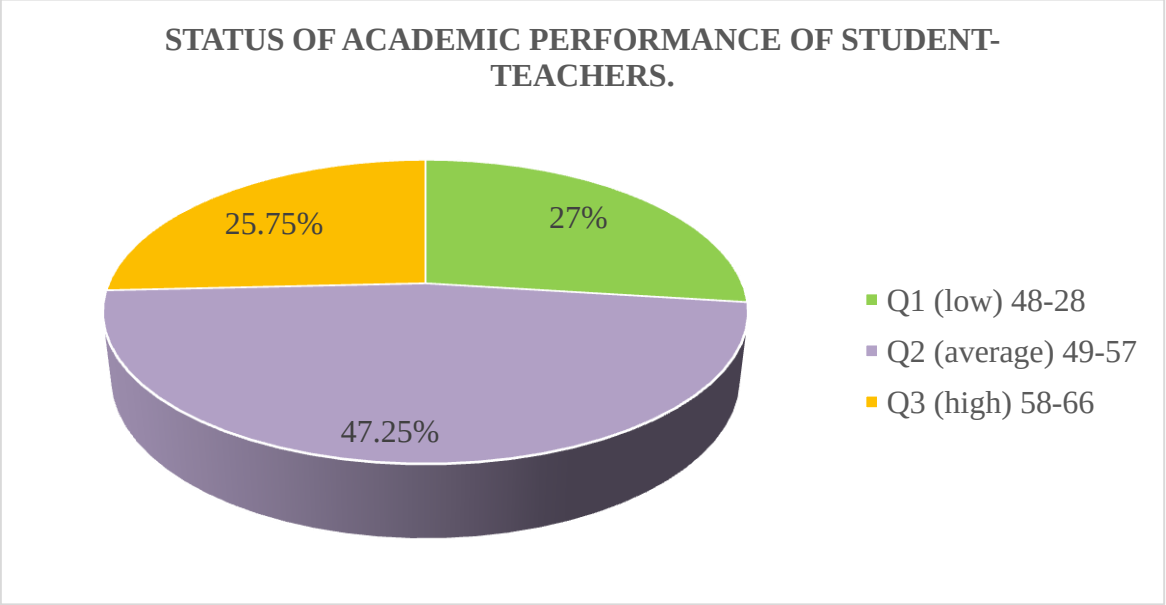

Figure No. 4 (d): Status of academic performance of student-teachers.

Table No. 4.0.4 showed that 27% of the student-teachers had low academic performance level, 25.75% had higher performance level and 47.25% had average level of academic performance.

4.1.5. Status of Academic Stress among Student-Teachers of Nagaland

The status of student-teachers on academic stress was examined and the result was shown in Table No. 4.0.5.

Table No. 4.0.5: ACADEMIC STRESS STATUS AMONG STUDENT-TEACHERS OF NAGALAND

Academic Stress	Score	N	Percentage (%)
Q1 (low)	159-104	100	25%
Q2(average)	160-179	196	49%
Q3 (high)	180-213	104	26%
	Total	N = 400	100%

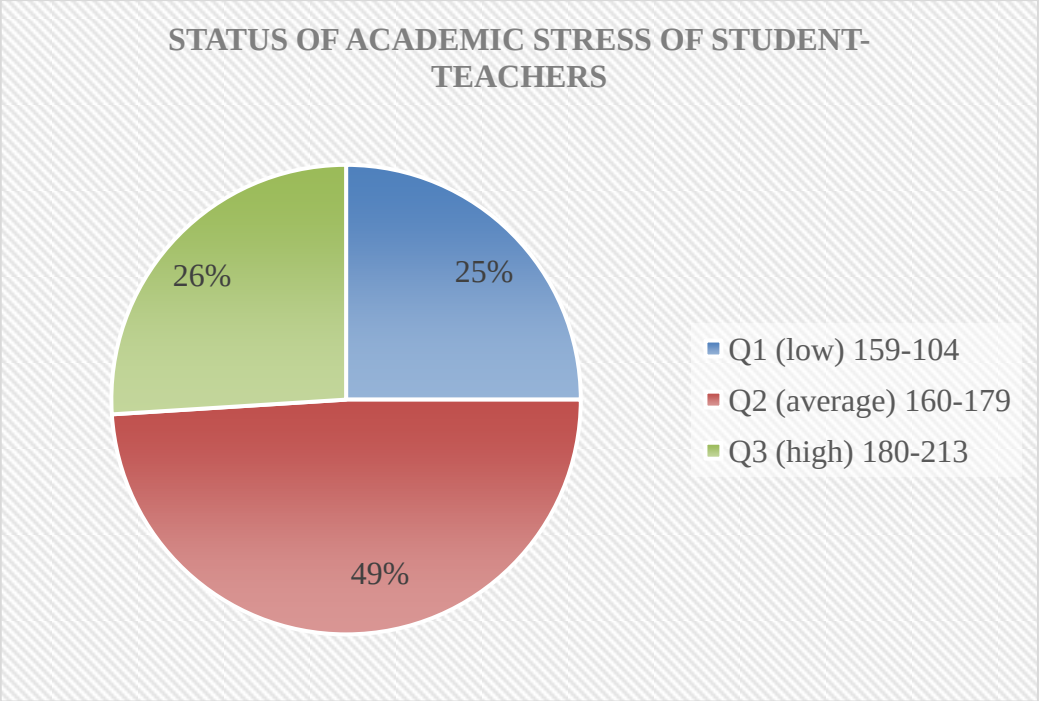

Figure No. 4 (e): Status of academic performance of student-teachers.

Table No. 4.0.5 indicated that 25% of the student-teachers had low academic stress, 49% had average academic stress and 26% had high level academic stress.

4.2. Objective-Wise Data Analysis

The objective-wise analyses of the data are as follows:

4.2.1. Attitude towards e-learning Differential with respect to Gender and Educational Qualification of Student-Teachers for the total Sample

Objective 1: To determine the significant difference among the student-teachers of Nagaland on attitude towards e-learning with respect to gender (male and female) and educational qualification (graduate and postgraduate).

The mean and SD of the attitude towards e-learning with respect to gender and educational qualification for the total sample and the t-value among them are presented in Table No. 4.1 and Figure No. 4(f).

Table No. 4.1: SIGNIFICANCE OF DIFFERENCE IN MEAN SCORES AND STANDARD DEVIATION ON ATTITUDE TOWARDS e-LEARNING WITH RESPECT TO GENDER AND EDUCATIONAL QUALIFICATION OF STUDENT-TEACHERS OF NAGALAND

Variance	Group	N	M	SD	C.R.	Significance
Attitude towards e-learning	Male	100	226.35	22.92	0.93	Not significant at 0.05 level of significance
	Female	300	223.91	22.30		
	Graduate	184	222.96	22.46	1.29	Not significant at 0.05 level of significance
	Postgraduate	216	225.86	22.41		

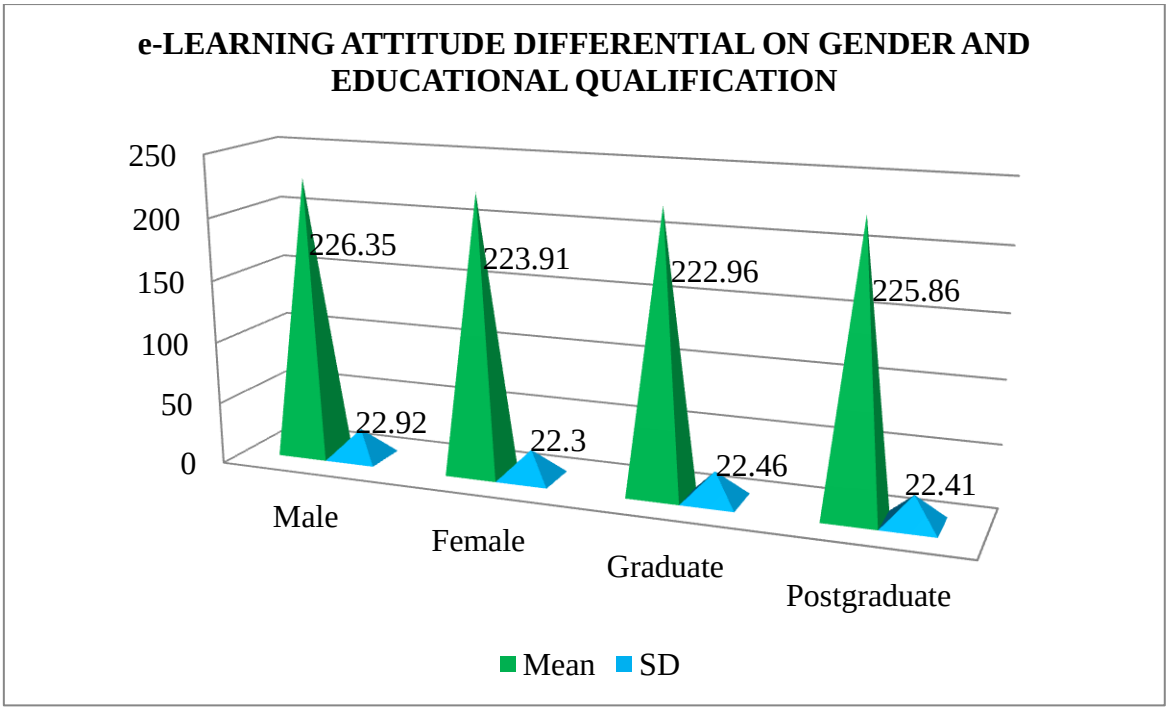

Figure No. 4 (f): e-learning attitude differential on gender and educational qualification.

4.2.1.1. Difference in the attitude of student-teachers toward e-learning with respect to gender (male and female).

Table No. 4.1 showed that the mean scores of attitude towards e-learning of male and female student-teachers of Nagaland were 226.35 and 223.91 respectively. It was indicated that the male student-teachers obtained higher mean scores in their attitude towards e-learning than the female student-teachers. The Critical Ratio (C.R.) between the two groups was 0.93, which was not significant at the 0.05 level of significance. This depicted that the male and female student-teachers did not differ significantly in their attitude towards e-learning. Hence, the formulated null hypothesis that "there is no significant difference in the attitude of student-teachers toward e-learning with respect to gender (male and female)" was accepted. The findings of Kumari (2013), Subramani (2014) and Kant (2016), go in tune with the present findings. However, the findings of Kumar (2018), Talluri (2023) and Panda & Neha (2024) contradicted the results of the present study.

4.2.1.2. Difference in the attitude of student-teachers toward e-learning with respect to educational qualification (graduate and postgraduate).

The table further indicated that the mean scores of attitude towards e-learning of graduate and postgraduate student-teachers of Nagaland were 222.96 and 225.86 respectively. It

was depicted that the postgraduate student-teachers obtained higher mean scores in their attitude towards e-learning than the graduate student-teachers. The C.R. between the two groups was 1.29 which was not significant at the 0.05 level of significance. This revealed that the graduate and postgraduate student-teachers did not differ significantly in their attitude towards e-learning. Hence, the formulated null hypothesis that "there is no significant difference in the attitude of student-teachers toward e-learning with respect to educational qualification (graduate and postgraduate)" was accepted. A similar finding was reported by Thirumoorthy & Arun (2021). Nevertheless, the recent findings of Sattanathan (2024) countered the present result.

4.2.2. Attitude towards e-learning Differential with respect to Pedagogy opted for the total Sample of Student-Teachers of Nagaland

Objective 2: To determine the significant difference in attitude of student-teachers toward e-learning with respect to the different pedagogy opted (language, social sciences, science and mathematics).

Table No. 4.2: e-LEARNING ATTITUDE DIFFERENTIAL WITH RESPECT TO PEDAGOGY OPTED OF STUDENT-TEACHERS FOR THE TOTAL SAMPLE

Variance	Sum of Squares	df	Mean Square	F-ratio	Significance
Between Groups	10603.28	3	3534.43	7.35	Significant at 0.05 level of significance
Within Groups	190528.51	396	481.13		
Total	201131.80	399	4015.56		

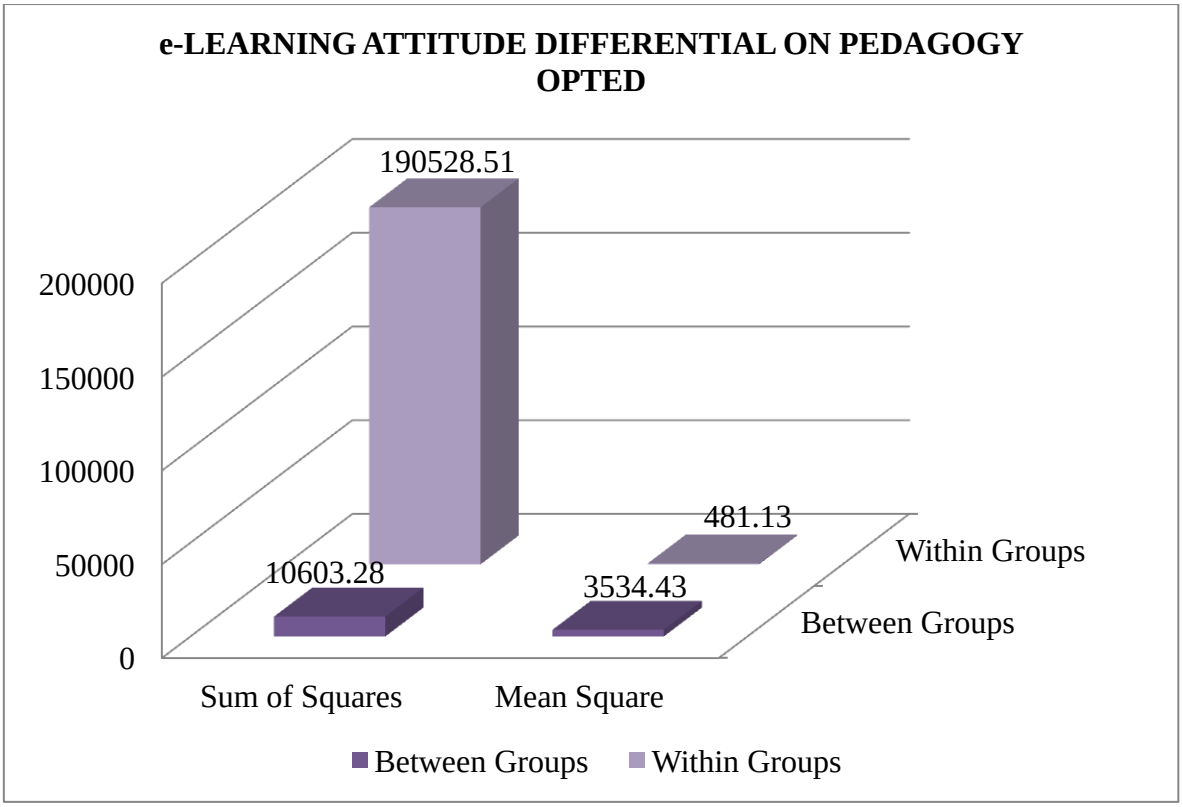

Figure No. 4 (g): e-learning attitude differential on pedagogy opted.

4.2.2.1. Difference in attitude of student-teachers toward e-learning with respect to the different pedagogy opted (language, social sciences, science and mathematics).

From Table No. 4.2 it was found that the F-ratio between and within the groups of e-learning attitude differential with respect to pedagogy opted was 7.35 which was significant at 0.05 level of significance (df 3/396 at 0.05 = 2.63). The mean square between the groups was 3534.43 and within the groups were 481.13. Thus, the formulated null hypothesis that "there is no significant difference in attitude of student-teachers toward e-learning with respect to the different pedagogy opted (language, social sciences, science and mathematics)" was rejected. That means between and within groups have differences when e-learning was taken as independent factor. Therefore, it was inferred that e-learning has positive influence between and among the different pedagogy opted by student-teachers.

4.2.2.1. Post Hoc t-Test of Attitude towards e-learning with respect to Pedagogy opted

Post hoc t-test was calculated to identify exactly which groups differ from each other. In this case, the Post hoc t-test was carried out to identify the difference between the subjects of pedagogy opted. The analysis was done and shown in Table No. 4.2.1.

Table No. 4.2.1: POST HOC t- TEST FOR MEAN AND STANDARD DEVIATION OF ATTITUDE TOWARDS e-LEARNING OF STUDENT-TEACHERS OF NAGALAND WITH RESPECT TO PEDAGOGY OPTED

Variance	Pedagogy opted	N	Mean	SD	C.R.	Significance
Attitude towards e-learning	Language	127	227.50	23.01	3.66	Significant at 0.05 level of significance
	Social sciences	163	218.45	17.81		
	Language	127	227.50	23.01	0.93	Not Significant at 0.05 level of significance
	Science	61	230.84	22.92		
	Language	127	227.50	23.01	0.35	Not Significant at 0.05 level of significance
	Mathematics	49	229.14	29.20		
	Social sciences	163	218.45	17.81	3.81	Significant at 0.05 level of significance
	Science	61	230.84	22.92		
	Social sciences	163	218.45	17.81	2.43	Significant at 0.05 level of significance
	Mathematics	49	229.14	29.20		
	Science	61	230.84	22.92	0.34	Not Significant at 0.05 level of significance
	Mathematics	49	229.14	29.20		

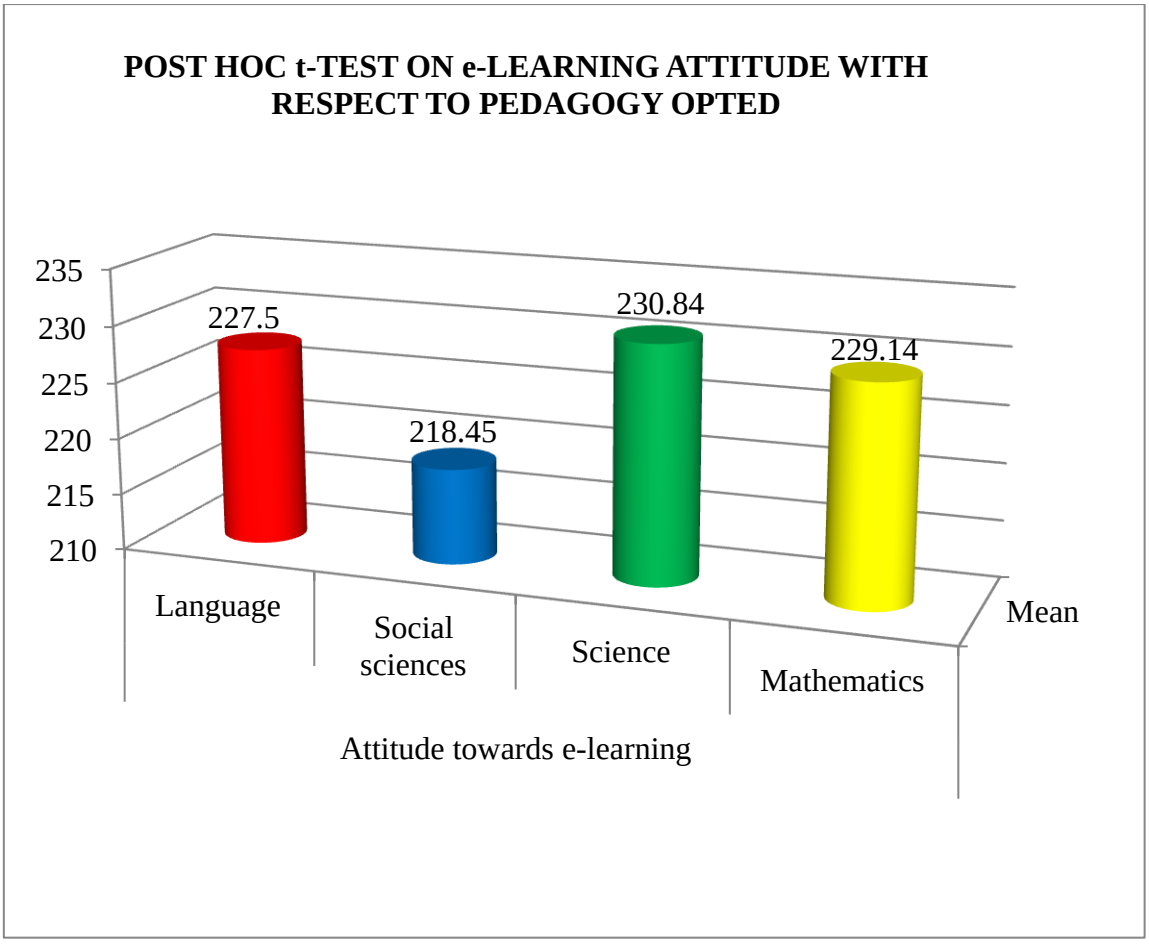

Figure No. 4 (h): Post Hoc t-Test on e-learning attitude with respect to pedagogy opted.

