MOBILE LEARNING AMONG DEGREE COLLEGE STUDENTS OF MIZORAM: AN ANALYTICAL STUDY

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MOBILE LEARNING AMONG DEGREE COLLEGE STUDENTS OF MIZORAM: AN ANALYTICAL STUDY

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DECLARATION

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DECEMBER, 2025

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

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CONCEPTUAL FRAMEWORK

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CHAPTER 1

CONCEPTUAL FRAMEWORK

1.1 INTRODUCTION

The digital era has profoundly reshaped education across the world. With rapid progress in Information and Communication Technologies (ICTs) and the widespread use of mobile devices, the ways in which learners access and interact with educational content have undergone major changes. Among the various innovations developed in this context, mobile learning (m-learning) has emerged as a particularly influential approach. M-learning allows students to use smartphones, tablets and other portable devices to obtain learning materials anytime and anywhere, extending learning beyond the constraints of traditional classroom environments (Traxler, 2007). This approach also corresponds to the expectations of twenty-first-century learners who increasingly favour flexible, interactive and self-directed learning experiences (Crompton, 2013).

The adoption of mobile learning has grown rapidly across the world due to its potential to complement formal education, enhance blended learning environments and promote learner autonomy. In India, improved digital infrastructure and rising mobile penetration have created opportunities for integrating mobile technologies into higher education. Consequently, educational institutions are exploring mobile learning strategies to enhance teaching effectiveness, expand access to learning resources and cultivate essential digital competencies among students.

In Mizoram, a northeastern state characterized by unique geographical, cultural and infrastructural conditions, mobile learning has become especially relevant. The state's hilly terrain, dispersed settlements and limited educational resources often present challenges to conventional teaching and learning processes. However, increasing smartphone ownership and improved internet connectivity among college-going youth have opened new avenues for technology-enabled learning. As a result, mobile learning has emerged as a practical and adaptable alternative to traditional instructional methods (Nayak & Pattnaik, 2020).

For degree college students in Mizoram, mobile learning offers several notable advantages. It offers immediate access to digital learning resources, enhances communication between learners, teachers and peers and promotes interactive participation through educational apps, online platforms and multimedia tools. Together, these elements support personalized, learner-centered educational experiences. According to Ally (2009), mobile devices support self-paced, flexible learning environments that empower students to review materials, manage their learning independently and engage more actively in the learning process. Such benefits are especially valuable for students facing academic, social or personal challenges that may limit their participation in regular classroom activities.

Moreover, mobile learning helps promote educational equity by reducing disparities between learners in urban and rural settings and by broadening access to high-quality learning resources. As Mizoram continues to prioritise educational progress, modernization and skill development, it becomes essential to examine how students perceive and use mobile learning. Gaining such insights enables institutions to develop more effective mobile-based teaching strategies, strengthen digital literacy and support evidence-informed policymaking within the state's higher education sector.

In this context, the present study aims to explore the views of degree college students in Mizoram regarding mobile learning, evaluate the extent of their mobile device usage for academic purposes, and develop a standardized scale to measure learning-related mobile use. This study is both timely and relevant, as it adds to the existing body of research on mobile learning and offers practical insights that can guide teaching practices and policy initiatives aimed at enhancing higher education outcomes in Mizoram.

1.1.1 CONCEPT OF LEARNING

The notion of learning is complex and comprehensive. Learning fundamentally entails the acquisition, modification and reinforcement of knowledge, skills, behaviors or beliefs through experience, practice, study or instruction. W. C. Morse and G. M. Wingo (1967) assert that *learning transforms an individual's capacity for perception, emotion and action through experiences that are partially perceptual, intellectual, emotional and physical.* The act of learning is a relatively enduring alteration in behavior or knowledge that is the result of extensive experience. Learning may occur deliberately, such as when a learner studies for an examination, or unintentionally, as in the gradual formation of habits through repeated experiences. It is also a continuous, lifelong process that shapes how individuals interpret and respond to their surroundings and the broader world (Schunk, 2012).

Key Features of Learning

Learning is sometimes defined as a process that induces substantial changes in knowledge, abilities, attitudes or behavior through experience and practice (Hilgard & Bower, 1975; Ormrod, 2020). Educational psychologists emphasize that learning differs from temporary changes resulting from maturation, weariness or reflexive responses. Learning involves interacting with the environment and can often be measured in ways that can be seen (Schunk, 2012). To gain a deeper understanding of this process, academics have emphasized various fundamental characteristics that define learning. These are:

- **Change in Behavior or Understanding:** Learning always leads to some kind of change, whether it's in knowledge, attitude, skills or behavior (Ormrod, 2020).
- **Experience-Based:** We learn by interacting with the world around us, whether it's through observation, practice, feedback or formal schooling (Kolb, 1984).