4.2.2.2. Post Hoc t-Test of attitude towards e-learning with respect to pedagogy opted.

Table No. 4.2.1 clearly implied that there was a significant difference between language and social sciences student-teachers on their attitude towards e-learning with the C.R. at 3.66 which was significant at the 0.05 level of significance. Social sciences and science student-teachers also had significant difference at the 0.05 level of significance, with C.R. at 3.81. Social sciences and mathematics student-teachers' attitude on e-learning was found to be significant at 0.05 level with C.R. at 2.43. The findings were consistent with Subramani (2014) and Sattanathen (2024). However, there was no significant difference between language and science, language and mathematics, and science and mathematics student-teachers with C.R. at 0.93, 0.35 and 0.34 respectively. Further, it was observed that the mean scores of science student-teachers was 230.84 which was higher than the language, social sciences and mathematics student-teachers whose mean scores were 227.50, 218.45 and 229.14 respectively. These findings indicated that science student-

teachers had the highest positive attitude towards e-learning and social sciences student-teachers had the lowest positive attitude towards e-learning.

4.2.3. Influence of Attitude towards e-learning Differential on Academic Performance of Student-Teachers of Nagaland

Objective 3: To assess the influence of attitude towards e-learning on academic performance of student-teachers of Nagaland.

Table No. 4.3: INFLUENCE OF e-LEARNING ATTITUDE DIFFERENTIAL ON ACADEMIC PERFORMANCE OF STUDENT-TEACHERS

Variance	Sum of Squares	df	"Mean Square"	F-ratio	Significance
Between Groups	53724.63	2	26862.32	72.35	Significant at 0.05 level of significance
Within Groups	147407.17	397	371.30		
Total	201131.80	399	27233.62		

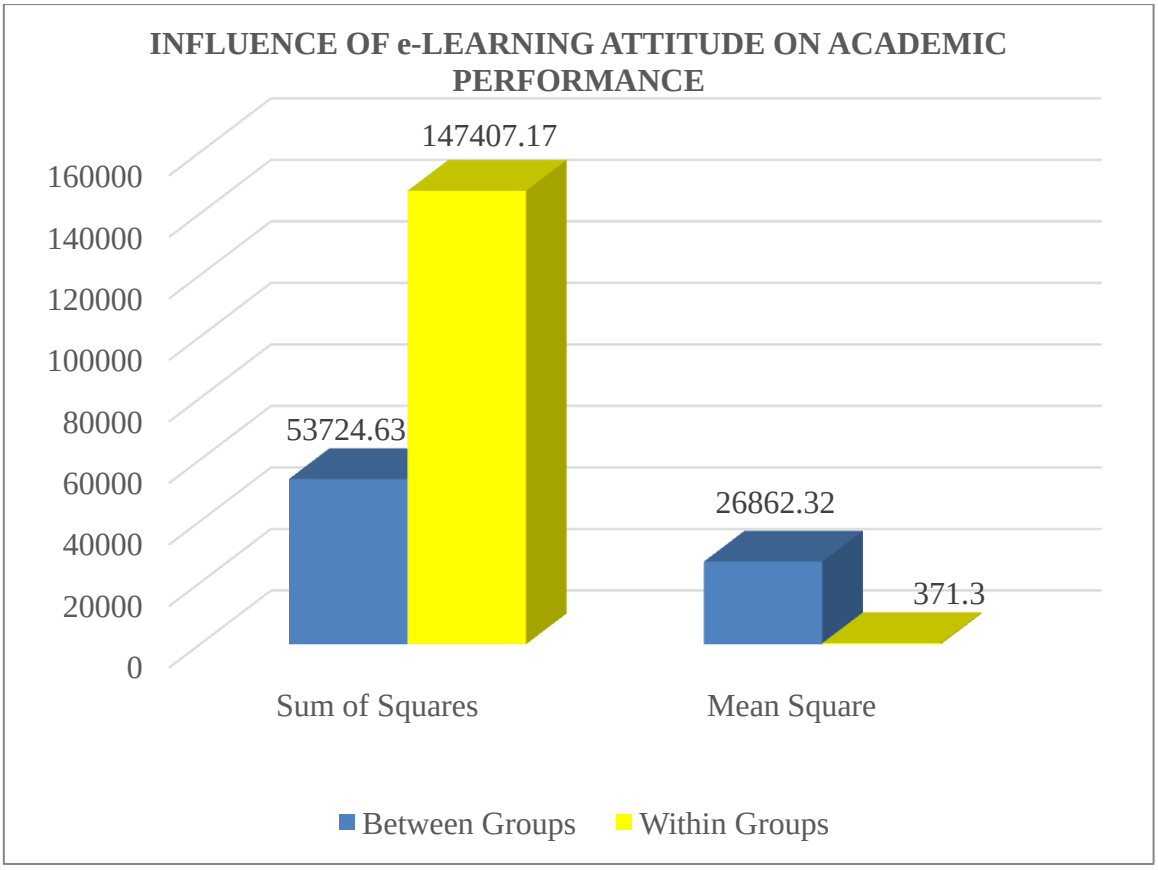

Figure No. 4 (i): Influence of e-learning attitude on academic performance.

4.2.3.1. Influence of attitude towards e-learning on academic performance of student-teachers.

From Table No. 4.3, it was established that the F-ratio between and within the groups on attitude towards e-learning and academic performance (high academic performance, average academic performance and low academic performance) was 72.35 which was significant at the 0.05 level of significance. The Mean Square between the groups was 26862.32 and within the groups were 371.30. Hence, the formulated null hypothesis that "there is no significant influence of attitude towards e-learning on academic performance of student-teachers of Nagaland" was rejected. That means between and within groups have differences when academic performance was taken as independent factor for attitude towards e-learning. Therefore, it was revealed that attitude towards e-learning had positive influence on academic performance between and among the student-teachers. This was supported by the findings of Mothibi (2015), Kumar (2018), Davis (2021 and Hamzaoui (2024).

4.2.3.1. Post Hoc t-Test of Attitude towards e-learning Differential on Academic Performance

The Post hoc t-test was carried out to find out the attitude towards e-learning differential on the different levels of academic performance as shown in Table No. 4.3.1.

Table No. 4.3.1: POST HOC t- TEST FOR MEAN AND STANDARD DEVIATION OF ATTITUDE TOWARDS e-LEARNING DIFFERENTIAL ON ACADEMIC PERFORMANCE OF STUDENT-TEACHERS (HIGH ACADEMIC PERFORMANCE, AVERAGE ACADEMIC PERFORMANCE AND LOW ACADEMIC PERFORMANCE)

Variance	Levels	N	Mean	SD	C.R.	Significance
Academic performance	Low	108	214.55	16.46	2.41	Significant at 0.05 level of significance
	Average	189	219.55	18.51		
	Low	108	214.55	16.46	10.78	Significant at 0.05 level of significance
	High	103	244.11	22.75		
	Average	189	219.55	18.51	9.39	Significant at 0.05 level of significance
	High	103	244.11	22.75		

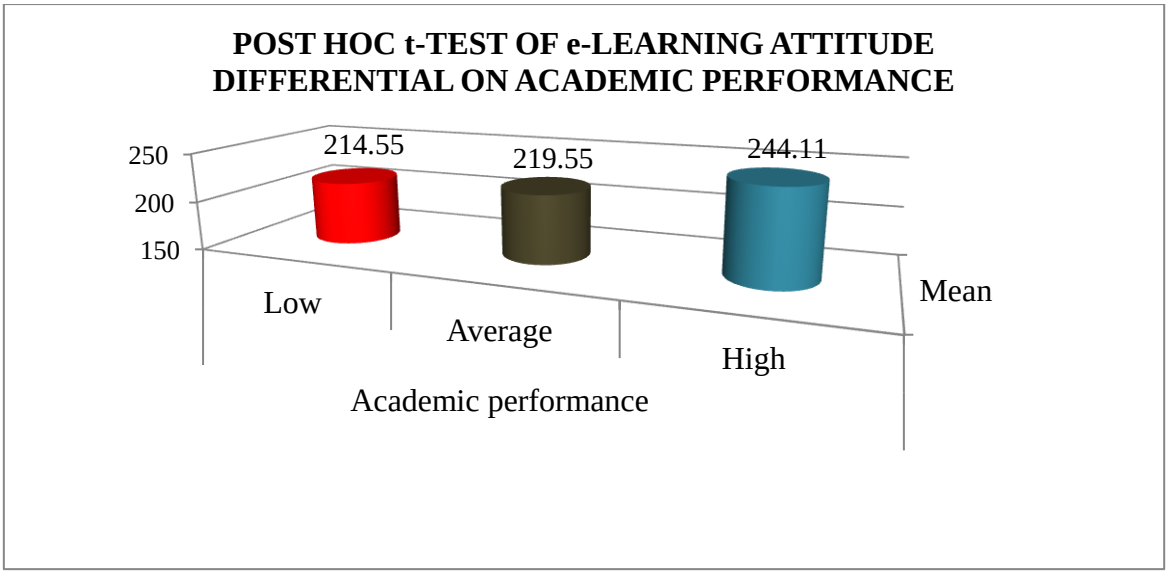

Figure No. 4 (j): Post Hoc t-Test of e-learning attitude differential on academic performance.

4.2.3.2. Post Hoc t-Test of attitude towards e-learning differential on academic performance.

Table No. 4.3.1 revealed that there was significant difference between the student-teachers with low and average academic performance on their attitude towards e-learning with the C.R. at 2.41 which was significant at the 0.05 level of significance. Student-teachers with low and high academic performance had significant difference in their attitude towards e-learning with C.R. at 10.78 which was significant at 0.05 level of confidence. There was also significant difference between the average and the high academic performance of student-teachers on their attitude towards e-learning with C.R. at 9.39 which was significant at the 0.05 level of significance.

Further, it was observed that the mean scores of low academic performance student-teachers was 214.55, the average academic performance student-teachers' mean scores was 219.55 and student-teachers with high academic performance had mean scores of 244.11. These findings indicated that student-teachers with higher academic performance had the highest positive attitude towards e-learning as compared to the low and average academic performance student-teachers.

4.2.4. Attitude towards e-learning Differential on Academic Stress of Student-Teachers of Nagaland

Objective 4: To assess the influence of attitude towards e-learning on academic stress of student-teachers of Nagaland.

Table No. 4.4: e-LEARNING ATTITUDE DIFFERENTIAL ON ACADEMIC STRESS OF STUDENT-TEACHERS

Variance	Sum of Squares	df	Mean Square	F-ratio	Significance
Between Groups	45493.46	2	22746.73	58.02	Significant at 0.05 level of significance
Within Groups	155638.34	397	392.04		
Total	201131.80	399	23138.76		

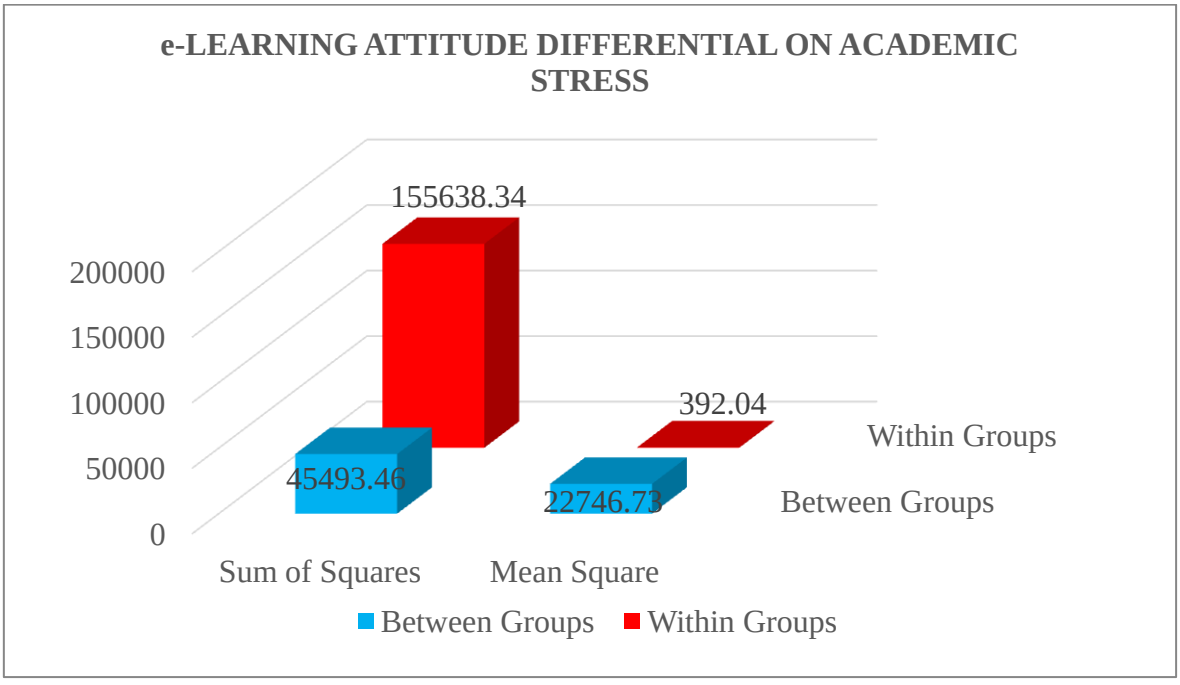

Figure No. 4 (k): e-learning attitude differential on academic stress.

4.2.4.1. Influence of attitude towards e-learning on academic stress of student-teachers.

Table No. 4.4. found that the F-ratio between and within the groups on attitude towards e-learning and academic stress (high academic stress, average academic stress and low academic stress) was 58.02, which was significant at the 0.05 level of significance. The Mean Square between the groups was 22746.73 and within the groups were 392.04. Hence, the formulated null hypothesis that "there is no significant influence of attitude towards e-learning on academic stress of student-teachers of Nagaland" was rejected. That means between and within groups have differences when academic stress was taken as independent factor for e-learning. Therefore, it was revealed that academic stress has negative influence between and among the student-teachers. This was also observed in the results of Moawad (2020) and Elashry et al. (2022).

4.2.4.1. Post Hoc t-Test of Attitude towards e-learning Differential on Academic Stress

The Post hoc t-test was carried out to find out the attitude towards e-learning differential on the different "levels of academic stress as shown in table 4.4.1.

Table No. 4.4.1: POST HOC t-TEST FOR MEAN AND STANDARD DEVIATION OF ATTITUDE TOWARDS e-LEARNING DIFFERENTIAL ON ACADEMIC STRESS OF STUDENT-TEACHERS (HIGH ACADEMIC STRESS, AVERAGE ACADEMIC STRESS AND LOW ACADEMIC STRESS)

POST HOC t-TEST

Variance	Levels	N	Mean	SD	C.R.	Significance
Academic stress	Low	100	242.93	24.01	8.58	Significant at 0.05 level of significance
	Average	196	219.59	17.91		
	Low	100	242.93	24.01	8.89	Significant at 0.05 level of significance
	High	104	216.13	18.58		
	Average	196	219.59	17.91	1.56	Not Significant at 0.05 level of significance
	High	104	216.13	18.58		

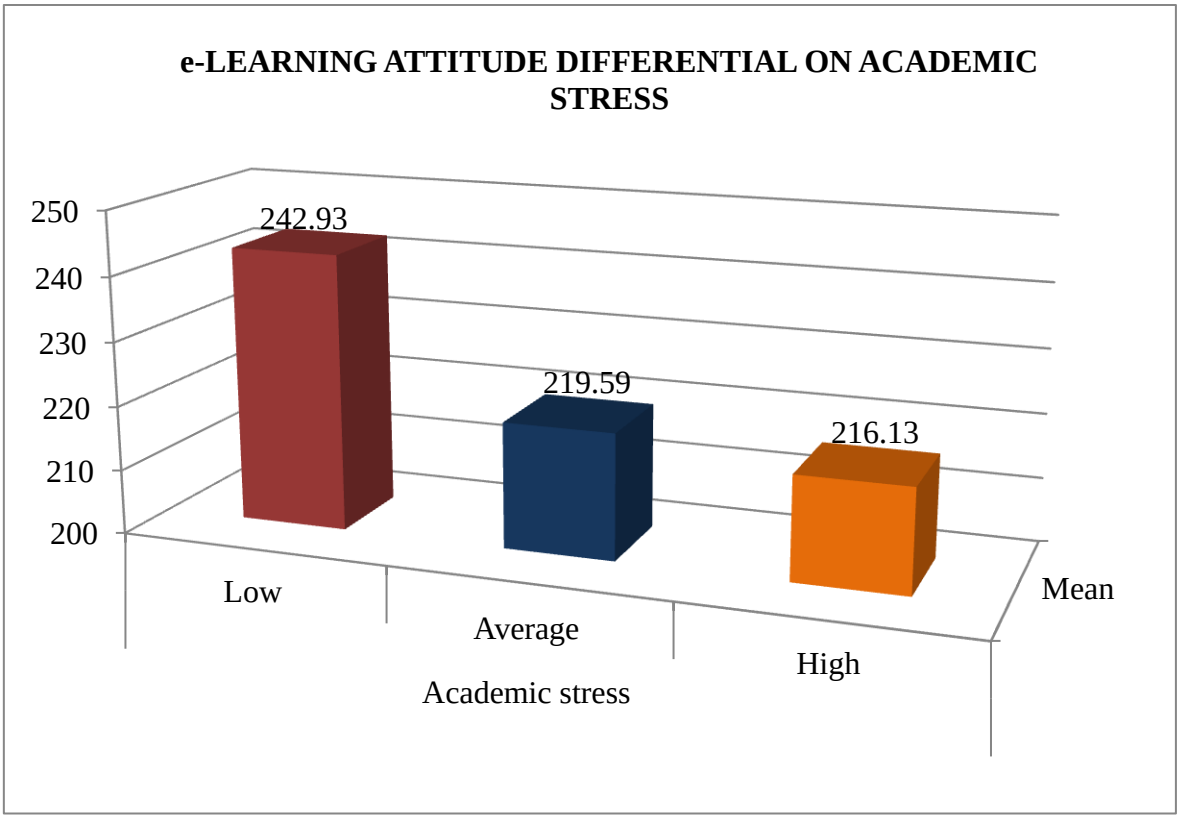

Figure No. 4 (l):Post hoc t-test of e-learning attitude differential on academic stress.

4.2.4.2. Post hoc t-test of e-learning attitude differential on academic stress.

Table No. 4.4.1 established significant difference between the student-teachers with low and average academic stress on their attitude towards e-learning with C.R. at 8.58, which was significant at 0.05 level of significance. Student-teachers with low and high academic stress had significant difference at 0.05 level with C.R. at 8.89 on their attitude towards e-learning. However, there was no significant difference at 0.05 level of significance between the average and the high academic stress of student-teachers on their attitude towards e-learning with C.R. at 1.56. Further, it was observed that the mean scores of low academic stress student-teachers was 242.93, the average academic stress of student-teachers was 219.59 and the student-teachers with high academic stress had mean scores of 216.13. These results indicated that student-teachers with high academic stress had the lowest positive attitude towards e-learning as compared to the low and average academic stress of student-teachers. These results were in agreement with the findings of Samudra & Matulessy (2021) and Setiakarnawijaya (2022).

4.2.5. Relationship between Attitude towards e-learning and Academic Performance of Student-Teachers of Nagaland

Objective 5: To determine the relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

Table No. 4.5: RELATIONSHIP BETWEEN e-LEARNING ATTITUDE AND ACADEMIC PERFORMANCE OF STUDENT-TEACHERS

Variance	Group	N	r
Attitude towards e-learning VS Academic performance	Male	100	0.55
	Female	300	0.51
	Graduate	184	0.52
	Postgraduate	216	0.5
	Language	127	0.54
	Social sciences	163	0.45
	Science	61	0.56
	Mathematics	49	0.46
	Total	400	0.52

4.2.5.1. Relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female) separately.

It can be observed from Table No. 4.5 that attitude towards e-learning in respect to gender was found to have positive relationship with regard to academic performance with r at 0.55 in male and 0.51 in female. Thus, it can be said that there was positive relationship between attitude towards e-learning and academic performance with respect to gender. Therefore, the formulated null hypothesis that "there exist no relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female) separately" was rejected.

4.2.5.2. Relationship between attitude towards e-learning and academic performance of student-teachers with respect to educational qualification (graduate and postgraduate) separately.

The attitude towards e-learning in respect to educational qualification with regard to academic performance was found to have positive relationship, with r at 0.52 in graduate and 0.50 in postgraduate student-teachers. Thus, it was concluded that there was positive relationship between attitude towards e-learning and academic performance with respect to educational qualification. Therefore, the formulated null hypothesis that "there exists no relationship between attitude towards e-learning and academic performance of student-teachers with respect to educational qualification (graduate and postgraduate) separately" was rejected.

4.2.5.3. Relationship between attitude towards e-learning and academic performance of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately.

The table further indicated that attitude towards e-learning in respect to pedagogy opted with regard to academic performance was found to have positive relationship, with r at 0.54, 0.45, 0.56, 0.46 and 0.51 in language, social sciences, science and mathematics respectively. Thus, it was inferred that there was positive relationship between e-learning and academic performance with respect to the different pedagogy opted. Therefore, the formulated null hypothesis that "there exists no relationship between attitude towards e-learning and academic performance of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately" was rejected. The result was consistent with the findings of Mothibi (2015) and Jawad & Shalash (2020).

In the total sample (N = 400), the relationship between attitude towards e-learning and academic performance was positively correlated with r at 0.52. Therefore, the formulated null hypothesis (5), "there exists no relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was rejected.

4.2.6. Relationship between Attitude towards e-learning and Academic Stress with respect to Gender, Educational Qualification and Pedagogy opted among Student-Teachers of Nagaland

Objective 6: To determine the relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

Table No. 4.6: RELATIONSHIP BETWEEN e-LEARNING ATTITUDE AND ACADEMIC STRESS WITH RESPECT TO GENDER, EDUCATIONAL QUALIFICATION AND PEDAGOGY OPTED AMONG STUDENT-TEACHERS

Variance	Group	N	r
Attitude towards e-learning vs academic Stress	Male	100	-0.56
	Female	300	-0.58
	Graduate	184	-0.49
	Postgraduate	216	-0.62
	Language	127	-0.57
	Social sciences	163	-0.46
	Science	61	-0.49
	Mathematics	49	-0.7
	Total	400	-0.57

4.2.6.1. Relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender (male and female) separately.

It was observed from Table No. 4.6 that attitude towards e-learning with respect to gender was found to have negative relationship with regard to academic stress, with r at -0.56 in male and -0.58 in female. Therefore, the formulated null hypothesis that "there exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender (male and female) separately" was rejected.

4.2.6.2. Relationship between attitude towards e-learning and academic stress of student-teachers with respect to educational qualification (graduate and postgraduate) separately.

It was also indicated that the attitude towards e-learning with respect to educational qualification in relation to academic stress was depicted to have negative relationship, with r at -0.49 in graduate and -0.62 in postgraduate student-teachers. Therefore, the formulated null hypothesis that "there exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to educational qualification (graduate and postgraduate) separately" was rejected.

4.2.6.3. Relationship between attitude towards e-learning and academic stress of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately.

The table further revealed that attitude towards e-learning with respect to pedagogy in relation to academic stress was found to have negative relationship, with r at -0.57, -0.46, -0.49 and -0.70 in language, social sciences, science and mathematics respectively. Therefore, the formulated null hypothesis that "there exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately" was rejected. The result was similar to the findings of Malik (2020) Elashry et al. (2022) and Akanpaadgi et al. (2023).

In the total sample (N = 400), the relationship between attitude towards e-learning and academic stress was negatively correlated with r at -0.57. Therefore, the formulated null hypothesis (6), "there exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was rejected.

4.2.7. Relationship between Academic Performance and Academic Stress with respect to Gender, Educational Qualification and Pedagogy opted among Student-Teachers of Nagaland

Objective 7: To determine the relationship between academic performance and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample and of the total sample.

Table No. 4.7: RELATIONSHIP BETWEEN ACADEMIC PERFORMANCE AND ACADEMIC STRESS WITH RESPECT TO GENDER, ACADEMIC QUALIFICATION AND PEDAGOGY OPTED AMONG STUDENT-TEACHERS

Variables	Group	N	r
Academic performance vs academic stress	Male	100	-0.75
	Female	300	-0.60
	Graduate	184	-0.58
	Postgraduate	216	-0.68
	Language	127	-0.56
	Social sciences	163	-0.66
	Science	61	-0.66
	Mathematics	49	-0.73
	Total	400	-0.63

4.2.7.1. Relationship between academic performance and academic stress of student-teachers with respect to gender (male and female) separately.

Table No. 4.7 revealed that the relationship between academic performance and academic stress with respect to gender was found to have negative relationship, with r at -0.75 in male and -0.60 in female. Hence, the formulated null hypothesis that "there exists no relationship between academic performance and academic stress of student-teachers with

respect to gender (male and female) separately" was rejected. Thus, there was negative relationship between academic performance and academic stress with respect to gender.

4.2.7.2. Relationship between academic performance and academic stress of student-teachers with respect to educational qualification (graduate and postgraduate) separately.

Academic performance in respect to educational qualification was indicated to have negative relationship with academic stress with r at -0.58 in graduate and -0.68 in postgraduate student-teachers. Hence, the formulated null hypothesis that "there exists no relationship between academic performance and academic stress of student-teachers with respect to educational qualification (graduate and postgraduate) separately" was rejected. Thus, it can be inferred that there was negative relationship between academic performance and academic stress with respect to educational qualification.

4.2.7.3. Relationship between academic performance and academic stress of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately.

The table further depicted that academic performance in respect to pedagogy was found to have negative relationship with academic stress with r at -0.56 in language, -0.66 in social sciences, -0.66 in science and -0.73 in mathematics. Hence, the formulated null hypothesis that "there exists no relationship between academic performance and academic stress of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately" was rejected. Thus, there was negative relationship between academic performance and academic stress with respect to the different pedagogy. Findings from this study were similar with the findings of Li et al. (2023), Polisetty & Pothu (2023).

In the total sample (N = 400), the relationship between academic performance and academic stress was negatively correlated with r at -0.63. Therefore, the formulated null hypothesis (7), "there exists no relationship between academic performance and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was rejected.

4.2.8. Relationship among Attitude towards e-learning, Academic Performance and Academic Stress of Student-Teachers of Nagaland

Objective 8: To determine the relationship among attitude towards e-learning, academic performance and academic stress of student-teachers of Nagaland.

Table No. 4.8: RELATIONSHIP AMONG ATTITUDE TOWARDS e-LEARNING, ACADEMIC PERFORMANCE AND ACADEMIC STRESS OF STUDENT-TEACHERS

Variance	N	R	Result
Attitude towards e-learning, academic performance & academic stress	400	0.60	Positive relationship among the variables

4.2.8.1. Relationship among attitude towards e-learning, academic performance and academic stress of student-teachers.

From the previous tables and analysis, it was found that there was negative relationship when the variables were analyzed separately; however, when the variables were analyzed together, it was found that they have positive relationship with R at 0.60 as shown in Table No. 4.8. Hence, the formulated null hypothesis that "there exists no relationship among attitude towards e-learning, academic performance and academic stress of student-teachers of Nagaland" was rejected. Thus, it may be established that there was positive relationship among attitude towards e-learning, academic performance and academic stress of student-teachers.

4.2.9. Influence and Interaction on Attitude towards e-learning with respect to Gender, Educational Qualification and Pedagogy opted of Student-Teachers of Nagaland.

The ninth objective of the present investigation was to study the three factor interactional effects on attitude towards e-learning with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy (language, social sciences, science and mathematics). Data were analyzed using 2x2x4 Factorial Design ANOVA of unequal cell size. The results are presented in Table 4.9. The interpretations related to the data are presented in separate captions.

Objective 9: To determine the interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

Table No. 4.9: INFLUENCE AND INTERACTION ON ATTITUDE TOWARDS e-LEARNING WITH RESPECT TO GENDER, EDUCATIONAL QUALIFICATION AND PEDAGOGY OPTED OF STUDENT-TEACHERS OF NAGALAND

Variance	Sum of Squares	df	Mean Square	F-ratio	Significance
Gender (A)	163.91	1	163.91	0.34	Not significant at 0.05 level of significance
Educational Qualification (B)	1069.52	1	1069.52	2.21	Not significant at 0.05 level of significance
Pedagogy (C)	10423.35	3	3473.45	7.19	Significant at 0.05 level of significance
Gender x Educational Qualification (AxB)	238.01	1	238.01	0.49	Not significant at 0.05 level of significance
Gender x Pedagogy (AxC)	2536.29	3	845.43	1.75	Not significant at 0.05 level of significance
Educational Qualification x Pedagogy (BxC)	43.75	3	14.58	0.03	Not significant at 0.05 level of significance
Gender x Educational Qualification x Pedagogy (AxBxC)	536.02	3	178.67	0.37	Not significant at 0.05 level of significance
Error	185595.69	384	483.32		
Total	20365273.00	400			
Corrected Total	201131.80	399			

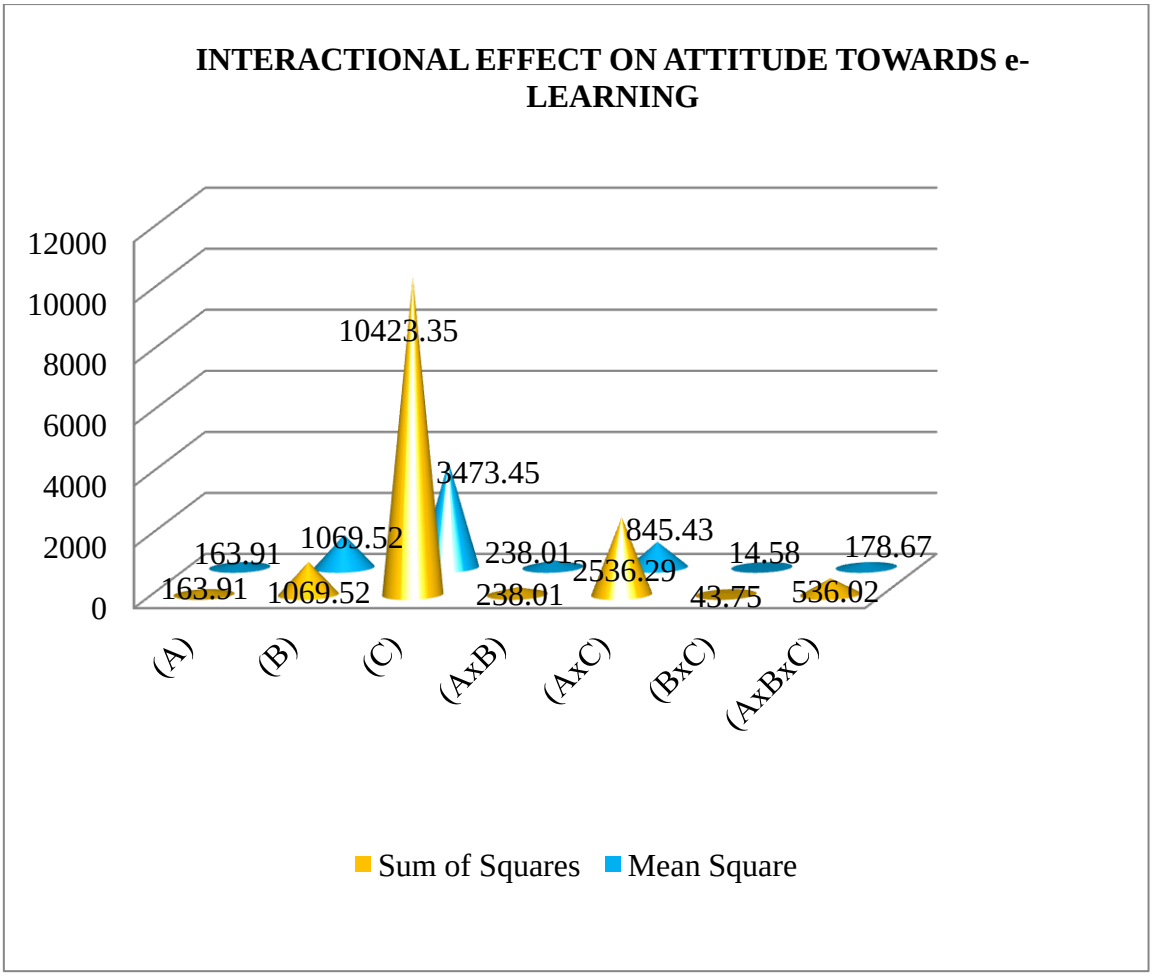

Figure No. 4 (m): Interactional effect on attitude towards e-learning.

4.2.9.1. Interactional effect on attitude towards e-learning of student-teachers with respect to gender (male and female).

In the present study, the researcher studied the interactional effect on attitude towards e-learning of the student-teachers with respect to gender (male and female). Table No. 4.9 indicated that F-ratio on attitude towards e-learning with respect to gender was 0.34 which was not significant at 0.05 level of significance with df equal to 1/384. Therefore, the formulated null hypothesis that "there is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female) separately and of the total sample" was accepted. Thus, it can be inferred that gender did not influence the attitude towards e-learning of student-teachers. The result was supported by the findings of Thakkar and Joshi (2017), Mahato et al. (2021) and Sattanathan (2024).

4.2.9.2. Interactional effect on attitude towards e-learning of student-teachers with respect to educational qualification (graduate and postgraduate).

In the present study, the researcher examined the interactional effect on attitude towards e-learning of the student-teachers with respect to educational qualification (graduate and postgraduate). The results were presented in Table No. 4.9 which showed that F-ratio on attitude towards e-learning with respect to educational qualification (graduate and postgraduate) was 2.21 which was not significant at 0.05 level of significance with df equal to 1/384. Therefore, the formulated null hypothesis that "there is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to educational qualification (graduate and Postgraduate) separately and of the total sample" was accepted. Thus, it was concluded that the educational qualification of student-teachers did not influence their attitude towards e-learning.

4.2.9.3. Interactional effect on attitude towards e-learning of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics).

In the present study, the researcher explored the interactional effect on attitude towards e-learning of the student-teachers with respect to pedagogy (language, social sciences, science and mathematics). The results were presented in Table No. 4.9 which depicted that F-ratio on attitude towards e-learning with respect to pedagogy opted (language, social sciences, science and mathematics) was 7.19 which was significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that "there is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was rejected. Thus, it can be established that the pedagogy opted by student-teachers influenced the attitude towards e-learning. The result was supported by the findings of Subramani (2014), Sarkar (2019), Mahapatra (2021) and Kripalani & Nagar (2023).

4.2.9.4. Interactional effect on attitude towards e-learning of student-teachers with respect to gender (male and female) and educational qualification (graduate and postgraduate)

In the present study, the researcher studied the interactional effect on attitude towards e-learning of the student-teachers with respect to gender and educational qualification. The results were presented in Table No. 4.9 revealed that F-ratio of 0.49 for interaction

between gender and educational qualification was not significant at 0.05 level of significance with df equal to 1/384. Therefore, the formulated null hypothesis that "there is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female) and educational qualification (graduate and postgraduate) separately and of the total sample" was accepted. Thus, it was established that there was no interactional influence on attitude towards e-learning of student–teachers with respect to gender and educational qualification.

4.2.9.5. Interactional effect on attitude towards e-learning of student-teachers with respect to gender (male and female) and pedagogy opted (language, social sciences, science and mathematics).

In the present study, the investigator examined the interactional effect on attitude towards e-learning of the student-teachers with respect to gender (male and female) and pedagogy opted (language, social sciences, science and mathematics). The results were presented in Table No. 4.9. It inferred that F-ratio of 1.75 for interaction between gender and pedagogy opted was not significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that "there is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was accepted. Thus, it can be deduced that there was no interactional influence on the attitude towards e-learning of student–teachers with respect to gender and pedagogy opted.

4.2.9.6. Interactional effect on attitude towards e-learning of student-teachers with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics).

In the present study, the investigator analyzed the interactional effect on attitude towards e-learning of the student-teachers with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics). The results were presented in Table No. 4.9. It indicated that F-ratio of 0.03 for interaction between educational qualification and pedagogy opted was not significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that "there is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample"

was accepted. Thus, it can be said no interactional influence on attitude towards e-learning of student-teachers with respect to educational qualification and pedagogy opted was observed.

4.2.9.7. Interactional effect on attitude towards e-learning of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics).

In the present study, the investigator explored the interactional effect on attitude towards e-learning of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics). The results were presented in Table No. 4.9. It showed that F-ratio of 0.37 for interaction among gender, educational qualification and pedagogy opted was not significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that "there is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was accepted. Thus, it can be inferred that there was no interactional influence on attitude towards e-learning of student-teachers with respect to gender, educational qualification and pedagogy opted.

4.2.10. Influence and Interaction on Academic Performance with respect to Gender, Educational Qualification and Pedagogy opted of Student-Teachers of Nagaland.

The tenth objective of the present investigation was to study the three factor interactional effects of gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) on academic performance of student-teachers of Nagaland. Data were analyzed using 2x2x4 Factorial Design ANOVA of unequal cell size. The results are presented in Table 4.10. The interpretations related to the data are presented in separate captions.