- **Relatively Permanent:** Learning leads to changes that are more lasting than temporary responses, unlike reflexes or short-term reactions (Hilgard & Bower, 1975).
- **Intentional or Unintentional:** Learning can be deliberate (like studying) or incidental (like learning from mistakes or observation) (Schunk, 2012).
- **Can Be Measured:** While sometimes difficult to quantify, learning is often assessed through performance, tests or demonstrations of skill (Ormrod, 2020).

Types of Learning

There are numerous methods of learning. The five most prevalent methods of learning drawn from major psychological and educational learning theories are as follows:

- *Cognitive Learning*: Cognitive learning refers to an active, experience-based approach to learning in which individuals use mental processes to understand information and build new knowledge upon what they already know, a concept illustrated in the work of Jean Piaget (1952). Cognitive skills develop through various mental functions including memory, comprehension, reasoning and problem-solving. Examples of cognitive learning activities include reading, logical thinking and learning a new language.
- *Behavioral Learning*: In accordance with behavioral learning theory, learning occurs through interactions with the environment, primarily through conditioning (rewards and consequences) that influences observable behaviors (Skinner, 1963). Behavioral learning highlights how external stimuli shape and determine observable behaviors. This consists of
    - Classical Conditioning (Pavlov, 1927): Classical conditioning involves learning through association and is based on the principle of associative learning. Pavlov's work demonstrated that organisms including humans, develop new behaviours and responses when a neutral stimulus is repeatedly paired with another stimulus, eventually forming a learned connection between them (Pavlov, 1927).

- Operant Conditioning (Skinner, 1963): Operant conditioning is the process of acquiring knowledge through the application of consequences (rewards/punishments). Behavior is reinforced by favorable outcomes and undermined by detrimental ones as demonstrated by Skinner.

- *Observational Learning*: Also referred to as modelling or imitation, observational learning is a process in which individuals acquire new behaviours by watching others, without necessarily experiencing the behaviour or receiving direct reinforcement themselves. In essence, people learn simply by observing the actions of those around them. Albert Bandura (1977) emphasized that individuals can gain new knowledge or behaviours through observation alone, even if they do not immediately reproduce what they have seen. His famous Bobo Doll experiment serves as a classic example of observational learning in action.

- *Experiential Learning:* Experiential learning, as described by David A. Kolb (1984), refers to the process of gaining knowledge through direct experience and subsequent reflection. This approach is based on the idea that people learn best when they actively engage in real-life situations. In this model of learning, priority is given to practical, hands-on experiences that allow learners to connect theory with real-world application.

- *Social Learning (Bandura, 1986)*: Social learning is the process of learning from others in order to modify one's own behavior in social settings. This phenomenon arises when individuals establish connections, engage in communication and collaborate.

1.1.2 LEARNING STYLES

Every individual learns differently and in ways that suit them. Each one of us is unique. Our perspectives are different. Our opinions and personalities are unique to each one of us. Each of us has a distinct learning style, just as our personalities are distinctive. The phrase "learning style" describes the various ways human absorb, process and retain information. A learning style is a set of theories that describe how each of us understands information differently. Every individual possesses a distinct

learning style and we all like knowledge to be conveyed in a manner that facilitates our comprehension. Learning styles are those *"educational conditions under which a student is most likely to learn."* (Stewart and Felicetti, 1992).

Husain (2016) highlighted seven different learning styles in his book *"Learning and Teaching: A Constructivist Approach."* These are:

- Visual Learning Style (Visual—Look and Learn): Visual learners have a strong grasp of spatial relationships and learn best through visual aids such as pictures, diagrams and images. Such learners are good at conceptualizing ideas visually and can recall information from visual aids like whiteboards or illustrations with ease.

- Aural/Auditory Learning Style (Hear and Learn): Auditory learners are people who learn best by hearing what other people have said and repeating it. Aural learners have an excellent sense of rhythm and enjoy listening to sounds. Learners with an auditory learning style can easily follow spoken instructions, enjoy discussion, enjoy reading aloud, like listening to someone explain things and can remember past conversations in great detail.

- Verbal Learning Style (Learn with Words): Verbal learners typically use written or spoken language to absorb information. Verbal learners are those who learn information by using written or spoken language. Additionally, these learners are more likely to think about the meaning of words and prefer that information be presented in an explanatory paragraph as opposed to a chart or diagram which a visual learner might prefer.

- Tactile/Physical/Kinesthetic Learning Style (Do and Learn): Kinesthetic learners grasp information most effectively through direct, hands-on engagement. They prefer learning experiences that involve physical activity and the use of their hands, bodies and sense of touch. Such learners are typically drawn to practical tasks like experiments or projects, often use gestures to explain ideas, and enjoy interacting with materials, constructing models, and moving around as part of the learning process.

- Logical Learning Style (Learn with Systems): Learners with a logical learning style thrive when they observe how data is correlated with each other. A learner who has a logical learning style tackles a task systematically or logically. Logical learners typically use a logical approach and comprehend systems and sequences easily.
- Social/Interpersonal Learning Style (Learn with others): Social learners respond well to learning activities that include peer interaction and discussion. For such learners, socializing makes learning more exciting, leading to a deeper understanding. Social learners perform better in groups or with a partner than when working alone, where they may lack attention.
- Solitary/Intrapersonal Learning Styles (Learn When Alone): As opposed to social learning, some learners are solitary learners who prefer working alone. While solitary learners may find it difficult to collaborate with others, they thrive when working alone. Instead of asking someone else for information, these learners prefer learning new skills on their own or doing tasks on their own.

Identifying learning styles is essential as it helps students as well as teachers by improving the overall teaching and learning experience. Awareness of personal learning styles fosters self-reflection and autonomous learning among learners. When students comprehend their most effective learning methods be it through visual stimuli, aural resources, textual engagement or kinesthetic activities they can choose study strategies that enhance understanding and memory retention. Kolb (1984) asserts that persons who participate in learning activities congruent with their chosen style are more inclined to achieve significant learning and retain information for an extended duration. Fleming and Mills (1992) argue that recognizing learning preferences fosters learner accountability, hence enhancing autonomy and motivation.

For educators, comprehending learning styles offers essential insights for curriculum development and instructional strategy. It enables educators to diversify their pedagogical approaches and cultivate more dynamic and effective learning

environments. For instance, integrating visual aids (such as charts and diagrams), auditory components (as debates and lectures) and kinesthetic tasks (including experiments or simulations) guarantees that instruction accommodates a broader spectrum of learners (Pashler et al., 2008). This diversity not only sustains student attention but also promotes a deeper comprehension by delivering knowledge through several approaches.

Moreover, recognizing variations in learning styles upholds the concept of inclusive education, guaranteeing that no student is disadvantaged by disparities in perception, cognitive capacity or sensory inclination. Inclusive pedagogy acknowledges that diverse learning methods are not a constraint but a valuable asset that enhances the educational experience for everyone (Honey & Mumford, 1992). By incorporating diverse pedagogical methods, educators may establish equitable opportunities for learners of differing backgrounds and abilities for success.

In contemporary education, technology significantly transforms the accommodation of varied learning preferences. Digital technologies, online learning platforms and mobile applications empower instructors to provide customized educational experiences suited to individual learning preferences. Multimedia tools, including interactive videos, virtual simulations and gamified learning environments, offer multisensory engagement that caters to both visual and kinesthetic learners (Ally, 2009). Mobile learning significantly improves flexibility and accessibility, enabling students to learn at their own speed and using chosen methods (Traxler, 2009).

Understanding different learning styles is not about categorizing learners, but rather acknowledging the variety of learning preferences and utilizing this insight to improve educational quality. By carefully implementing awareness of learning styles, teachers can cultivate motivation, engagement and enduring learning in students within both conventional and technology-enhanced settings.

1.1.3 WHY DO WE LEARN

People engage in learning for different reasons and one common motivation is the desire for success which may be influenced by personal or professional goals (Ryan & Deci, 2000). Learning can be seen as an essential part of being human. From early life, individuals begin to absorb information, adjust to their surroundings and gradually form an understanding of the world (Illeris, 2018). The question of why we seek knowledge does not have a single answer. Instead, it may be shaped by various factors, ranging from the need to adapt to circumstances to the wish for personal growth or fulfilment.

Survival and Adaptation

At its most basic level, learning could be linked to survival. Early human needed to understand their environment such as recognizing edible plants, tracking animals or creating shelter to live safely. This type of learning was vital for survival. Our brains also developed to detect patterns, recall experiences and apply knowledge in new situations which continues to help people adapt to present-day challenges (Illeris, 2018).