Objective 10: To determine the interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

Table No. 4.10: INFLUENCE AND INTERACTION ON ACADEMIC PERFORMANCE WITH RESPECT TO GENDER, EDUCATIONAL QUALIFICATION AND PEDAGOGY OPTED OF STUDENT-TEACHERS

Variance	Sum of Squares	df	Mean Square	F-ratio	Significance
Gender (A)	483.29	1	483.29	9.83	Significant at 0.05 level of significance
Educational Qualification (B)	117.48	1	117.48	2.39	Not significant at 0.05 level of significance
Pedagogy opted (C)	3237.35	3	1079.12	21.95	Significant at 0.05 level of significance
Gender x Educational Qualification (AxB)	179.65	1	179.65	3.65	Not significant at 0.05 level of significance
Gender x Pedagogy opted (AxC)	345.88	3	115.29	2.35	Not significant at 0.05 level of significance
Educational Qualification x Pedagogy opted (BxC)	46.14	3	15.38	0.31	Not Significant at 0.05 level of significance
Gender x Educational Qualification x Pedagogy opted (AxBxC)	24.31	3	8.10	0.17	Not Significant at 0.05 level of significance
Error	18879.09	384	49.16		
Total	1110904.00	400			
Corrected Total	24514.71	399			

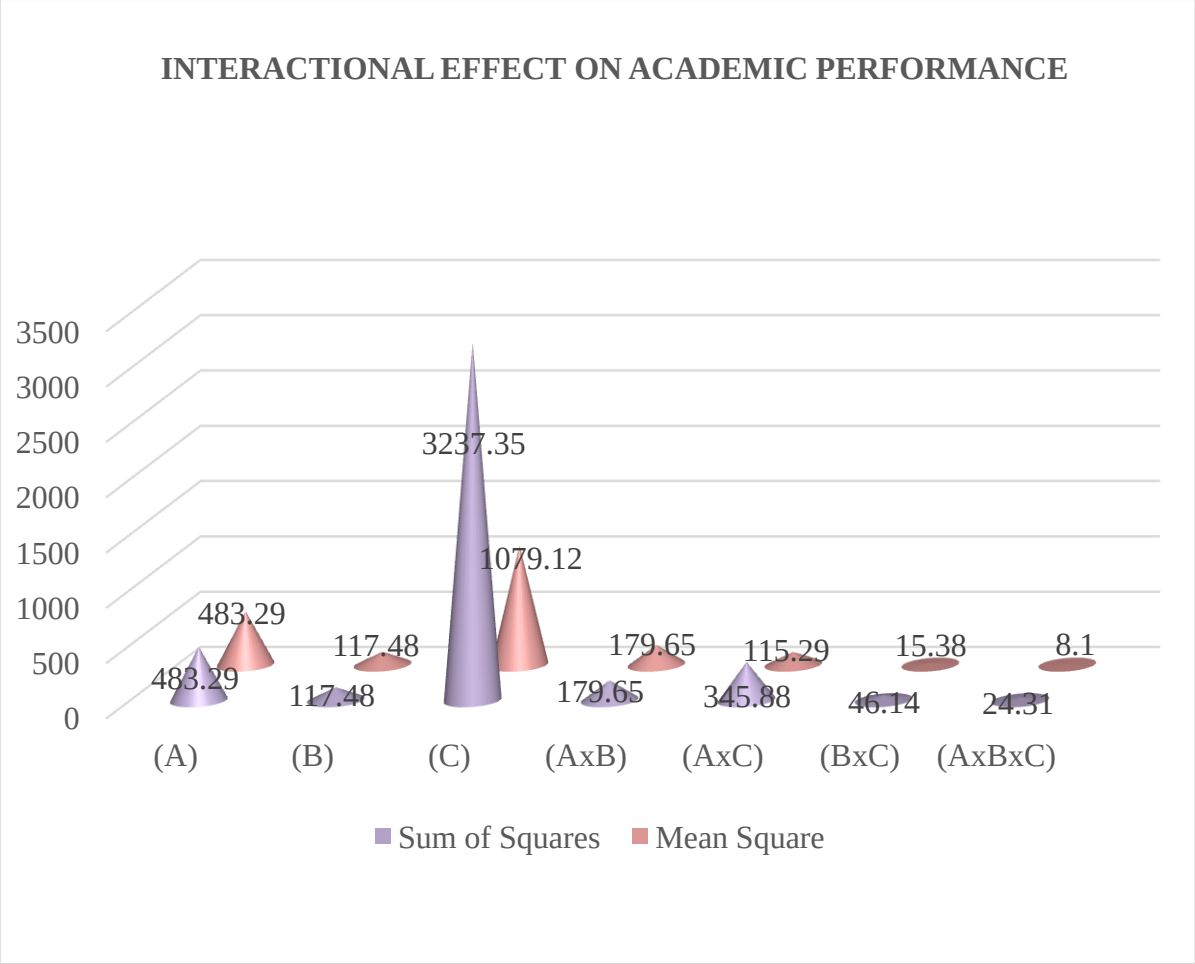

Figure No. 4 (n): Interactional effect on academic performance.

4.2.10.1. Interactional effect on academic performance of student-teachers with respect to gender (male and female).

In the present study, the researcher studied the interactional effect of gender on academic performance of the student-teachers. The results were presented in Table No. 4.10 which showed that F-ratio of gender on academic performance was 9.83 which was significant at 0.05 level with df equal to 1/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female) separately and of the total sample" was rejected. Thus, it can be established that gender influenced the academic performance of student-teachers.

4.2.10.2. Interactional effect on academic performance of student-teachers with respect to educational qualification (graduate and postgraduate).

The researcher explored the interactional effect of educational qualification (graduate and postgraduate) on academic performance of the student-teachers and the findings were presented in Table No. 4.10. The table observed that F-ratio of educational qualification (graduate and postgraduate) on academic performance was 2.39 which was not significant at 0.05 level of significance with df equal to 1/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic performance of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) separately and of the total sample" was accepted. Thus, it can be concluded that the educational qualification did not influence the academic performance of student-teachers.

4.2.10.3. Interactional effect on academic performance of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics).

In the present study, the researcher examined the interactional effect of pedagogy opted (language, social sciences, science and mathematics) on academic performance of the student-teachers. The results were presented in Table No. 4.10. It was found that F-ratio of pedagogy opted (language, social sciences, science and mathematics) on academic performance was 21.95 which was significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic performance of student-teachers of Nagaland with respect to pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was rejected. Thus, it can be deduced that pedagogy opted influenced the academic performance of student-teachers.

4.2.10.4. Interactional effect on academic performance of student-teachers with respect to gender (male and female) and educational qualification (graduate and postgraduate).

In the present study, the researcher studied the interactional effect of gender and educational qualification on academic performance of the student-teachers. The results were presented in Table No. 4.10. It indicated that F-ratio of 3.65 for interaction between gender and educational qualification was not significant at 0.05 level of significance with df equal to 1/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic performance of student-teachers of Nagaland with respect to gender

(male and female) and educational qualification (graduate and postgraduate) separately and of the total sample" was accepted. Thus, it can be inferred that there was no interactional influence of gender and educational qualification on the academic performance of student–teachers.

4.2.10.5. Interactional effect on academic performance of student-teachers with respect to gender (male and female) and pedagogy opted (language, social sciences, science and mathematics).

In the present study, the investigator explored the interactional effect of gender and pedagogy opted on attitude academic performance of the student-teachers. The results were presented in Table No. 4.10. It showed that F-ratio of 2.35 for interaction between gender and pedagogy was not significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female) and pedagogy (language, social sciences, science and mathematics) separately and of the total sample" was accepted. Thus, it can be concluded that there was no interactional influence of gender and pedagogy on the academic performance of student–teachers.

4.2.10.6. Interactional effect on academic performance of student-teachers with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics).

In the present study, the researcher examined the interactional effect of educational qualification and pedagogy opted on academic performance of the student-teachers. The results presented in Table No. 4.10 depicted that F-ratio of 0.31 for interaction between educational qualification and pedagogy opted was not significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic performance of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was accepted. Thus, it can be deduced that there was no interactional influence of educational qualification and pedagogy opted on the academic performance of student–teachers.

4.2.10.7. Interactional effect on academic performance of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics).

In the present study, the researcher analyzed the interactional effect of gender, educational qualification and pedagogy opted on academic performance of the student-teachers. The results were presented in Table No. 4.10. It observed that F-ratio of 0.17 for interaction among gender, educational qualification and pedagogy opted was not significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was accepted. Thus, it can be concluded that there was no interactional influence of gender, educational qualification and pedagogy opted on the academic performance of student–teachers.

4.2.11. Influence and Interaction on Academic Stress with respect to Gender, Educational Qualification and Pedagogy opted of Student-Teachers of Nagaland.

The eleventh objective was to examine the three factor interactional effects of gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) on academic stress. Data were analyzed using 2x2x2 Factorial Design ANOVA of unequal cell size. The results are presented in Table 4.11. The interpretations related to the data are presented in separate captions.

Objective 11: To determine the interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

Table No. 4.11: INFLUENCE AND INTERACTION ON ACADEMIC STRESS WITH RESPECT TO GENDER, EDUCATIONAL QUALIFICATION AND PEDAGOGY OPTED OF STUDENT-TEACHERS

Variance	Sum of Squares	df	Mean Square	F-ratio	Significance
Gender (A)	1483.41	1	1483.41	4.02	Significant at 0.05 level of significance
Educational qualification (B)	483.51	1	483.51	1.31	Not Significant at 0.05 level of significance
Pedagogy (C)	8501.26	3	2833.75	7.68	Significant at 0.05 level of significance
Gender x Educational qualification (AxB)	451.66	1	451.66	1.24	Not significant at 0.05 level of significance
Gender x Pedagogy opted (AxC)	4583.43	3	1527.81	4.14	Significant at 0.05 level of significance
Educational qualification x Pedagogy opted (BxC)	382.54	3	127.51	0.35	Not Significant at 0.05 level of significance
Gender x Educational qualification x Pedagogy opted (AxBxC)	530.75	3	176.92	0.48	Not Significant at 0.05 level of significance
Error	141673.16	384	368.94		
Total	11380207.00	400			
Corrected Total	157371.10	399			

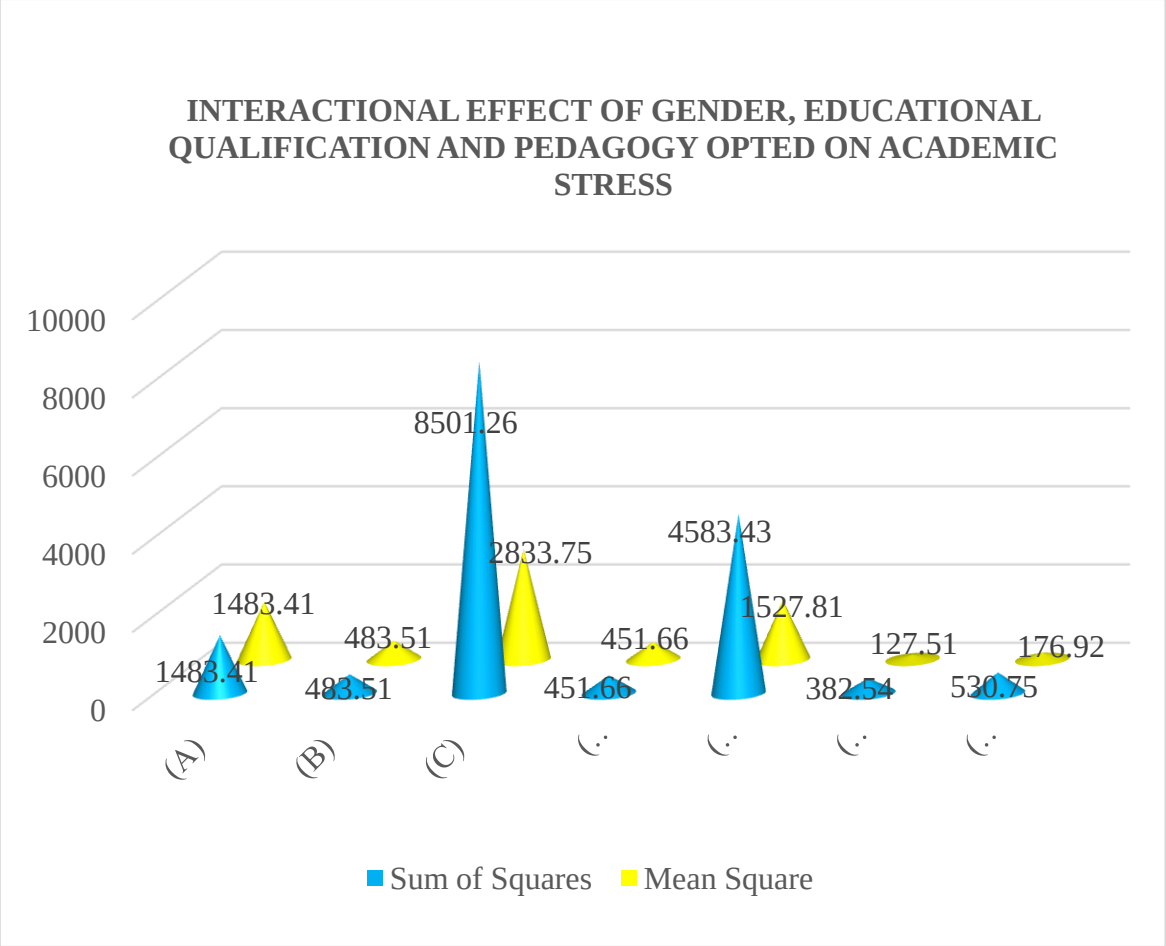

Figure No. 4 (o): Interactional effect of gender, educational qualification and pedagogy opted on academic stress.

4.2.11.1. Interactional effect on academic stress of student-teachers with respect to gender (male and female).

In the current study, the researcher examined the interactional effect of gender on academic stress of the student-teachers. The results were presented in Table No. 4.11 which indicated that F-ratio of gender on academic stress was 4.02 which was significant at 0.05 level with df equal to 1/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female) separately and of the total sample" was rejected. Thus, it was inferred that gender influenced the academic stress of student-teachers.

4.2.11.2. Interactional effect on academic stress of student-teachers with respect to educational qualification (graduate and postgraduate).

In the present survey, the researcher examined the interactional effect of educational qualification (graduate and postgraduate) on academic stress of the student-teachers. The results presented in Table No. 4.11 showed that F-ratio of educational qualification (graduate and postgraduate) on academic stress was 1.31 which was not significant at 0.05 level of significance with df equal to 1/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic stress of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) separately and of the total sample" was accepted. Thus, it can be depicted that the educational qualification did not influence the academic stress of student-teachers.

4.2.11.3. Interactional effect on academic stress of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics).

In the present study, the researcher explored the interactional effect of pedagogy opted (language, social sciences, science and mathematics) on academic stress of the student-teachers. The results presented in Table No. 4.11 revealed that F-ratio of pedagogy opted (language, social sciences, science and mathematics) on academic stress was 7.68 which was significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic stress of student-teachers of Nagaland with respect to pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was rejected. Thus, it can be concluded that the pedagogy opted influenced the academic stress of student-teachers.

4.2.11.4. Interactional effect on academic stress of student-teachers with respect to gender (male and female) and educational qualification (graduate and postgraduate).

In the present analysis, the researcher studied the interactional effect of gender and educational qualification on academic stress of the student-teachers. The results presented in Table No. 4.11 depicted that F-ratio of 1.24 for interaction between gender and educational qualification was not significant at 0.05 level of significance with df equal to 1/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female) and educational qualification (graduate and postgraduate) separately and of the total

sample" was accepted. Thus, it can be deduced that there was no interactional influence of gender and educational qualification on the academic stress of student–teachers.

4.2.11.5. Interactional effect on academic stress of student-teachers of gender (male and female) and pedagogy opted (language, social sciences, science and mathematics).

In the present study, the researcher studied the interactional effect of gender and pedagogy opted on attitude academic stress of the student-teachers. The results in Table No. 4.11 indicated that F-ratio of 4.14 for interaction between gender and pedagogy opted was significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic stress of student-teachers of Nagaland with respect to gender(male and female) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was rejected. Thus, it can be said that there was interactional influence of gender and pedagogy opted on the academic stress of student–teachers.

4.2.11.6. Interactional effect on academic stress of student-teachers with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics).

In the present investigation, the researcher examined the interactional effect of educational qualification and pedagogy opted on academic stress of the student-teachers. Table No. 4.11 showed that F-ratio of 0.35 for interaction between educational qualification and pedagogy opted were not significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that" there is no interactional effect on academic stress of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was accepted. Therefore, it was inferred that there was no interactional influence of educational qualification and pedagogy opted on the academic stress of student–teachers.

4.2.11.7. Interactional effect on academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics).

In the current study, the researcher explored the interactional effect of gender, educational qualification and pedagogy opted on academic stress of the student-teachers. The results

were presented in Table No. 4.11 which indicated that F-ratio of 0.48 for interaction among gender, educational qualification and pedagogy opted was not significant at 0.05 level of significance with df equal to 3/384. Therefore, the formulated null hypothesis that "there is no interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample" was accepted. Hence, it was deduced that there was no interactional influence of gender, educational qualification and pedagogy opted on the academic stress of student–teachers.

CHAPTER V

MAJOR FINDINGS, DISCUSSIONS, EDUCATIONAL IMPLICATIONS, CONCLUSION AND SUGGESTIONS FOR FURTHER RESEARCH

5.1. Introduction

The present study aimed to investigate the student-teachers attitude towards e-learning and its relation with academic performance and academic stress. The major findings, discussions, educational implications, suggestions for further study, conclusion and a brief summary of the whole study are presented in this chapter.

5.2. Major Findings of the Study

The major findings from the analysis of the data are summarized and presented in this chapter.

Objective 1: To determine the levels of attitude of student-teachers toward e-learning with respect to gender (male and female) and educational qualification (graduate and postgraduate).

a) Gender (male and female):

1. Male and female student-teachers did not differ significantly in their attitude towards e-learning.

b) Educational qualification (graduate and postgraduate):

2. Graduate and postgraduate student-teachers did not differ significantly in their attitude towards e-learning.

Objective 2: To determine the significant difference in attitude of student-teachers toward e-learning with respect to the different pedagogy opted (language, social sciences, science and mathematics).

3. Attitude towards e-learning had significant positive influence between and within student-teachers when it was taken as independent factor.

4. The Post hoc t-test revealed significant difference between pedagogy of language and social sciences, social sciences and science and social sciences and mathematics. However, no significant difference was found between the pedagogy of language and science, language and mathematics and science and mathematics.

Objective 3: To assess the influence of attitude towards e-learning on academic performance of student-teachers of Nagaland.

5. Between and within groups had significant differences when academic performance was taken as independent factor for e-learning. Therefore, academic performance had significant positive influence between and among the student-teachers.
6. From the Post hoc t-test, it was inferred that there was significant difference between student-teachers with low and average, low and high and average and high academic performance on the attitude towards e-learning.

Objective 4: To assess the influence of attitude towards e-learning on academic stress of student-teachers of Nagaland.

7. Between and within groups had significant differences when academic stress was taken as independent factor for e-learning. Therefore, academic stress had positive influence between and among the student-teachers.
8. Student-teachers with low and average academic stress and low and high academic stress had significant difference on the attitude towards e-learning, while student-teachers with average and high academic stress did not differ significantly in the attitude towards e-learning, as was indicated in Post hoc t-test.