Biological and Evolutionary Impulse

Research in neuroscience suggests that learning is closely connected to brain function. For example, dopamine, often referred to as the "feel-good" neurotransmitter, is released when people experience new or successful learning, creating a sense of reward (Schultz, 2015). This natural response may encourage further exploration and from an evolutionary perspective, may have contributed to survival and reproduction.

Exploration and Curiosity

Curiosity is another possible reason people learn. For instance, children are naturally inquisitive as they try to make sense of the wld around them. For many, the joy of discovery, rather than direct usefulness, often drives curiosity-based learning (Illeris, 2018).

Personal growth and satisfaction

Learning may also contribute to emotional, spiritual or intellectual growth. It can support greater self-awareness and broader perspectives. Knowles, Holton and Swanson (2015) note that adult learners who engage in self-directed learning often find more satisfaction and meaning in their experiences.

Social connection and cultural continuity

Learning is also tied to social life. Through shared language, traditions and stories, individuals are able to interact with others and sustain cultural practices. This process helps strengthen community and communication across generations (Illeris, 2018).

Achievement and Growth

Learning can provide access to opportunities by supporting adaptability and skill development. Gaining new knowledge or abilities not only has practical benefits but may also enhance confidence and enjoyment Knowles, Holton & Swanson (2015).

Significance and Goal

Finally, many people turn to learning in search of meaning or direction in life. Whether through philosophy, science or spirituality, the process of learning can play a role in understanding oneself and one's purpose (Ryan & Deci, 2000).

1.1.4 HOW DO PEOPLE LEARN

Learning is widely regarded as a key aspect of human development, shaping how individuals acquire knowledge, skills, and attitudes throughout their lives. Although people vary in their preferred ways of learning, several common factors tend to influence the learning process. Often, learning can be understood as a combination of experience, reflection, and adjustment, influenced by both personal and environmental factors (Illeris, 2018).

One way people may acquire knowledge is through observation and imitation. From an early age, individuals tend to watch and follow the behaviors of parents, peers, teachers or other role models. This kind of social learning can support

the understanding of cultural practices, language or norms without the need for direct instruction (Bandura, 1977). Much of this may happen unconsciously with people repeating behaviors that appear beneficial which over time may develop into skills or habits.

Learning can also be supported by active participation and communication. Many learners seem to process information more effectively when they are engaged in discussion or hands-on activities compared to when they only listen passively. Practical experiences such as problem-solving or experimentation can make abstract knowledge easier to remember. Interaction with others may also provide opportunities for feedback which can help learners notice mistakes and gradually adjust their approach (Kolb, 1984).

Motivation and curiosity are additional factors that appear to influence learning. When learners are genuinely interested in a topic, they are often more willing to explore, ask questions and persist when difficulties arise. Research suggests that intrinsic motivation such as personal satisfaction can lead to deeper and longer-lasting learning than relying only on external rewards like grades or praise (Ryan & Deci, 2000). At the same time, stress or pressure may make it more difficult to concentrate and retain information.

Memory and practice also play a part in the learning process. Information is more likely to be remembered when it is reviewed multiple times, particularly if it is encountered in different situations. Approaches such as spaced repetition, where material is revisited at increasing intervals, may help to strengthen memory (Cepeda et al., 2006). Linking new ideas to what is already known can also support understanding, as the brain often organizes knowledge into patterns rather than isolated facts.

Overall, learning may be seen as a gradual and ongoing process shaped by cognitive activity, personal factors and the environment. Through practice, observation, curiosity and reflection, individuals continue to adapt and grow, illustrating the flexible nature of human learning.

1.1.5 HISTORY OF LEARNING WITH ELECTRONIC DEVICES

The progression of education has consistently been intertwined with technical innovations. Each innovation from the printing press to the internet has revolutionized the way knowledge is transmitted and received. The integration of electronic devices has been one of the most transformative developments in education, revolutionizing instruction and learning over the past century.

The Early Years: Radio and Television

The emergence of radio and television in the early twentieth century marked the first major shift toward the use of electronic technologies in education. During the 1920s and 1930s, educational radio broadcasts provided students in remote areas with access to lessons and instructional content (Cuban, 1986). By the 1950s, television further advanced media-based learning by introducing visual instruction into classrooms with programs such as Sesame Street blending entertainment and basic educational concepts for young learners.