Objective 5: To determine the relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

9. There was positive relationship between attitude towards e-learning and academic performance with respect to gender (male and female).

b) Educational qualification (graduate and postgraduate):

10. There was positive relationship between attitude towards e-learning and academic performance with respect to educational qualification (graduate and postgraduate).

c) Pedagogy opted (language, social sciences, science and mathematics):

11. There was positive relationship between e-learning and academic performance with respect to the different pedagogy opted (language, social sciences, science and mathematics).
12. There was positive correlation between attitude towards e-learning and academic performance with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

Objective 6: To determine the relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

13. There was negative relationship between attitude towards e-learning and academic stress with respect to gender (male and female).

b) Educational qualification (graduate and postgraduate):

14. There was negative relationship between attitude towards e-learning and academic stress with respect to educational qualification (graduate and postgraduate).

c) Pedagogy opted (language, social sciences, science and mathematics):

15. There was negative relationship between attitude towards e-learning and academic stress with respect to the different pedagogy opted (language, social sciences, science and mathematics).
16. There was negative correlation between attitude towards e-learning and academic stress with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

Objective 7: To determine the relationship between academic performance and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

17. There was negative relationship between academic performance and academic stress with respect to gender (male and female).

b) Educational qualification (graduate and postgraduate):

18. There was negative relationship between academic performance and academic stress with respect to educational qualification (graduate and postgraduate).

c) Pedagogy opted (language, social sciences, science and mathematics):

19. There was negative relationship between academic performance and academic stress with respect to the different pedagogy opted (language, social sciences, science and mathematics).
20. There was negative correlation between academic performance and academic stress with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

Objective 8: To determine the relationship among attitude towards e-learning, academic performance and academic stress of student-teachers of Nagaland.

21. When the variables (attitude towards e-learning, academic performance and academic stress) were analyzed together, it was found that they have positive relationship.

Objective 9: To determine the interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

22. Gender (male and female) did not significantly influence the attitude towards e-learning of student-teachers.

b) Educational qualification (graduate and postgraduate):

23. Educational qualification (graduate and postgraduate) did not significantly influence the attitude towards e-learning of student-teachers.

c) Pedagogy opted (language, social sciences, science and mathematics):

24. Pedagogy opted (language, social sciences, science and mathematics) by student-teachers had significant influence on the attitude towards e-learning.

d) **Gender (male and female) and educational qualification (graduate and postgraduate):**

25. There was no significant interactional influence of gender (male and female) and educational qualification (graduate and postgraduate) on the attitude towards e-learning of student–teachers.

e) Gender (male and female) and pedagogy opted (language, social sciences, science and mathematics):

26. There was no significant interactional influence of gender (male and female) and pedagogy opted (language, social sciences, science and mathematics) on the attitude towards e-learning of student–teachers.

f) Educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences science and mathematics):

27. There was no significant interactional influence of educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) on the attitude towards e-learning of student-teachers.

g) Gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics):

28. There was no significant interactional influence of gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) on the attitude towards e-learning of student-teachers.

Objective 10: To determine the interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

29. Gender (male and female) had significantly influenced the academic performance of student-teachers.

b) Educational qualification (graduate and postgraduate):

30. The educational qualification (graduate and postgraduate) did not significantly influence the academic performance of student-teachers.

c) Pedagogy opted (language, social sciences science and mathematics):

31. Pedagogy opted (language, social sciences, science and mathematics) had significant influence on the academic performance of student-teachers.

d) Gender (male and female) and educational qualification (graduate and postgraduate):

32. There was no significant interactional influence of gender (male and female) and educational qualification (graduate and postgraduate) on the academic performance of student–teachers.

e) Gender (male and female) and pedagogy opted (language, social sciences, science and mathematics):

33. No significant interactional influence was found between gender (male and female) and pedagogy opted (language, social sciences, science and mathematics)

f) Educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics):

34. There was no significant interactional influence of educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) on the academic performance of student–teachers.

g) Gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics):

35. No significant interactional influence was observed among gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) on the academic performance of student–teachers.

Objective 11: To determine the interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

36. Gender (male and female) had significantly influenced the academic stress of student-teachers.

b) Educational qualification (graduate and postgraduate):

37. Educational qualification (graduate and postgraduate) did not significantly influence the academic stress of student-teachers.

c) Pedagogy opted (language, social sciences ,science and mathematics):

38. Pedagogy opted (language, social sciences, science and mathematics) significantly influenced the academic stress of student-teachers.

d) Gender (male and female) and educational qualification (graduate and postgraduate):

39. There was no significant interactional influence of gender (male and female) and educational qualification (graduate and postgraduate) on the academic stress of student–teachers.

e) Gender (male and female) and pedagogy opted (language, social sciences, science and mathematics):

40. There was significant interactional influence of gender (male and female) and pedagogy opted (language, social sciences, science and mathematics) on the academic stress of student–teachers.

f) Educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics):

41. There was no significant interactional influence of educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) on the academic stress of student–teachers.

g) Gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics):

42. There was no significant interactional influence of gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) on the academic stress of student–teachers.

5.3. Discussions

The present study aimed to determine the attitude towards e-learning among student-teachers with respect to gender (male and female) and the educational qualification (graduate and postgraduate). Accordingly, it was found that male and female student-teachers did not differ significantly in their attitude towards e-learning. Similarly, Kumari (2013), Thakkar & Joshi (2017) and Kant (2016) found in their studies that attitude towards e-learning was not affected by differences in gender. This could be because both the male and female student-teachers are well informed and up-to-date about the use of e-learning tools. However, it was observed that when the mean scores for the present study was analyzed, male student-teachers had higher attitude towards e-learning than their female counterpart. These findings go in tune with the findings of Kant (2016) in whose study, male teachers had higher attitude towards new technology than the female teachers. This could be due to the fact that male student-teachers spent more time using their smart phones than their female counterpart. The findings of Madhusudhan (2019) contradicted the present findings as considerable gender difference was found in the study, where female students were depicted to have high attitude towards e-learning than male students.

The study established that graduate and postgraduate student-teachers did not differ significantly in their attitude towards e-learning. The results were consistent with the findings of Thirumoorthy & Arun (2021) who also agreed that graduate and postgraduate student-teachers had no significant difference in their attitude towards e-learning. It was observed that the postgraduate student-teachers obtained higher mean scores in their attitude towards e-learning than the graduate student-teachers. It may be that the graduate students were fresh graduates and may not be exposed to self learning materials as the postgraduate student-teachers. Yet, the recent result of Sattanathan (2024) countered the mean scores of the present findings. The students at all the levels are now being exposed to e-learning and are familiar with e-learning teaching-learning strategies. Therefore, the younger students may have higher attitude towards e-learning.

Regarding the attitude towards e-learning differential on pedagogy opted, the present findings indicated that attitude towards e-learning had positive influence between and within the student teachers. This finding was supported by the findings of Sarkar (2019) which indicated that the secondary teachers' perception towards the use of ICT as an instructional tool is positively high irrespective of subject stream. "The present finding" also revealed that in the Post hoc t-test, student-teachers who opted for science pedagogy had higher mean scores in their attitude towards e-learning than the other student-teachers who opted for language, social sciences and mathematics. This could be because the student-teachers belonging to science pedagogy had more interest and motivation in the application of technology in their subject area. It was also found that social sciences pedagogy student-teachers had the lowest attitude towards e-learning as compared to the other student-teachers from different pedagogy. This could be due to insufficient knowledge about the use of technology. It was further indicated that the attitude towards e-learning between language and science, language and mathematics and science and mathematics was insignificant.

The results of the present study on influence of attitude towards e-learning on academic performance revealed that academic performance had positive and significant influence between and within groups. This result was similar to the findings of Mothibi (2015), Davis (2021) and Hamzaoui (2024) in which it was found that e-learning had positive impact on the students' overall academic achievement. The present findings further depicted in the Post hoc t-test that student-teachers with higher academic performance had higher positive attitude towards e-learning as compared to the low and average academic performance student-teachers. Student-teachers with positive attitude towards e-learning had the likelihood to perform well as they would have the acquired knowledge and skill in utilizing e-learning resources for their studies. The findings were verified by the studies of Neema-Abooki (2014), Udayakumar (2020), Bhurisrestha & Sharma (2022) and Kevin (2023). These findings affirmed that positive and higher attitude towards e-learning lead to higher and better academic performance among the students.

It was concluded from the present study that between and within groups had significant differences when academic stress was taken as independent factor for attitude towards e-learning. Student-teachers with higher academic stress had lower positive attitude towards e-learning. This may be because student-teachers with lower attitude towards e-learning would have lower motivation in using e-learning resources, due to which they may not

have the skills in using the e-resources which in turn increased their academic stress. The results of the present study was supported by the findings of Moawad (2020) and Elashry et al. (2022) in which they concurred that e-learning had negative influence among the students. It was further inferred in the present Post hoc t-test that there was significant variation between the students with low positive attitude and high academic stress. Similarly, Samudra & Matulessy (2021) and Setiakarnawijaya (2022) asserted that unpreparedness of the students for online class lowered their attitude towards e-learning. Moreover, students who had pleasant experience during online learning tended to have lower academic stress.

The current research observed that there was positive relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender, educational qualification and pedagogy opted separately and of the total sample. The reason could be attributed to the willingness of the student-teachers to adopt and adapt e-learning in the teaching-learning process. The results were in tune with the studies of Jawad & Shalash and Maharani et al. (2022) who also agreed that e-learning had positive and significant relationship with students' academic performance.

Based on the findings of the present study, it was showed that there was negative relationship between attitude towards e-learning and academic stress with respect to gender, educational qualification and pedagogy opted among the student-teachers separately and of the total sample. The negative relationship could be because many of the student-teachers were still dependent on the traditional method of teaching and learning. It could also be because many of the students-teachers were not confident in using the e-learning resources that increased their academic stress. Similar findings were affirmed in the study of Malik et al. (2020) and Akanpaadgi et al. (2023) that students experienced academic stress due to online learning.

The present study also highlighted that there was negative relationship between academic performance and academic stress with respect to gender, educational qualification and pedagogy opted separately and of the total sample. The rapid transition from conventional teaching-learning to e-learning could be one of the main reasons for increase in academic stress that was negatively affecting the academic performance of the student-teachers. This

was supported by the results of Borah et al. (2022) and Hernandez Jr. (2023) which showed negative relationship between academic stress and academic performance.

Another objective of the present study was to determine the relationship among the attitude towards e-learning, academic performance and academic stress. It was established that when the variables were analyzed together, it was found that they had a positive relationship. It was interesting to note that this could be due to the fact that the right amount of stress can boost the student-teachers to perform well in their studies by incorporating the e-resources which are available at their convenience. As they perform better, this may improve their attitude towards e-learning.

The study further aimed to analyze the interactional effect on attitude towards e-learning with respect to gender, educational qualification and pedagogy opted separately and of the total sample. It was found that gender as well as educational qualification did not significantly influence the attitude towards e-learning when analyzed separately. There was also no significant interactional influence of gender and educational qualification; gender and pedagogy opted; educational qualification and pedagogy opted; and gender, educational qualification and pedagogy opted on the attitude towards e-learning. This could be due to the fact that everyone understands the necessity and importance of e-learning in the teaching-learning process. However, significant difference was revealed in the interactional influence of pedagogy opted on the attitude towards e-learning. It was assumed that science and mathematics student-teachers used the e-resources for their practical works and written assignments and so they may have gained the confidence and competence in handling e-learning resources, while social sciences and language student-teachers might be less interested and less comfortable in utilizing e-resources. This finding was in contrast with the study of Kripalani & Nagar (2023) who found that subject stream did not influence the attitude towards e-learning.

The present study further highlighted the interactional effect on academic performance with respect to gender, educational qualification and pedagogy opted separately and of the total sample. It was found that gender as well as pedagogy opted significantly influenced the academic performance when analyzed separately. There was no significant interactional influence on academic performance with regard to educational qualification when analyzed separately. Nevertheless, when gender and educational qualification;

gender and pedagogy opted; educational qualification and pedagogy opted; and the overall gender, educational qualification and pedagogy opted were analyzed, there was no significant influence on the academic performance. This may be because all the student-teachers had been exposed to the use of e-learning while preparing their assignments, projects and tests or examinations.

Another objective of the present study was to examine the interactional effect on academic stress of student-teachers with respect to gender, educational qualification and pedagogy opted separately and of the total sample. It was observed that there was significant interactional influence on academic stress with respect to gender; pedagogy opted; and gender and pedagogy opted. The reason could be due to the student-teachers now being well adapted with the synchronous, asynchronous and blended learning process. There still many student-teachers who are faced with academic stress due to e-learning. This could be because of increased assignments and presentations; not being able to select relevant materials from the vast e-resources; technical issues and digital distractions to mention a few. However, there was no significant interactional influence on academic stress with respect to educational qualification; gender and educational qualification; educational qualification and pedagogy opted; and gender, educational qualification and pedagogy opted. The reasons could be because the student-teachers have had sufficient exposure and experience in e-learning. Despite some of its disadvantages, the student-teachers are now well adjusted with e-learning and may have realized its flexibility, access, convenience and opportunities provided.

5.4. Educational Implications

Based on the findings of the present study, few educational implications can be made that may help understand better, the importance of e-learning and its influence on the academic performance and academic stress of student-teachers in the following way:

1. The results from the present study revealed that e-learning is inevitable as it improves the learning outcome of the student-teachers. This finding may encourage teacher educators in selecting and developing appropriate strategies involving the use of e-learning tools and applications to make teaching-learning in classroom effective. This in turn would encourage student-teachers to incorporate e-learning in their classroom as and when they join the teaching profession.

2. The urgent need to integrate the emerging trends in educational technology should be taken up as a priority by the policy makers. As NEP-2020 envisions for smart classrooms in all the schools, this will require re-examining and revamping of the curriculum including financial assistance from central and state governments for funding and improving the facilities for technology enabled classrooms. Therefore, the findings of the present study provide an understanding of the attitude of student-teachers towards e-learning and its impact on the academic performance. Keeping this view in mind, necessary actions can be taken up to establish and improve techno-enabled classrooms in teacher education colleges.
3. From the findings of the present study, it was also indicated that student-teachers have positive attitude towards e-learning, which should be further encouraged as this has the potential to improve the academic performance to a large extent. As such, hands-on training on the practical use of the tools and apps not only for teaching-learning process but also for evaluation and assessment through the use of technology can be focused and organized for student-teachers during the course period.
4. The increase in academic competitions lead to academic stress as revealed in the present study. Therefore, the basic training on counseling should be provided to student-teachers during their B.Ed. course. Also mentors and counseling units should be set up and strengthened in all the teacher education colleges to help student-teachers cope with the hectic nature of the academic course and support them to overcome academic stress.
5. It is important to understand the learning styles of the student-teachers as this would have a major impact on the effective use of e-learning tools and techniques in the classroom teaching-learning as well as independent study by the student-teachers. This would also help minimize the academic stress level of the student-teachers.
6. Additionally, the various stakeholders must try and provide a congenial learning environment whether it is at home, classroom or social environment to reduce the stress caused by e-learning and improve the attitude towards e-learning to enhance the academic performance of student-teachers.
7. The fact that academic stress caused by e-learning is evident from the findings of the present study. As such, it is important to consider the demographic background of the student-teachers in order to better facilitate them according to their needs.

5.5. Conclusion

e-learning is rapidly transforming the education sector. The integration of technology in the teaching-learning process had been found to positively impact the learning outcome of the student-teachers. It improves the relationship on the academic performance and motivates student-teachers to interact and exchange knowledge and understanding of the subject matter, and thus sustain their learning. The present study revealed a clear perspective of the attitude of student-teachers' towards e-learning and how it influenced and enhanced their academic performance. Therefore, it is crucial to encourage and motivate the student-teachers to develop their skills and competence in using e-learning tools and resources to their advantage. One thing to take into account is to make wise use of e-leaning resources so that academic stress can be reduced among the student-teachers. All the teacher education colleges in Nagaland have adopted the use of e-learning by the administrators, teacher educators and student-teachers. Therefore, it is noteworthy to mention that this is sufficient evidence that teacher education colleges in Nagaland are on the right track towards technology enabled teaching-learning process. Nevertheless, there is still a strong need for identifying suitable strategies for effective implementation of e-learning based on the local context.

For e-learning to be effective and successful, it is important for teachers to be prepared, skillful and efficient. Having a positive attitude towards e-learning enhances the teaching-learning strategies that are learner-based and personalized. Regardless of several regional challenges encountered by the student-teachers such as erratic power supply and internet lag, attempts to enhance the technological skills should be a priority. The invaluable role of e-learning in teacher education programmes must be acknowledged as it indeed has a promising prospect. "The Digital India Campaign is helping to transform the entire nation into a digitally empowered society and knowledge economy. While education will play a critical role in this transformation, technology itself will play an important role in the improvement of educational processes and outcomes; thus, the relationship between technology and education at all levels is bi-directional" (NEP-2020, p. 56). Hence, accepting e-learning as an important 21st century skill, teachers can assist and support the student-teachers to adopt the emerging e-learning approaches to teaching-learning process.

5.6. Suggestions for further Research

Based on the observations made in the present study, the following suggestions are made for further research:

1. The study can be extended to a larger sample, including both B.Ed. as well as D. El. Ed. student-teachers.
2. The study can be conducted for the M.Ed. student-teachers.
3. The attitude of teacher educators towards e-learning and its effectiveness on the teaching-learning outcome can be studied.
4. The academic e-learning stress of the graduate and postgraduate students in the general courses can be conducted.
5. A study on the challenges faced by the administrators in integrating e-learning in the institutions can be carried out.
6. A comprehensive survey on the need-based training programmes on the application of e-learning in teacher education colleges can be studied.
7. A comparative study can be conducted between the private and government teacher education colleges.
8. The problems faced by student-teachers in using e-learning resources can be studied.
9. The effectiveness of e-learning on the academic performance and academic stress of female student-teachers can be carried out.
10. The impact of e-learning on the different learning styles of the student-teachers can be carried out.

SUMMARY

1. Introduction

To improve the quality of teaching and learning experiences of both the teachers and learners, e-learning is applied in education. Technology helps make instructional delivery effective and efficient and plays an indispensable role in ensuring effective learning outcomes. For the teacher to integrate e-learning successfully in the teaching-learning environment, one need to develop skills, attitude, desired ICT knowledge and competence including a sound pedagogical understanding. The impact of e-learning in the academic field has produced a large opportunity for both the teachers and the students to reinvent the teaching-learning strategies, methods and techniques which would enhance learner-centric education. Student-teachers have equal access to e-resources which aid in improving their teaching-learning competencies and in enhancing their technological skills, thus, transforming the education process. E-learning has become a major trend in learning and its appropriate use would determine learners' needs, desired learning outcomes and lead to improvement in learners' academic performance and make radical changes in the traditional teaching-learning process. E-learning help learners and instructors by providing well designed learning materials and accessible delivery method. Through e-learning, teachers are able to assist their students with supplementary instructions outside the classroom. At the same time, teachers are able to deepen their knowledge as lifelong learners.

2. Review of Related Literature

The researcher reviewed the related literature for the present study under three broad categories as given below:

i) Studies related to attitude towards e-learning.

ii) Studies related to attitude towards e-learning in relation with academic performance.

iii) Studies related to attitude towards e-learning in relation with academic stress.

The researcher reviewed 23 studies related to attitude towards e-learning; 24 studies related to attitude towards e-learning in relation to academic performance; and 23 studies related to attitude towards e-learning in relation to academic stress. Overall, the researcher reviewed 70 studies related to the present study.

3. Research Gap

Review of researches done indicated that a number of researches have been conducted on the attitude towards e-learning and its impact on either academic performance or academic stress respectively. The greater numbers of the studies were carried out with respect to gender, a few on subject streams and a negligible number on educational qualification. However, no studies have so far been carried out on the interactional effects of student-teachers' attitude towards e-learning, academic performance and academic stress in the context of Nagaland. This indicates a clear gap for the present study and hence it is essential to conduct the research work accordingly.

4. Need and Significance of the Study

The role of e-learning in the educational aspect in general and in the teacher education programme in particular, cannot be evaded anymore. e-learning has gained an important place in the teaching-learning process and has provided opportunities and possibilities to both the teachers and the students to enhance their profession and academic career. Student–teachers now have to be well acquainted with the use of technologies. In order to do so, the attitude towards e-learning plays a major role in developing interest and motivation to effectively use new technologies in the profession. Moreover, the study of the attitude of student-teachers towards e-learning has become very important in order to gain valuable insights and understanding about its influence on the academic performance and academic stress among them. In doing so, the researcher hopes to enlighten the experiences of the student-teachers about the shift from conventional classrooms to the e-learning platforms. When the student-teachers are able to equip themselves with the knowledge and skills of technology based instruction and learning, it is believed that it may bring about "significant positive changes" and development in education.

5. Statement of the Problem

By investigating the attitude of student-teachers towards e-learning and the influence on their academic performance and academic stress in the context of Nagaland, the researcher hopes to find suggested solutions for improvement in Teacher Education Programme. Thus, the problem is stated as **"Attitude towards e-learning in relation to Academic Performance and Academic Stress among Student-Teachers of Nagaland".**

6. Operational Definition of the Terms Used

1. Attitude: An attitude is the tendency to react favourably or unfavourably towards a stimulus. In this study, it means the favourable or unfavourable reaction of student-teachers towards the use of e-learning in the B.Ed. colleges.
2. Student-teacher: Student-teacher includes the pre-service and in-service teachers undergoing Secondary Teacher Education course in the B.Ed colleges.
3. e-learning: e-learning is considered as an electronic based instruction and learning, giving opportunity to the learner(s) to learn anytime and anywhere.
4. Academic performance: Academic performance refers to stating or expressing the 4th Semester student-teacher's achievement or performance in the achievement test prepared by the researcher.
5. Academic stress: Academic stress is the mental and physical stress caused due to a shift from conventional classroom to e-learning platforms for instruction and learning among student-teachers.

7. Objectives of the Study

1. The following are the objectives of the present study:

1. To determine the significant difference among the student-teachers of Nagaland on attitude towards e-learning with respect to gender (male and female) and educational qualification (graduate and postgraduate).
2. To determine the significant difference in attitude of student-teachers toward e-learning with respect to the different pedagogy opted (language, social sciences, science and mathematics).
3. To assess the influence of attitude towards e-learning on academic performance of student-teachers of Nagaland.
4. To assess the influence of attitude towards e-learning on academic stress of student-teachers of Nagaland.
5. To determine the relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

6. To determine the relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender, educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.
7. To determine the relationship between academic performance and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.
8. To determine the relationship among attitude towards e-learning, academic performance and academic stress of student-teachers of Nagaland.
9. To determine the interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.
10. To determine the interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.
11. To determine the interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

8. Hypotheses of the Study

The following hypotheses are formulated for the present study:

1. There is no significant difference in the attitude of student-teachers towards e-learning with respect to gender (male and female) and educational qualification (graduate and postgraduate).

   1.1. There is no significant difference in the attitude of student-teachers toward e-learning with respect to gender (male and female).

   1.2. There is no significant difference in the attitude of student-teachers toward e-learning with respect to educational qualification (graduate and postgraduate).

2. There is no significant difference in attitude of student-teachers toward e-learning with respect to the different pedagogy opted (language, social sciences, science and mathematics).
3. There is no significant influence of attitude towards e-learning on academic performance of student-teachers of Nagaland.
4. There is no significant influence of attitude towards e-learning on academic stress of student-teachers of Nagaland.
5. There exists no relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

   5.1. There exists no relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female) separately.

   5.2. There exists no relationship between attitude towards e-learning and academic performance of student-teachers with respect to educational qualification (graduate and postgraduate) separately.

   5.3. There exists no relationship between attitude towards e-learning and academic performance of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately.
6. There exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

   6.1. There exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender (male and female) separately.

   6.2. There exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to educational qualification (graduate and postgraduate) separately.

   6.3. There exists no relationship between attitude towards e-learning and academic stress of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately.

7. There exists no relationship between academic performance and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

   7.1. There exists no relationship between academic performance and academic stress of student-teachers with respect to gender (male and female) separately.

   7.2. There exist no relationship between academic performance and academic stress of student-teachers with respect to educational qualification (graduate and postgraduate) separately.

   7.3. There exists no relationship between academic performance and academic stress of student-teachers with respect to pedagogy opted (language, social sciences, science and mathematics) separately.

8. There exists no relationship among attitude towards e-learning, academic performance and academic stress of student-teachers of Nagaland.

9. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate), pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

   9.1. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female) separately and of the total sample.

   9.2. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) separately and of the total sample.

   9.3. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

   9.4. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female) and educational qualification (graduate and postgraduate) separately and of the total sample.

   9.5. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

9.6. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

9.7. There is no interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

10. There is no significant interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate), pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

10.1. There is no significant interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female) separately and of the total sample.

10.2. There is no significant interactional effect on academic performance of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) separately and of the total sample.

10.3. There is no significant interactional effect on academic performance of student-teachers of Nagaland with respect to pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

10.4. There is no interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female) and educational qualification (graduate and postgraduate) separately and of the total sample.

10.5. There is no interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

10.6. There is no interactional effect on academic performance of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

10.7. There is no interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female), educational qualification

(graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

11. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate), pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

    11.1. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female) separately and of the total sample.

    11.2. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) separately and of the total sample.

    11.3. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

    11.4. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female) and educational qualification (graduate and postgraduate) separately and of the total sample.

    11.5. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

    11.6. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

    11.7. There is no significant interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

9. Delimitation of the Study

The present study is delimited to

1. Student-teachers of B.Ed. colleges of Nagaland.
2. The 4th Semester student-teachers.

10. Variables of the Study

The variables of the present study included the attitude towards e-learning, academic performance and academic stress. These variables were studied with regard to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics).

11. Research Method

The researcher adopted the Descriptive Survey Method for the present study.

12. Population of the Study

The total "population of the present study" comprised of the B.Ed. student-teachers of Nagaland from all the eight (8) teacher education colleges.

13. Sample of the Study

As per the nature "of the study", the researcher had selected 400 student-teachers from the 8 teacher education colleges in Nagaland using the Simple Random Sampling Technique.

14. Tools Used

The following tools were used for the collection of data for the present study:

1. Attitude towards e-learning Scale constructed and standardized by Dimple Rani (2016).
2. Achievement Test constructed and standardized by the researcher.
3. Academic e-learning Stress Scale constructed and standardized by the researcher.

15. Procedure of Data Collection

Prior permission from the principals and administrators of teacher education colleges was taken for collection of data. The data was collected from the 4th semester student-teachers. The researcher personally visited and administered the tools to the sample population to ensure prompt and complete return of the tools.

16. Statistical Techniques Used

The researcher applied Mean, Standard Deviation, t-test (C.R.), Pearson's Product-Moment Correlation, Multiple Correlation and ANOVA for analyzing the data collected.

17. Analysis of Data

The data collected were organized, classified, tabulated, analyzed and interpreted. The questionnaire of the respondents were thoroughly checked and edited for accuracy, usefulness and completeness. It was then classified into the different categories with respect to gender, educational qualification and pedagogy opted. The raw data thus classified were coded with numerical numbers and entered on MS Excel sheet. The statistical techniques were applied for analyzing and interpreting the numerical data gathered and organized with the help of SPSS V .20 (Statistical Package of Social Sciences) and represented through tables. Graphs were prepared with MS Excel for easy and simple understanding of the data tabulated. After the data analysis, the findings were interpreted and conclusions and generalizations were drawn by keeping the research objectives and hypotheses in mind.

18. Major Findings of the Study

The major findings from the analysis of the data are summarized and presented in this chapter.

Objective 1: To determine the levels of attitude of student-teachers toward e-learning with respect to gender (male and female) and educational qualification (graduate and postgraduate).

a) Gender (male and female):

1. Male and female student-teachers did not differ significantly in their attitude towards e-learning.

b) Educational qualification (graduate and postgraduate):

2. Graduate and postgraduate student-teachers did not differ significantly in their attitude towards e-learning.

Objective 2: To determine the significant difference in attitude of student-teachers toward e-learning with respect to the different pedagogy opted (language, social sciences, science and mathematics).

3. Attitude towards e-learning had significant positive influence between and within student-teachers when it was taken as independent factor.
4. The Post hoc t-test revealed significant difference between pedagogy of language and social sciences, social sciences and science and social sciences and mathematics. However, no significant difference was found between the pedagogy of language and science, language and mathematics and science and mathematics.

Objective 3: To assess the influence of attitude towards e-learning on academic performance of student-teachers of Nagaland.

5. Between and within groups had significant differences when academic performance was taken as independent factor for e-learning. Therefore, academic performance had significant positive influence between and among the student-teachers.
6. From the Post hoc t-test, it was inferred that there was significant difference between student-teachers with low and average, low and high and average and high academic performance on the attitude towards e-learning.

Objective 4: To assess the influence of attitude towards e-learning on academic stress of student-teachers of Nagaland.

7. Between and within groups had significant differences when academic stress was taken as independent factor for e-learning. Therefore, academic stress had positive influence between and among the student-teachers.
8. Student-teachers with low and average academic stress and low and high academic stress had significant difference on the attitude towards e-learning, while student-teachers with average and high academic stress did not differ significantly in the attitude towards e-learning, as was indicated in Post hoc t-test.

Objective 5: To determine the relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

9. There was positive relationship between attitude towards e-learning and academic performance with respect to gender (male and female).

b) Educational qualification (graduate and postgraduate):

10. There was positive relationship between attitude towards e-learning and academic performance with respect to educational qualification (graduate and postgraduate).

c) Pedagogy opted (language, social sciences, science and mathematics):

11. There was positive relationship between e-learning and academic performance with respect to the different pedagogy opted (language, social sciences, science and mathematics).
12. There was positive correlation between attitude towards e-learning and academic performance with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

Objective 6: To determine the relationship between attitude towards e-learning and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

13. There was negative relationship between attitude towards e-learning and academic stress with respect to gender (male and female).

b) Educational qualification (graduate and postgraduate):

14. There was negative relationship between attitude towards e-learning and academic stress with respect to educational qualification (graduate and postgraduate).

c) Pedagogy opted (language, social sciences, science and mathematics):

15. There was negative relationship between attitude towards e-learning and academic stress with respect to the different pedagogy opted (language, social sciences, science and mathematics).
16. There was negative correlation between attitude towards e-learning and academic stress with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

Objective 7: To determine the relationship between academic performance and academic stress of student-teachers with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

17. There was negative relationship between academic performance and academic stress with respect to gender (male and female).

b) Educational qualification (graduate and postgraduate):

18. There was negative relationship between academic performance and academic stress with respect to educational qualification (graduate and postgraduate).

c) Pedagogy opted (language, social sciences, science and mathematics):

19. There was negative relationship between academic performance and academic stress with respect to the different pedagogy opted (language, social sciences, science and mathematics).
20. There was negative correlation between academic performance and academic stress with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

Objective 8: To determine the relationship among attitude towards e-learning, academic performance and academic stress of student-teachers of Nagaland.

21. When the variables (attitude towards e-learning, academic performance and academic stress) were analyzed together, it was found that they have positive relationship.

Objective 9: To determine the interactional effect on attitude towards e-learning of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

22. Gender (male and female) did not significantly influence the attitude towards e-learning of student-teachers.

b) Educational qualification (graduate and postgraduate):

23. Educational qualification (graduate and postgraduate) did not significantly influence the attitude towards e-learning of student-teachers.

c) Pedagogy opted (language, social sciences, science and mathematics):

24. Pedagogy opted (language, social sciences, science and mathematics) by student-teachers had significant influence on the attitude towards e-learning.

d) **Gender (male and female) and educational qualification (graduate and postgraduate):**

25. There was no significant interactional influence of gender (male and female) and educational qualification (graduate and postgraduate) on the attitude towards e-learning of student–teachers.

e) Gender (male and female) and pedagogy opted (language, social sciences, science and mathematics):

26. There was no significant interactional influence of gender (male and female) and pedagogy opted (language, social sciences, science and mathematics) on the attitude towards e-learning of student–teachers.

f) Educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences science and mathematics):

27. There was no significant interactional influence of educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) on the attitude towards e-learning of student-teachers.

g) Gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics):

28. There was no significant interactional influence of gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted

(language, social sciences, science and mathematics) on the attitude towards e-learning of student-teachers.

Objective 10: To determine the interactional effect on academic performance of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

29. Gender (male and female) had significantly influenced the academic performance of student-teachers.

b) Educational qualification (graduate and postgraduate):

30. The educational qualification (graduate and postgraduate) did not significantly influence the academic performance of student-teachers.

c) Pedagogy opted (language, social sciences science and mathematics):

31. Pedagogy opted (language, social sciences, science and mathematics) had significant influence on the academic performance of student-teachers.

d) Gender (male and female) and educational qualification (graduate and postgraduate):

32. There was no significant interactional influence of gender (male and female) and educational qualification (graduate and postgraduate) on the academic performance of student–teachers.

e) Gender (male and female) and pedagogy opted (language, social sciences, science and mathematics):

33. No significant interactional influence was found between gender (male and female) and pedagogy opted (language, social sciences, science and mathematics)

f) Educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics):

34. There was no significant interactional influence of educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) "on the academic performance of" student–teachers.

g) Gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics):

35. No significant interactional influence was observed among gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) "on the academic performance of" student–teachers.

Objective 11: To determine the interactional effect on academic stress of student-teachers of Nagaland with respect to gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) separately and of the total sample.

a) Gender (male and female):

36. Gender (male and female) had significantly influenced the academic stress of student-teachers.

b) Educational qualification (graduate and postgraduate):

37. Educational qualification (graduate and postgraduate) did not significantly influence the academic stress of student-teachers.

c) Pedagogy opted (language, social sciences ,science and mathematics):

38. Pedagogy opted (language, social sciences, science and mathematics) significantly influenced the academic stress of student-teachers.

d) Gender (male and female) and educational qualification (graduate and postgraduate):

39. There was no significant interactional influence of gender (male and female) and educational qualification (graduate and postgraduate) on the academic stress of student–teachers.

e) Gender (male and female) and pedagogy opted (language, social sciences, science and mathematics):

40. There was significant interactional influence of gender (male and female) and pedagogy opted (language, social sciences, science and mathematics) on the academic stress of student–teachers.

f) Educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics):

41. There was no significant interactional influence of educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) on the academic stress of student–teachers.

g) Gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics):

42. There was no significant interactional influence of gender (male and female), educational qualification (graduate and postgraduate) and pedagogy opted (language, social sciences, science and mathematics) on the academic stress of student–teachers.

19. Discussions

The present study aimed to determine the attitude towards e-learning among student-teachers with respect to gender (male and female) and the educational qualification (graduate and postgraduate). Accordingly, it was found that male and female student-teachers did not differ significantly in their attitude towards e-learning. Similarly, Kumari (2013), Thakkar & Joshi (2017) and Kant (2016) found in their studies that attitude towards e-learning was not affected by differences in gender. This could be because both the male and female student-teachers are well informed and up-to-date about the use of e-learning tools. However, it was observed that when the mean scores for the present study was analyzed, male student-teachers had higher attitude towards e-learning than their female counterpart. These findings go in tune with the findings of Kant (2016) in whose study, male teachers had higher attitude towards new technology than the female teachers. This could be due to the fact that male student-teachers spent more time using their smart phones than their female counterpart. The findings of Madhusudhan (2019) contradicted the present findings as considerable gender difference was found in the study, where female students were depicted to have high attitude towards e-learning than male students.

The study established that graduate and postgraduate student-teachers did not differ significantly in their attitude towards e-learning. The results were consistent with the findings of Thirumoorthy & Arun (2021) who also agreed that graduate and postgraduate student-teachers had no significant difference in their attitude towards e-learning. It was observed that the postgraduate student-teachers obtained higher mean scores in their attitude towards e-learning than the graduate student-teachers. It may be that the graduate students were fresh graduates and may not be exposed to self learning materials as the postgraduate student-teachers. Yet, the recent result of Sattanathan (2024) countered the mean scores of the present findings. The students at all the levels are now being exposed to

e-learning and are familiar with e-learning teaching-learning strategies. Therefore, the younger students may have higher attitude towards e-learning.

Regarding the attitude towards e-learning differential on pedagogy opted, the present findings indicated that attitude towards e-learning had positive influence between and within the student teachers. This finding was supported by the findings of Sarkar (2019) which indicated that the secondary teachers' perception towards the use of ICT as an instructional tool is positively high irrespective of subject stream. "The present finding" also revealed that in the Post hoc t-test, student-teachers who opted for science pedagogy had higher mean scores in their attitude towards e-learning than the other student-teachers who opted for language, social sciences and mathematics. This could be because the student-teachers belonging to science pedagogy had more interest and motivation in the application of technology in their subject area. It was also found that social sciences pedagogy student-teachers had the lowest attitude towards e-learning as compared to the other student-teachers from different pedagogy. This could be due to insufficient knowledge about the use of technology. It was further indicated that the attitude towards e-learning between language and science, language and mathematics and science and mathematics was insignificant.

The results of the present study on influence of attitude towards e-learning on academic performance revealed that academic performance had positive and significant influence between and within groups. This result was similar to the findings of Mothibi (2015), Davis (2021) and Hamzaoui (2024) in which it was found that e-learning had positive impact on the students' overall academic achievement. The present findings further depicted in the Post hoc t-test that student-teachers with higher academic performance "had higher positive attitude towards e-learning as compared to the low and average academic performance student-teachers. Student-teachers with positive attitude towards e-learning had the likelihood to perform well as they would have the acquired knowledge and skill in utilizing e-learning resources for their studies. The findings were verified by the studies of Neema-Abooki (2014), Udayakumar (2020), Bhurisrestha & Sharma (2022) and Kevin (2023). These findings affirmed that positive and higher attitude towards e-learning lead to higher and better academic performance among the students.

It was concluded from the present study that between and within groups had significant differences when academic stress was taken as independent factor for attitude towards e-learning. Student-teachers with higher academic stress had lower positive attitude towards e-learning. This may be because student-teachers with lower attitude towards e-learning would have lower motivation in using e-learning resources, due to which they may not have the skills in using the e-resources which in turn increased their academic stress. The results of the present study was supported by the findings of Moawad (2020) and Elashry et al. (2022) in which they concurred that e-learning had negative influence among the students. It was further inferred in the present Post hoc t-test that there was significant variation between the students with low positive attitude and high academic stress. Similarly, Samudra & Matulessy (2021) and Setiakarnawijaya (2022) asserted that unpreparedness of the students for online class lowered their attitude towards e-learning. Moreover, students who had pleasant experience during online learning tended to have lower academic stress.

The current research observed that there was positive relationship between attitude towards e-learning and academic performance of student-teachers with respect to gender, educational qualification and pedagogy opted separately and of the total sample. The reason could be attributed to the willingness of the student-teachers to adopt and adapt e-learning in the teaching-learning process. The results were in tune with the studies of Jawad & Shalash and Maharani et al. (2022) who also agreed that e-learning had positive and significant relationship with students' academic performance.

Based on the findings of the present study, it was showed that there was negative relationship between attitude towards e-learning and academic stress with respect to gender, educational qualification and pedagogy opted among the student-teachers separately and of the total sample. The negative relationship could be because many of the student-teachers were still dependent on the traditional method of teaching and learning. It could also be because many of the students-teachers were not confident in using the e-learning resources that increased their academic stress. Similar findings were affirmed in the study of Malik et al. (2020) and Akanpaadgi et al. (2023) that students experienced academic stress due to online learning.