The Emergence of Computers

Computers marked the actual turning point. Universities used mainframe computers for basic Computer-Assisted Instruction (CAI) and research projects in the 1960s and 1970s (Aslan & Reigeluth, 2011). Personal Computers (PCs) were included in schools in the 1980s therefore giving students useful experience. While Oregon Trail was a tool that mixed learning with interactivity, software like Logo was used to instruct programming ideas.

The Age of the Internet

The rise of the internet during the 1990s and early 2000s brought about a major transformation in education. With online connectivity expanding rapidly, learners gained access to vast amounts of digital information, and teachers increasingly incorporated web-based resources into their instructional practices (Octoproctor, n.d.). Over time, e-learning technologies have evolved to facilitate distance education, flexible learning pathways and self-directed study.

Communication between students and educators also changed as email, online forums and discussion boards became common tools for academic interaction.

Mobile Devices in Contemporary Classrooms

The emergence of smartphones and tablets in the late 2000s made learning more flexible and individualized. Students can now access educational applications and platforms such as Google Classroom, Duolingo and Khan Academy anytime and from anywhere. Modern classrooms increasingly incorporate tools like interactive whiteboards, e-books and virtual laboratories which enhance both accessibility and engagement in the learning process (Darmendrail, Gasparini, & Müller, 2023).

The Pandemic and Remote Learning

The global adoption of electronic learning aids was expedited by the COVID-19 pandemic in 2020. The potential and challenges of digital learning were underscored by the nearly instantaneous transition of schools to online platforms. Educators developed innovative methods to deliver teachings remotely while video conferencing tools such as Microsoft Teams, Google Meet and Zoom became indispensable in the field of education (Wikipedia, 2025).

Looking Forward

With ongoing technological advancements, artificial intelligence, virtual reality and adaptive learning systems are anticipated to play a significant role in the future of education. These innovations aim to provide more personalized, immersive, and effective learning experiences (Siddiqui & Masud, 2017).

Throughout its history, the evolution of education through the use of electronic devices has been marked by expansion, flexibility and innovation. From radios to artificial intelligence-powered systems, these technologies have democratized education by removing obstacles and offering fresh possibilities for students all around. As we advance, electronic learning will surely remain a key driver in the evolution and use of knowledge.

1.1.6 NEP 2020 IN RELATION TO TECHNOLOGICAL USE IN EDUCATIONAL SETTINGS

The Government of India introduced the National Education Policy (NEP) 2020 as a comprehensive framework to reform and strengthen the country's education system. Replacing the earlier National Policy on Education of 1986 which was revised in 1992, NEP 2020 was formally approved by the Union Cabinet on July 29, 2020. The policy seeks to modernize education in India, aligning it with the demands of the twenty-first century by promoting a holistic, flexible and multidisciplinary approach while addressing the needs of a digitally connected and globally competitive world (Ministry of Education, Government of India, 2020).

A notable feature of NEP 2020 is its emphasis on technology integration across all levels of education. Recognizing the increasing role of digital tools in society, the policy identifies technology as a key enabler for improving learning outcomes, enhancing accessibility, reducing educational inequalities and modernizing both pedagogical practices and administrative processes (Ministry of Education, Government of India, 2020).

NEP 2020 envisions an education system in which technology is deeply embedded, shaping teaching, learning, assessment and administration. The policy underscores digital inclusion, aiming to ensure equitable access to high-quality education for students from diverse geographic and socio-economic backgrounds. The following section highlights the key strategies and initiatives proposed under NEP 2020 to develop a learner-centered, technology-driven education ecosystem in India (Ministry of Education, Government of India, 2020).

Vision for Technology in Education

NEP 2020 envisions a future in which technology serves not merely as a supporting tool but as an integral part of teaching, learning, assessment and administration. The policy seeks to build a flexible, inclusive and learner-centered education ecosystem by harnessing digital technologies. A key focus of NEP 2020 is promoting digital equity ensuring that students from all geographic locations and

socio-economic backgrounds have access to high-quality educational opportunities (Ministry of Education, Government of India, 2020).

Establishment of the National Educational Technology Forum (NETF)

A key element of NEP 2020's technological framework is the establishment of the National Educational Technology Forum (NETF). This autonomous body is responsible for:

- Guiding decision-making regarding the adoption and implementation of educational technology tools.
- Encouraging research and fostering innovation in the field of educational technology.
- Providing a platform for knowledge exchange and development of best practices among institutions and educators.
- NETF is expected to act as a central hub that guides the implementation of technology in a pedagogically sound and ethically responsible manner.

Digital Infrastructure and National Platforms

NEP 2020 highlights the importance of enhancing digital infrastructure across all levels of education. Key government-led platforms are being expanded and optimized to support teaching and learning:

- DIKSHA: Offers digital resources and learning content for teachers and students across different states.
- SWAYAM: Provides Massive Open Online Courses (MOOCs) for higher education learners.
- e-Pathshala: Distributes e-books and multimedia content.
- SWAYAM Prabha: Delivers educational content via 24x7 DTH channels.
- Virtual Labs: Offer simulated experiments for remote learners. (Ministry of Education, Government of India, 2020).

These platforms aim to ensure multi-modal access to educational resources and are being adapted for mobile use to reach learners in remote areas.

Technology for Blended and Online Learning

NEP 2020 strongly advocates for blended learning approaches that combine traditional classroom instruction with online digital resources. This model facilitates:

- Personalized learning paths, allowing students to progress at their own pace.
- Interactive and multimedia content, which enhances learner engagement.
- Flipped classrooms, where students review instructional material at home and participate in practical or discussion-based activities during class.
- Recognition of the critical role of digital readiness in schools and higher education, particularly in the context of post-COVID-19 education (Ministry of Education, Government of India, 2020).

Teacher Training and Digital Pedagogy

One of the key enablers of successful technology adoption is teacher preparedness. NEP 2020 addresses this by

- Introducing comprehensive ICT training for teachers.
- Ensuring familiarity with Learning Management Systems (LMS) and virtual classroom tools.
- Creating ongoing opportunities for online professional development.
- By equipping educators with digital competencies, the policy aims to make the integration of technology seamless and effective.

Inclusive and Equitable Use of Technology

A core principle of NEP 2020 is promoting inclusivity, especially in access to technology. The policy aims to:

- Narrow the digital divide by providing devices and internet connectivity to marginalized communities.
- Make educational content available in regional languages and in accessible formats for students with disabilities.
- Create offline learning solutions to reach areas with limited or no internet connectivity.

- Ensure that technology serves as a means to enhance equity rather than exacerbate existing educational disparities (Ministry of Education, Government of India, 2020).

Role of Emerging Technologies

NEP 2020 encourages educational institutions to adopt and experiment with emerging technologies, including:

- Artificial Intelligence (AI) to support adaptive learning and analyze student performance.
- Virtual Reality (VR) and Augmented Reality (AR) to provide immersive learning experiences.
- Blockchain to ensure secure management of academic credentials.
- Data analytics to offer continuous feedback and improve teaching and learning processes.
- The use of these technologies aims to cultivate critical thinking, creativity, and other essential 21st-century skills among students (Ministry of Education, Government of India, 2020).

Use of Mobile Devices in Education

Acknowledging the extensive use of smartphones, NEP 2020 promotes:

- The creation of learning content optimized for mobile devices.
- Ensuring that educational platforms, such as DIKSHA and e-Pathshala, are fully accessible on mobile devices.
- Distribution of low-cost tablets and smartphones to students in need.
- This mobile-friendly approach expands the reach of digital education to rural and remote communities (Ministry of Education, Government of India, 2020).

Technology in Higher Education

In higher education, NEP 2020 proposes:

- Offering online degree programs through accredited universities.
- Promoting MOOCs, digital certification, and virtual laboratories.
- Facilitating international collaboration via online platforms.

- Implementing academic credit banks and blockchain-based transcripts for flexible learning pathways (Ministry of Education, Government of India, 2020).

Digital Governance and Administration

The policy also focuses on the use of technology for education governance, including:

- Education Management Information Systems (EMIS) for data-informed planning.
- Online admissions, assessments, and certifications.
- Real-time monitoring of attendance and learning outcomes.

This approach ensures transparency, accountability and efficient management across the education system (Ministry of Education, Government of India, 2020).

NEP 2020 outlines a forward-looking framework for the digital transformation of education in India. The policy emphasizes not only the integration of technology into teaching and learning but also its incorporation into the administrative, structural, and operational dimensions of the education system. By prioritizing accessibility, teacher capacity building, inclusive content, and the adoption of emerging technologies, NEP 2020 aims to establish an equitable, innovative, and future-ready education ecosystem in the country (Ministry of Education, Government of India, 2020).