The present study also highlighted that there was negative relationship between academic performance and academic stress with respect to gender, educational qualification and pedagogy opted separately and of the total sample. The rapid transition from conventional teaching-learning to e-learning could be one of the main reasons for increase in academic stress that was negatively affecting the academic performance of the student-teachers. This was supported by the results of Borah et al. (2022) and Hernandez Jr. (2023) which showed negative relationship between academic stress and academic performance.

Another objective of the present study was to determine the relationship among the attitude towards e-learning, academic performance and academic stress. It was established that when the variables were analyzed together, it was found that they had a positive relationship. It was interesting to note that this could be due to the fact that the right amount of stress can boost the student-teachers to perform well in their studies by incorporating the e-resources which are available at their convenience. As they perform better, this may improve their attitude towards e-learning.

The study further aimed to analyze the interactional effect on attitude towards e-learning with respect to gender, educational qualification and pedagogy opted separately and of the total sample. It was found that gender as well as educational qualification did not significantly influence the attitude towards e-learning when analyzed separately. There was also no significant interactional influence of gender and educational qualification; gender and pedagogy opted; educational qualification and pedagogy opted; and gender, educational qualification and pedagogy opted on the attitude towards e-learning. This could be due to the fact that everyone understands the necessity and importance of e-learning in the teaching-learning process. However, significant difference was revealed in the interactional influence of pedagogy opted on the attitude towards e-learning. It was assumed that science and mathematics student-teachers used the e-resources for their practical works and written assignments and so they may have gained the confidence and competence in handling e-learning resources, while social sciences and language student-teachers might be less interested and less comfortable in utilizing e-resources. This finding was in contrast with the study of Kripalani & Nagar (2023) who found that subject stream did not influence the attitude towards e-learning.

The present study further highlighted the interactional effect on academic performance with respect to gender, educational qualification and pedagogy opted separately and of the

total sample. It was found that gender as well as pedagogy opted significantly influenced the academic performance when analyzed separately. There was no significant interactional influence on academic performance with regard to educational qualification when analyzed separately. Nevertheless, when gender and educational qualification; gender and pedagogy opted; educational qualification and pedagogy opted; and the overall gender, educational qualification and pedagogy opted were analyzed, there was no significant influence on the academic performance. This may be because all the student-teachers had been exposed to the use of e-learning while preparing their assignments, projects and tests or examinations.

Another objective of the present study was to examine the interactional effect on academic stress of student-teachers with respect to gender, educational qualification and pedagogy opted separately and of the total sample. It was observed that there was significant interactional influence on academic stress with respect to gender; pedagogy opted; and gender and pedagogy opted. The reason could be due to the student-teachers now being well adapted with the synchronous, asynchronous and blended learning process. There still many student-teachers who are faced with academic stress due to e-learning. This could be because of increased assignments and presentations; not being able to select relevant materials from the vast e-resources; technical issues and digital distractions to mention a few. However, there was no significant interactional influence on academic stress with respect to educational qualification; gender and educational qualification; educational qualification and pedagogy opted; and gender, educational qualification and pedagogy opted. The reasons could be because the student-teachers have had sufficient exposure and experience in e-learning. Despite some of its disadvantages, the student-teachers are now well adjusted with e-learning and may have realized its flexibility, access, convenience and opportunities provided.

20. Educational Implications

Based on the findings of the present study, few educational implications can be made that may help understand better, the importance of e-learning and its influence on the academic performance and academic stress of student-teachers in the following way:

1. The results from the present study revealed that e-learning is inevitable as it improves the learning outcome of the student-teachers. This finding may encourage teacher educators in selecting and developing appropriate strategies involving the

use of e-learning tools and applications to make teaching-learning in classroom effective. This in turn would encourage student-teachers to incorporate e-learning in their classroom as and when they join the teaching profession.

2. The urgent need to integrate the emerging trends in educational technology should be taken up as a priority by the policy makers. As NEP-2020 envisions for smart classrooms in all the schools, this will require re-examining and revamping of the curriculum including financial assistance from central and state governments for funding and improving the facilities for technology enabled classrooms. Therefore, the findings of the present study provide an understanding of the attitude of student-teachers towards e-learning and its impact on the academic performance. Keeping this view in mind, necessary actions can be taken up to establish and improve techno-enabled classrooms in teacher education colleges.
3. From the findings of the present study, it was also indicated that student-teachers have positive attitude towards e-learning, which should be further encouraged as this has the potential to improve the academic performance to a large extent. As such, hands-on training on the practical use of the tools and apps not only for teaching-learning process but also for evaluation and assessment through the use of technology can be focused and organized for student-teachers during the course period.
4. The increase in academic competitions lead to academic stress as revealed in the present study. Therefore, the basic training on counseling should be provided to student-teachers during their B.Ed. course. Also mentors and counseling units should be set up and strengthened in all the teacher education colleges to help student-teachers cope with the hectic nature of the academic course and support them to overcome academic stress.
5. It is important to understand the learning styles of the student-teachers as this would have a major impact on the effective use of e-learning tools and techniques in the classroom teaching-learning as well as independent study by the student-teachers. This would also help minimize the academic stress level of the student-teachers.
6. Additionally, the various stakeholders must try and provide a congenial learning environment whether it is at home, classroom or social environment to reduce the stress caused by e-learning and improve the attitude towards e-learning to enhance the academic performance of student-teachers.

7. The fact that academic stress caused by e-learning is evident from the findings of the present study. As such, it is important to consider the demographic background of the student-teachers in order to better facilitate them according to their needs.

21. Conclusion

e-learning is rapidly transforming the education sector. The integration of technology in the teaching-learning process had been found to positively impact the learning outcome of the student-teachers. It improves the relationship on the academic performance and motivates student-teachers to interact and exchange knowledge and understanding of the subject matter, and thus sustain their learning. The present study revealed a clear perspective of the attitude of student-teachers' towards e-learning and how it influenced and enhanced their academic performance. Therefore, it is crucial to encourage and motivate the student-teachers to develop their skills and competence in using e-learning tools and resources to their advantage. One thing to take into account is to make wise use of e-leaning resources so that academic stress can be reduced among the student-teachers. All the teacher education colleges in Nagaland have adopted the use of e-learning by the administrators, teacher educators and student-teachers. Therefore, it is noteworthy to mention that this is sufficient evidence that teacher education colleges in Nagaland are on the right track towards technology enabled teaching-learning process. Nevertheless, there is still a strong need for identifying suitable strategies for effective implementation of e-learning based on the local context.

For e-learning to be effective and successful, it is important for teachers to be prepared, skillful and efficient. Having a positive attitude towards e-learning enhances the teaching-learning strategies that are learner-based and personalized. Regardless of several regional challenges encountered by the student-teachers such as erratic power supply and internet lag, attempts to enhance the technological skills should be a priority. The invaluable role of e-learning in teacher education programmes must be acknowledged as it indeed has a promising prospect. "The Digital India Campaign is helping to transform the entire nation into a digitally empowered society and knowledge economy. While education will play a critical role in this transformation, technology itself will play an important role in the improvement of educational processes and outcomes; thus, the relationship between technology and education at all levels is bi-directional" (NEP-2020, p. 56). Hence,

accepting e-learning as an important 21st century skill, teachers can assist and support the student-teachers to adopt the emerging e-learning approaches to teaching-learning process.

22. Suggestions for Further Research

Based on the observations made in the present study, the following suggestions are made for further research:

1. The study can be extended to a larger sample, including both B.Ed. as well as D. El. Ed. student-teachers.
2. The study can be conducted for the M.Ed. student-teachers.
3. The attitude of teacher educators towards e-learning and its effectiveness on the teaching-learning outcome can be studied.
4. The academic e-learning stress of the graduate and postgraduate students in the general courses can be conducted.
5. A study on the challenges faced by the administrators in integrating e-learning in the institutions can be carried out.
6. A comprehensive survey on the need-based training programmes on the application of e-learning in teacher education colleges can be studied.
7. A comparative study can be conducted between the private and government teacher education colleges.
8. The problems faced by student-teachers in using e-learning resources can be studied.
9. The effectiveness of e-learning on the academic performance and academic stress of female student-teachers can be carried out.
10. The impact of e-learning on the different learning styles of the student-teachers can be carried out.

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Appendix –I

Attitude towards e-learning Scale, developed by Dimpal Rani.

Please fill in these following entries: Date:_____

Name:_____ Father's Name: _____

Date of Birth: _____ Gender: Male [ ] Female [ ]

Employed [ ] Unemployed [ ] Self-employed [ ] Student [ ]

If employed: Designation _____ Experience in years _____

Qualification : Academic _____ Professional _____

Institution _____ Place _____

Area : Ueban [ ] Rural [ ] Married [ ] Unmarried [ ] Widow [ ]

INSTRUCTIONS

65 statements on attitude towards e-learning have been given. Read each statement carefully and put a tick "√" on the alternative which is closest to your answer, viz., *Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D) and Strongly Disagree (SD).*

Kindly answer all the statements.

Your answers will be kept confidential.

Sl. No.	Statements	SA	A	UD	D	SD
1	I enjoy getting information through e-learning.					
2	I feel nervousness when I think about e-learning.					
3	I know a lot about e-learning.					
4	Use of e-learning is a waste of time.					
5	In my notion e-learning is a boon.					
6	e-learning is a reliable source of information.					
7	I would like to learn how to use e-learning resources.					
8	I feel exchange of information through e-learning is accurate.					
9	I rely heavily on e-learning.					
10	e-leaning is a cheap source of information.					
11	e-learning adversely affect on health.					
12	I feel e-learning is a good substitute for teacher.					
13	e-leaning offers opportunities for the development of creative					

	abilities.					
14	e-learning does not excite me.					
15	Continuously working on electronic learning I get exhausted.					
16	I feel I get maximum information through e-learning with minimum time and efforts.					
17	e-learning is an obstacle in education.					
18	Sometimes e-learning distracts the learner's focus.					
19	e-learning is relatively new concept.					
20	e-learning keeps me up to date.					
21	e-learning is popular among young generation.					
22	e-learning suppresses the creative abilities.					
23	e-learning provides only specific knowledge.					
24	e-learning decreases the reading ability.					
25	e-learning is as interactive as real teaching learning process.					
26	e-learning helps me with home assignments and projects.					
27	e-learning increases access to education.					
28	e-learning enables me to achieve more.					
29	e-learning creates more problems than it solves.					
30	e-learning is as informative as teacher.					
31	I improve my performance with the help of e-learning.					
32	I can effectively work outside the class with the help of e-learning.					
33	e-learning is very time consuming.					
34	e-learning is difficult for me.					
35	I do not have any interest in using e-learning.					
36	e-learning is very easy to use.					
37	Learning becomes fun through e-learning.					
38	I am very slow in using internet.					
39	I worry about my ability to use e-learning.					
40	I enjoy e-learning while travelling.					
41	It is difficult to read on screen for me.					
42	e-learning leads to social isolation.					

43	I feel headache while reading on screen after sometime.					
44	e-learning is more interesting than classroom learning.					
45	I feel handicapped without use of internet.					
46	I prefer reading on books than on computer or mobile screen.					
47	e-learning becomes beneficial to me when I have missed the class.					
48	It is difficult to work with computer for a long time.					
49	When I could not comprehend the concept in classroom teaching I read it on internet.					
50	I often check my e-mail id.					
51	I come to know various educational courses through internet.					
52	I use social sites for sharing information.					
53	e-learning makes me confused.					
54	Sometimes the online information is not accurate.					
55	I can easily find sample of question papers on internet.					
56	I think negatively about e-learning.					
57	e-learning is very costly for me.					
58	I feel it is the era of e-learning.					
59	It reduces the interaction with teacher.					
60	I need not to ask others for a topic because of e-learning.					
61	Whenever I find difficulty with my study I go for internet.					
62	e-learning makes me more confident.					
63	e-learning makes me more competent.					
64	I feel uncomfortable with e-learning.					
65	e-learning helps me in many ways.					

Appendix –II

Achievement Test for Student-Teachers

INSTRUCTIONS:

The purpose of this test is to measure the B.Ed. student-teachers' performance on the scholastic aspect. The test comprises of 70 items carrying 1 mark each. Please read the instructions carefully and answer all the items. Your responses will be kept confidential and will be used for research purpose only.

Please fill in the following information

Name of the student-Teacher :

_____

Gender : Male [ ] Female [ ]

Name of the Institute :

_____

Educational Qualification : Graduate [ ] Post Graduate [ ]

Pedagogy opted : Language (English) [ ] Social Science [ ]

Science [ ] Mathematics [ ]

I. Fill in the blanks: (15x1 = 15)

1. Parents who are nurturing, responsive and supportive, yet set firm limits for their children are following a _____ (permissive/authoritative) parenting style.
2. Access to resources, equity, participation, diversity and human rights are principles of _____ (social order/social justice).
3. An evaluation of an individual's mental health and social being is called _____ (psychosocial/multiple intelligence) assessment.
4. A process that leads to change as a result of experience and increases the potential for improved performance is known as_____ (teaching/learning).
5. The foundation of the word reading and comprehension is provided by _____ (oral/written) language.
6. An individual's attitude of logical and rational thinking refers to _____ (scientific temper/scientific method).

7. The approach to assessment that is formative rather than summative is the characteristic of _____ (Behaviorist/Constructivist) approach.
8. A cause, explanation or justification for an action or event is _____ (knowledge/reason).
9. Inclusion for girls, children with disabilities and children from marginalized groups is the enactment of_____ (RTE 2007/RTE 2009).
10. All children in the same classroom, in the same school is_____ (special/inclusive) education.
11. A student being worried that he/she will be bullied on the playground at recess is an example of_____ (mental/sexual) abuse.
12. How to answer a test or how to perform an experiment is an example of _____ (teaching/instruction).
13. An unconscious psychological strategy adopted by the individual to tackle a frustrating situation is_____ (defense mechanism/socialization).
14. Cultural beliefs, values, norms and traditions that influence curriculum development belong to the_____ (sociological/environmental) determinant.
15. The knowledge that deforestation leads to climate change is _____ (priori/posteriori) knowledge.

Match the following: **(6x1 = 6)**

16.

a. Piaget	1. Psycho-social development theory
b. Vygotsky	2. Moral development theory
c. Ericson	3. Cognitive development theory
d. Kohlberg	4. Socio-cultural construction theory
	5. Personality development theory

	(a)	(b)	(c)	(d)
i)	5	3	4	1
ii)	3	4	1	2
iii)	2	5	3	4
iv)	1	2	5	3

17.

a. Knowledge	1. A state or habit of mind in which trust or confidence is placed in someone or something.
b. Information	2. The state of being in accord with fact or reality.
c. Belief	3. Organized data or facts systematically presented.
d. Truth	4. An event or occurrence which leaves an impression on someone.
	5. The fact or condition of knowing something with familiarity gained through experience or association.

	(a)	(b)	(c)	(d)
i)	5	4	3	2
ii)	3	1	4	5
iii)	2	5	3	4
iv)	5	3	1	2

18.

a. Law of Effect	1. Any behaviour that is followed by pleasant consequences is likely to be repeated.
b. Law of Exercise	2. Meaningful practice and repetition helps in increasing efficiency and durability of learning.
c. Law of Readiness	3. A satisfying state of affairs results when an individual is willing to learn and is allowed to do so.
d. Law of Intensity	4. A student will learn more from the real thing than a substitute.
	5. The thing learned last will be best remembered.

	(a)	(b)	(c)	(d)
i)	1	2	3	4
ii)	2	3	4	5
iii)	3	4	5	1
iv)	4	5	1	2

19.

a. Sarva Shiksha Abhiyan (SSA)	1. To improve access, equity and quality in Higher Education Institutions.
b. Rashtriya Madhyamik Shiksha Abhiyan (RMSA)	2. Universalization of Elementary Education in a time bound manner.
c. Right to Education (RTE)	3. Coordination, determination and maintenance of standards of University Education.
d. Rashtriya Uchchatar Shiksha Abhiyan (RUSA)	4. Free and compulsory education for children between 6-14 years of age.
	5. Universalization of Secondary Education for children between 6-14 years of age.

	(a)	(b)	(c)	(d)
i)	2	5	4	1
ii)	3	1	5	2
iii)	5	3	1	4
iv)	1	2	3	4

20.

a. Assessment	1. Provides value judgment about the progress of the learner, teachers' efforts and effectiveness of the instructional programmes.
b. Evaluation	2. The art of determining size, capacity or quantity.
c. Test	3. Intended to measure a student's knowledge, skill, aptitude, etc.
d. Examination	4. The systematic basis for making inferences about learning, improvement and development of students.
	5. A measuring instrument consisting of a standard set of questions for being answered by students.

	(a)	(b)	(c)	(d)
i)	1	3	5	2
ii)	3	4	1	5
iii)	4	1	5	3
iv)	4	2	1	5

21.

a. Disparity in Literacy	1. In most countries, there is a substantial gender pay gap.
b. Disparity in Sex Ratio	2. Male literacy is 80.9% and Female literacy is 64.4%
c. Disparity in Public sector and Government service	3. People of all genders have equal rights, responsibilities and opportunities.
d. Gender Parity Index	4. 940 Females per 1000 Males
	5. Inequality between men and women in reproductive health, empowerment and labour market.

	(a)	(b)	(c)	(d)
i)	1	3	5	4
ii)	2	1	3	4
iii)	1	3	2	5
iv)	2	4	1	5

22.

a. Autism	1. People with two or more long term impairments.
b. Mental Retardation	2. Obsessive interests and repetitive behaviours.
c. Loco motor and Neuromuscular Disorders	3. Significant limitations in both intellectual functioning and adaptive behaviour.
d. Multiple Disabilities	4. Problem of movement caused by damage to the nervous system.
	5. A disorder that interferes with the students' ability to listen, think, speak or write.

	(a)	(b)	(c)	(d)
i)	2	5	1	3
ii)	2	3	4	1
iii)	1	3	2	4
iv)	3	4	1	5

II. Tick the correct option: (16x1= 16)

23. A school where students lead a harmonious life with nature and blended natural learning methods is a theory given by:

a) Gandhi

b) Dr. B. R. Ambedkar

c) Dr. Radhakrishnan

d) Tagore

24. A number that reflects the likelihood that a particular event will occur is:

a) Deductive

b) Inductive

c) Logical

d) Probability

25. An informal assessment for Children With Special needs is:

a) Using Standardized Tests for content mastery

b) Performing an experiment in the Science laboratory

c) Individual presentation of assigned topics

d) Presenting a Role Play in the school function

26. Teaching students how to think about how they think and how they approach learning is called:

a) Cognitive

b) Meta Cognitive

c) Constructivism

d) Behaviorism

27. The Salamanca Statement and Framework of Action on Special Needs education was adopted in the year:

a) 1796

b) 1893

c) 1994

d) 2005

28. An example of Intrinsic Motivation is:

a) A student learning new words because he/she loves to read.

b) A student studying in order to pass the examination.

c) A student doing his/her homework to avoid punishment.

d) A student reading a book to receive praise from the teacher.

29. The function(s) of language is/are:

a) Means of communication

b) Expression of identity

c) Imaginative Expression

d) All of the above

30. The teaching of Social Sciences is losing popularity as:

a) It presents several situations of conflicts in human values.

b) It lays too much emphasis upon scientific temperament.

c) It is considered a non-utility subject.

d) It encourages many subjects of study.