1.1.7 MODERN LEARNING APPROACHES

The development of technology, psychology and pedagogy has significantly influenced the evolution of contemporary learning approaches. Some of the most notable examples are:

Blended Learning

Blended learning incorporates online learning with conventional face-to-face instruction. It is frequently employed in corporate training, universities and institutions, as it enables self-paced study and flexibility (Garrison & Vaughan, 2008).

Flipped Classroom

The flipped classroom model promotes active learning and increases student engagement. In this approach, learners first gain new knowledge at home through videos, readings and other resources while classroom time is dedicated to discussion, problem-solving and collaborative activities (Bergmann & Sams, 2012).

Personalized Learning

A personalized learning strategy is a kind of education that tries to fit the particular needs, interests and aspirations of every single individual student by changing the path of study and teaching methods. The goal is to improve the efficacy and involvement of learning by realizing that different students learn at different speeds and in many ways (Pane et al., 2015).

Project-Based Learning (PBL)

Project-Based Learning (PBL) is an instructional approach in which students actively engage in authentic, real-world projects. Rather than following traditional teaching methods, learners spend an extended period exploring complex problems or challenges, ultimately producing a final product, solution, or presentation. This method fosters creativity, critical thinking and collaboration among students (Thomas, 2000).

Gamification

Gamification refers to the use of game design elements and principles to enhance student engagement, motivation and participation. This approach makes learning more interactive and enjoyable. For example, students might earn points for completing tasks, unlock new topics or collaborate in teams to solve challenges, mimicking the experience of overcoming obstacles in a game (Deterding et al., 2011).

Microlearning

An educational tool, microlearning emphasizes acquiring new knowledge in tiny chunks. This approach to learning breaks down topics into short-form, standalone units of study that the learner can view as many times as necessary, whenever and wherever they need (Hug, 2005).

Social Learning

Social learning is the process of observing other individuals in order to adapt one's behaviour in social settings. It emphasizes learning through collaboration, discussion and peer interaction. It includes forums, group projects and social media-based platforms (Bandura, 1977).

Experiential Learning

Experiential learning is a process in which learners gain knowledge through direct experience and reflect on their actions. It involves hands-on activities such as internships, simulations, fieldwork or practical exercises. This approach emphasizes reflection and the application of learning to real-world situations (Kolb, 1984).

Adaptive Learning

A pedagogical method called adaptive learning customizes learning experiences by changing instruction and materials depending on each student's requirements and development. It creates a personalized learning path and pace (Walkington, 2013).

Mobile Learning

Mobile learning (m-learning) involves using mobile devices to access educational content and resources. This approach offers flexibility and convenience, enabling students to learn anytime and anywhere (Ally, 2009).

1.1.8 MOBILE LEARNING

Mobile learning has developed into a transforming force in education by providing students the freedom to access educational contents anytime and anywhere using mobile devices, including smartphones, tablets and laptops. This mode of learning reflects broader shifts in pedagogy, technology and societal needs in the 21st century. As the world becomes increasingly digital and interconnected, the role of mobile learning in improving access, engagement and educational outcomes has grown significantly (Crompton, 2013).

Mobile learning can be defined as "Learning across multiple contexts, through social and content interactions, using personal electronic devices" (Crompton, 2013, p. 4). It is rooted in the principles of ubiquitous learning and constructivist theory which emphasize learner autonomy, contextual learning and the integration of learning into daily life. The evolution of mobile learning has paralleled advancements in mobile technology and wireless communication, moving from early portable media devices to smartphones with high-speed internet and powerful learning apps (Traxler, 2009).

The flexibility and portability of mobile devices have led to an expansion of learning beyond traditional classroom boundaries. Learners can now access educational materials while commuting, during breaks or at home, making learning more continuous and integrated into daily routines (Traxler, 2009). This approach is especially advantageous for non-traditional learners, working professionals and students in remote or underserved areas, who may face limited access to formal educational institutions.

One of the most significant advantages of mobile learning is accessibility. Mobile devices can reach learners in underserved areas where traditional infrastructure may be lacking. According to Ally (2009), mobile learning supports

lifelong learning by providing access to educational resources without the constraints of time and place. This is particularly important in developing countries where mobile penetration often exceeds internet access through desktops or laptops.