31. Skills such as leadership, accountability, analytical thinking and co-operation can best be assessed through:

a) Projects

b) Assignments

c) Lectures

d) Demonstrations

32. Group compatibility, kindness and sympathy, fair play, emotional adjustability, courtesy and politeness, self confidence, cooperation, leadership, cheerfulness and dependability are characteristics of:

a) Social Maturity

b) Intellectual Maturity

c) Stress Management

d) Anxiety Management

33. The agencies involved in curriculum development at the national level are:

a) UGC, NCTE, NIEPA/ NUEPA, NCERT

b) UGC, SCTE, SBTE, SCERT

c) NCTE, NIEPA/NUEPA, SIE, SBTE

d) NCTE, UNESCO, SCERT, NCERT

34. 'It would be bad for me to cheat in the test' is an example of:

a) Socio-cultural Development

b) Psycho-social Development

c) Moral Development

d) Cognitive Development

35. The problem(s) of Vocational Education in India is/are:

i) Wrong attitude

ii) Narrow curriculum

a) Only (i)

b) Only (ii)

c) Neither (i) nor (ii)

d) Both (i) & (ii)

36. Specialized Knowledge means:

a) Knowledge of all Secondary level disciplines

b) Knowledge of a particular discipline

c) Knowledge of Curricular subjects

d) Knowledge of Co-curricular subjects

37. Signs that a child might be gifted and talented:

a) Able to concentrate and focus well on tasks.

b) Short attention span.

c) Have trouble following direction.

d) An IQ between 70 and 85.

38. Curriculum designed to help pupils gain the skills, knowledge and understanding they need to lead healthy, independent lives and to become informed, active and responsible citizens is a:

a) Curriculum of Self Development

b) Curriculum of Economic Development

c) Curriculum of Environmental Development

d) Curriculum of Social Development

IV. Circle (T) for True and (F) for False: (18x1 = 18)

39.	Persistent and established gender inequalities mean that women often experience lower human development outcomes than men.	T	F
40.	Life skills education does not develop problem solving skills.	T	F
41.	Language registers play an important role in dialogue between characters in fictions.	T	F
42.	Multiculturalism in curriculum development makes it difficult for students to	T	F

	respect and value other cultures.		
43.	Gender-just education challenges educators to recognize and accommodate different learning styles.	T	F
44.	Education has been used to bring in modernization in the society.	T	F
45.	Mathematical knowledge helps in understanding the contents of other school subjects.	T	F
46.	The purpose of assessment is to pass judgment, while the purpose of evaluation is for improvement of performance.	T	F
47.	Teaching as a profession is only for Elementary and Secondary school levels.	T	F
48.	Training is imparting knowledge, while teaching is imparting skills in a specific field.	T	F
49.	School safety is sheltering students from violence and bullying and not from drugs.	T	F
50.	Physiotherapist focus on improving the patients' ability to perform activities of daily living, whereas Occupational Therapist focus on improving the patients' ability to move their body.	T	F
51.	The physical growth of Asians is different from that of Africans.	T	F
52.	If the language of a child is weak, so also with their learning.	T	F
53.	Mother-tongue is the third language.	T	F
54.	Feedback usually given after a task is completed is written feedback.	T	F
55.	'Girls should play with dolls and a boy with trucks' is a typical example of Gender-stereotyping.	T	F
56.	Making students feel afraid to make mistakes is a way for addressing social climate of the classroom.	T	F

For Pedagogy of Teaching Language (English)

I. Fill in the blanks: (5x1 = 5)

57. A method which emphasizes on the use of target language in teaching language is _____ (Natural/Direct) Method.

58. Any collection of written work in the form of Prose, Poetry, Fiction and Drama is _____ (Literature/Language).

59. Writing style that is less likely to be emotional is _____ (formal/informal) style.

60. The process of creating a literary piece using metaphor, symbols and ambiguity is _____ (Prose/Poetry).

61. New opportunities to meet, interact and communicate with people at the global level are created by learning _____ (English/Hindi).

II. Match the following: **(2x1 = 2)**

62.

a. Syntax	1. well, unwell, wellness
b. Morphology	2. The college started its academic session on 1st May, 2022.
c. Discourse	3. John, he, in
d. Semantics	4. The word 'Trunk' can mean 'tree trunk', a 'box' or an 'elephant's trunk'
	5. climb /klaɪm/, subtle /ˈsʌtəl/, thumb /θʌm/

	(a)	(b)	(c)	(d)
i)	3	1	2	4
ii)	3	2	4	5
iii)	4	3	1	2
iv)	2	4	3	1

63.

a. Remembering	1. Generalize, rephrase, paraphrase
b. Understanding	2. Simplify, criticize, illustrate
c. Applying	3. Identify, name, recite
d. Analyzing	4. Decide, judge, value
	5. Demonstrate, dramatize, make sentences

	(a)	(b)	(c)	(d)
i)	1	5	4	5
ii)	2	4	1	3
iii)	3	1	5	2
iv)	4	3	1	2

III. Tick the correct answer: **(4x1 = 4)**

64. A test where certain words are removed and the students are asked to replace the missing items is:

a) Cloze Test

b) Open-ended question

c) Peer Evaluation

d) Self Evaluation

65. The Article which endeavors every State to provide adequate facilities for instruction in mother-tongue at the Primary Stage of education is laid down in:

a) Article 343

b) Article 346 (c)

c) Article 350 (A)

d) Article 350 (B)

66. The use of Information and Communication Technology in teaching-learning language:

a) Decreases motivation in teaching-learning language

b) Develop fear in the students to learn language

c) Distracts students interest in learning language

d) Facilitates interactions and relationships in teaching-learning language

67. The first skill people learn when learning a language is through:

a) Speaking

b) Writing

c) Listening

d) Reading

IV. Circle (T) for True and (F) for False: **(3x1 = 3)**

68.	In language, Continuous Comprehensive Evaluation is only for process evaluation.	T	F
69.	Language education is confined to the language in the classroom teaching.	T	F
70.	A good language teacher connects learning to the real world outside the classroom.	T	F

i. ***<u>For Pedagogy of Teaching Social Sciences</u>***

I. Fill in the blanks: (5x1 = 5)

57. The pioneer of Critical Pedagogy is _____ (Paulo Freire/John Dewey).

58. Concept attainment Model belongs to the_____ (Social/Information Processing) Family of Models.

59. 'Social Sciences' as a school subject is for_____ (Elementary/Secondary) level.

60. In Social Sciences, an analysis of a given content material carried out more systematically and scientifically in the true spirit of the science of teaching is _____ (pedagogical/content) analysis.

61. The teacher facilitating the students to organize a role play in groups on the topic *"Roles of Citizens in a Modern Democracy"* is following the _____ (social constructivist/behaviorist) approach.

II. Match the following: (2x1 = 2)

62.

a. History	1. Develop understanding of institutions, practices and relations that constitute public life and modes of inquiry that promote citizenship.
b. Political science	2. Develop understanding about where things are found, why they are there and how they develop and change over time.
c. Economics	3. Allows us to observe and understand how people and societies behaved.
d. Geography	4. Develop understanding of how societies use scarce resources to produce valuable commodities and distribute them among people.
	5. Understand the workings of human society and to explain social behaviour.

	(a)	(b)	(c)	(d)
i)	4	3	2	5
ii)	3	1	4	2
iii)	2	5	3	1
iv)	1	2	3	4

63.

a. Nature Watch	1. Organizing Social Work in the Bus station.
b. Community Service	2. Observing for two hours, how many people follow traffic rules at a city traffic junction.
c. Club Activities	3. Visit to Botanical Garden.
d. Social Surveillance	4. Organizing debate on "Jhum Cultivation".
	5. Visit to Taj Mahal.

	(a)	(b)	(c)	(d)
i)	3	1	4	2
ii)	4	3	2	5
iii)	2	5	3	1
iv)	1	2	3	4

III. Tick the correct answer: **(4x1 = 4)**

64. The Principle of Curriculum construction that allows necessary changes in its contents and methods as per the changing needs and situation is:

a) Principle of Integration

b) Principle of Flexibility

c) Principle of Co-relation

d) Principle of Forward Looking

65. The general aims of teaching Social Sciences according to NCF 2005 are to:

i) Establish a sense of self-identity.

ii) Provide learners the ability to understand social and economic challenges facing the nation.

iii) Inculcate in the learners a critical appreciation for conservation and environmental concerns along with developmental issues.

iv) Discuss multiple perspectives including ST & SC and the disenfranchised people.

a) Only (i) and (ii)
b) Only (iii) and (iv)
c) All of the above
d) None of the above

66. The method of teaching in Social Sciences that will encourage indirect learning is:

a) Lecture with examples

b) Team teaching

c) Demonstration

d) Collaborative Learning

67. A misconception of Social Sciences is:

a) It merely transmits information and is text centered.

b) It lends itself to scientific inquiry.

c) Relevant local contexts are part of the teaching-learning process.

d) It carries a normative responsibility of creating a strong sense of human values.

IV. Circle whether True or False: (3x1 = 3)

68.	The way in which resources are organized and distributed in the society is studied in Geography subject.	T	F
69.	Apathy towards Social Sciences is due to insufficient funds.	T	F
70.	A purpose of using Information and Communication Technology in teaching-learning Social Sciences is for making learning interactive.	T	F

iii. For Pedagogy of Teaching Science

I. Fill in the blanks: (5x1 = 5)

57. A standardized way of making observations, gathering data, forming theories, testing predictions and interpreting results is _____ (scientific method/scientific management).

58. Concept Attainment Model is based on the theory propounded by _____ (J.S. Bruner/E.L. Thorndike).

59. Curiosity, rationality, objectivity and honesty are some features of _____ (scientific attitude/scientific experiment).

60. An analysis of a given content material carried out more systematically and scientifically in the true spirit of the science of teaching is _____ (content/pedagogical) analysis.

61. The study of energy, matter and their interactions are the nature of _____ (Physics/Biology).

II. Match the following: **(2x1 = 2)**

62.

a. Science at the Primary level	1. Preparation to earn livelihood
b. Science at the Upper Primary level	2. Nurturing curiosity
c. Science at the Secondary level	3. Surveys on environment
d- Science at Higher Secondary level	4. Systematic experimentation
	5. Enhancement of profession or career

	(a)	(b)	(c)	(d)
i)	1	4	2	5
ii)	4	2	3	5
iii)	2	3	4	1
iv)	3	1	2	4

63.

a. Remembering	1. Explain, generalize, classify
b. Understanding	2. Identify, label, state
c. Applying	3. Criticize, discriminate, simplify
d. Analyzing	4. Demonstrate, dramatize, operate
	5. Argue, assess, defend

	(a)	(b)	(c)	(d)
i)	5	3	1	4
ii)	4	2	3	1
iii)	3	4	5	2
iv)	2	1	4	3

III. Tick the correct answer: **(4x1 = 4)**

64. The Principle of Curriculum construction that allows necessary changes in its contents and methods as per the changing needs and situation is:

a) Principle of Integration

b) Principle of Co-relation

c) Principle of Flexibility

d) Principle of Forward Looking

65. Some general aims of science according to NCF 2005 include:

i) Developing awareness among learners about the interface of science, technology and society.

ii) Sensitizing the learners about the issues of environment and health.

iii) View science as a social enterprise and to understand how social factors influence the development of science.

iv) Enabling learners to acquire practical knowledge and skills to enter the world of work.

a) Only (i) and (iv)

b) Only (ii) and (iii)

c) All of the above

d) None of the above

66. The method of teaching that will encourage indirect learning is:

a) Lecture with examples

b) Collaborative Learning

c) Demonstration

d) Team teaching

67. "Science is the fundamental emotion which stands at the cradle of true art and true science" is defined by:

a) Albert Einstein

b) Isaac Newton

c) Stephen Hawking

d) C.V. Raman

IV. Circle (T) for True and (F) for False: **(3x1 = 3)**

68.	Test of adulteration of food samples is experimentation.	T	F
69.	Superstitions make unreal real, whereas science is self imposed beliefs.	T	F
70.	The use of ICT encourages scientific and technological creativity among students.	T	F

iv. ***For Pedagogy of Teaching Mathematics***

I**. Fill in the blanks:** **(5x1 = 5)**

57. The method of teaching that involves "finding out" instead of being "merely told" about things is the _____ (Heuristic/Project) method.

58. A student who learns mathematics more easily by doing, exploring and discovering is a _____ (visual/kinesthetic) learner.

59. Any declarative sentence that is true or false is _____ (mathematical proposition/drawing conclusions).

60. An analysis of a given content material carried out more systematically and scientifically in the true spirit of the science of teaching is _____ (pedagogical/content) analysis.

61. In a B.Ed. college of 100 students, 40 like tea, 20 like coffee and 80 like both tea and coffee. The relationship can best be represented by _____ (Truth Tables/Venn diagram).

II. Match the following: **(2x1 = 2)**

62.

a. Self Study	1. Studying in the library in the presence of the librarian who may assist in developing proper study habits.
b. Supervised Study	2. Generating as many ideas as possible to use aesthetic sense in mathematics
c. Brainstorming	3. Study using e-resources after school
d. Oral Work	4. A group of three students working together to complete the assignment on 'profit and loss' of a particular local shop.
	5. Mental work wherein a problem is solved without the use to pen and paper.

	(a)	(b)	(c)	(d)
i)	2	4	1	3
ii)	4	3	2	1
iii)	3	1	2	5
iv)	3	4	1	5

63.

a. Remembering	1. Identify, recall, label
b. Understanding	2. Predict, assess, justify
c. Applying	3. Demonstrate, dramatize, solve
d. Analyzing	4. Deduce, discriminate, simplify
	5. Explain, infer, classify

	(a)	(b)	(c)	(d)
i)	1	5	3	4
ii)	5	4	3	2
iii)	3	2	1	5
iv)	4	3	2	1

III. Tick the correct option: **(4x1 = 4)**

64. Use of puzzles in mathematics:

a) Make it more confusing and complicated

b) Develop fear in the students

c) Help students grasp diverse mathematical concepts

d) Distract students and move their attention away from the problem

65. Some of the general aims of teaching-learning mathematics according to NCF 2005 are to:

i) Develop logical and problem solving ability

ii) Precisely state propositions and justify them

iii) Nurture analytical ability

iv) Mathematise the child's thought process

a) Only (i) and (iii)
b) Only (ii) and (iv)
c) (i), (ii) and (iii)
d) (i), (ii), (iii) and (iv)

66. A good mathematics teacher:

a) Encourage students to memorize formula and concepts

b) Must continue to learn, reflect and improve their practice

c) Need only a certification to apply for a teaching job

d) Motivate students to learn only what is in the textbook

67. The Principle of Curriculum construction that allows necessary changes in its contents and methods as per the changing needs and situation is:

a) Principle of Integration

b) Principle of Co-relation

c) Principle of Flexibility

d) Principle of Forward Looking

IV. Circle (T) for True and (F) for False: (5x1 = 5)

68.	In Mathematics, Continuous Comprehensive Evaluation is only for process evaluation.	T	F
69.	Even without measuring, someone may give the approximate temperature of the day is an example of mathematical intuition.	T	F
70.	Algebra, Trigonometry and Calculus are used in game designs.	T	F

Appendix –III

Academic e-learning Stress Scale

Please fill in the following information:

Name of the student-Teacher :

_____

Gender : Male [ ] Female [ ]

Name of the Institute :

_____

Educational Qualification : Graduate [ ] Post Graduate [ ]

Pedagogy opted : Language (English) [ ] Social Science [ ]

Science [ ] Mathematics [ ]

This scale consists of Fifty (50) items based on Five point alternatives, *viz., Strongly Agree (SA), Agree (A), Undecided (UD), Disagree (D), Strongly Disagree (SD).* Please give your honest response by putting a tick "√" in the relevant box.

Kindly answer all the items.

Your responses will be kept confidential.

Sl. No.	ITEMS	SD	D	UD	A	SA
1	I feel confident in handling e-learning applications.					
2	I feel motivated while discussing contents on e-learning platforms.					
3	I feel nervous when teachers have high expectations from me in utilizing e-platforms.					
4	I find learning interesting when teachers use e-learning resources.					
5	The inability to operate e-learning tools makes me feel insecure.					
6	I lose interest in learning when there is frequent internet fluctuation.					
7	I am comfortable attending Online classes.					
8	I feel intimidated by e-learning tools.					
9	The indifference shown by teachers towards e-learning discourages me to use e-learning platforms.					
10	I am satisfied with the computer laboratory facilities of the institution.					

11	I feel privileged for having access to smart classroom in my institution.					
12	I feel disadvantaged due to lack of internet facilities in my institution.					
13	I have good network coverage which reduces my tension.					
14	I feel helpless without internet.					
15	e-learning motivates me in carrying out my academic work efficiently.					
16	e-learning improves interaction among teachers and students.					
17	There is healthy competition among peers due to e-learning.					
18	e-learning has maximized co-operation among classmates.					
19	e-learning has reduced the quality of academic activities in the teaching-learning process.					
20	Competition for grades has increased social pressure among peers.					
21	I feel disappointed when I do not receive immediate feedback from teachers after e-classes.					
22	Academic e-learning interactions are more organized than face-to-face interactions.					
23	I am under constant pressure of daily learning as e-learning has increased home assignments.					
24	I can access relevant e-learning resources with ease.					
25	I find it stressful while selecting appropriate study materials on e-platforms.					
26	The digital library resources are convenient to use.					
27	e-learning materials provided by teachers are sufficient for examination purpose.					
28	e-contents provide better comprehension of subjects.					
29	e-contents helps me in preparing for examination.					
30	Last minute preparation for examination through e-learning causes stress.					
31	I am losing grades due to e-learning.					
32	e-learning improves the quality of my academic work.					

33	I feel disappointed when the quality of my academic work is negatively affected by irrelevant e-sources.					
34	Constant use of e-devices is affecting my health.					
35	I do not experience mental stress while using e-resources.					
36	Internet service packages are affordable for me.					
37	I often face financial pressure to access the internet.					
38	I often feel physically stressed due to continuous use of e-devices.					
39	Increased screen time affects my mood in general.					
40	Financial support from my family saves me a lot from stress.					
41	I have my family support for online classes.					
42	Familial interactions disturb online classes.					
43	Using e-learning platforms help me complete my assignments on time.					
44	Poor network services make it difficult to manage my time causing tension.					
45	e-learning is a waste of time.					
46	e-learning increases isolation.					
47	I am open-minded towards new technological innovations in education.					
48	I can easily adapt with the latest e-learning applications.					
49	I am apprehensive about the continuation of online education.					
50	Inadequate physical infrastructure may prevent the learners from adapting e-learning innovations in education.					

MULTI-DISCIPLINARY ONE DAY INTER NATIONAL E-CONFERENCE

On

WOMEN EMPOWERMENT: ROLE OF LAW, SOCIETY, CULTURE, POLITICS, LITERATURE AND MEDIA

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She / He has Presented Paper entitled

Attitude towards e-learning among Female Student-Teachers in Nagaland: Role of e-learning in Empowering Women.

in the Conference .

Convener
Dr.Snigdha R. Kamble

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We appreciate the participation and contribution for the International Conference.

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Department of Teacher Education
School of Humanities & Education
Kohima Campus, Meriema - 797 004

Certificate of Participation

This is to certify that Mr./Mrs./Ms./Dr./Prof. Asale Vitso

Department of Teacher Education, NU : Kohima

has participated/Presented a paper entitled e-learning in Teacher Education : Challenges and prospects as per NEP - 2020

in the **National Seminar on Social Transformation in India 2.0 and NEP-2020** held from 21st to 22nd April, 2022 organised by Department of Teacher Education, School of Humanities & Education, Nagaland University, Kohima Campus, Meriema, Nagaland-797 004.

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