Mobile learning also supports personalized and engaging learning experiences. Unlike traditional, uniform education models, it allows learners to tailor their learning based on individual needs, preferences, and learning styles. Educational applications can adjust to varying skill levels, monitor progress, and provide immediate feedback (Kukulska-Hulme & Shield, 2008). Additionally, the use of multimedia tools such as audio, video, and interactive content makes learning more engaging and memorable. Incorporating gamified elements and microlearning modules in mobile apps has been shown to enhance motivation and knowledge retention among learners (Gikas & Grant, 2013).

Another benefit is the ability to foster collaborative and social learning. Mobile platforms often include features that support communication and collaboration such as messaging, forums and real-time document sharing. These tools facilitate peer interaction, group work and knowledge sharing which are vital components of modern education (Koole, 2009).

Despite its promise, mobile learning is not without challenges. Technical limitations such as device compatibility, battery life and poor network coverage can hinder learning experiences, especially in low-resource settings. There is also the issue of digital inequality—not all students have equal access to mobile devices or stable internet connections which can exacerbate existing educational disparities (Park, 2011).

Moreover, distraction and over-reliance on devices pose potential risks. Mobile devices can be a source of distraction due to notifications, social media and non-educational apps. Educators need to design learning experiences that are engaging enough to hold attention while also promoting responsible device use (Sharples et al., 2015). Additionally, concerns regarding data privacy, cyberbullying and screen time have sparked debates about the appropriate implementation of mobile technology in educational contexts.

The future of mobile learning is closely linked to its integration with emerging technologies such as Artificial Intelligence (AI), Augmented Reality (AR) and learning analytics. These tools can further customize learning experiences, increase interactivity and provide detailed insights into student behavior and outcomes (Naismith et al., 2004). As mobile learning advances, it is essential for educational institutions to invest in teacher training, robust infrastructure and inclusive policies to ensure equitable access and effective implementation.

Mobile learning has reshaped the educational landscape by breaking down barriers to access, increasing student engagement and enabling more personalized learning experiences. While there are challenges related to infrastructure, inequality and device management, the potential benefits far outweigh the drawbacks when mobile learning is thoughtfully implemented. With continual developments in mobile technology, educators and policymakers must embrace its potential and address its limitations to build more inclusive, flexible and learner-centered educational systems.

1.1.9 EVOLUTION OF MOBILE DEVICE SERVICES AND THEIR IMPACT ON EDUCATION IN MIZO SOCIETY

As part of the country's plans for digital transformation, Mizoram has seen a big change in education since mobile device services became available. Mobile devices were not very important in education in the early 2000s. Most of the time, they were used for texting and calling. It was hard to find internet services because the state had rough terrain and a bad network infrastructure (Lalthlamuana, 2017). The rise of smartphones and 3G and 4G networks has made digital learning more accessible which has changed the way schools work. Students and teachers started to use digital libraries, e-books and other online resources that they couldn't get to before.

Government policies and legislation have made this digital shift possible. The Government of India started the Digital India program in 2015 to improve internet infrastructure and make sure that digital access was affordable (Ministry of

Electronics and Information Technology [MeitY], 2015). The BharatNet project was started to bring broadband internet to villages, even some remote areas in Mizoram, as part of this vision to support mobile-based learning in rural areas. The Samagra Shiksha Abhiyan which was started in 2018 has helped schools use ICT even more by paying for smart classrooms, ICT labs and teacher training (Ministry of Education, 2018). The Right to Education (RTE) Act, 2009 established a legal framework guaranteeing that every child aged 6 to 14 is entitled to free and compulsory education thereby facilitating the utilization of mobile technology to engage marginalized learners (Government of India, 2009). The National Education Policy (NEP) 2020 made technology even more important in education. It said that digital tools, online platforms and mobile-based learning are all important parts of making education in India accessible and of high quality (Government of India, 2020).

Mizo society has experienced considerable changes due to mobile devices. Mobile devices became necessary for continuing education during the COVID-19 pandemic when schools and colleges were closed. Teachers and students used WhatsApp, Zoom and Google Classroom a lot. The problems with connectivity in Mizoram did not take long for students and teachers to get used to it (Zokhuma, 2021). Along with formal schooling, mobile devices have made it easier for students to learn on their own. For instance, they can learn new skills by watching YouTube videos, using e-learning apps or taking Massive Open Online Courses (MOOCs). Teachers could also keep up with the latest teaching methods through professional development programs that were available on mobile devices.

There are also problems that make it hard to make the most of these benefits. The digital divide has widened due to the scarcity of networks in remote regions and the prohibitive costs of smartphones and mobile data for many individuals. Some students from less wealthy parts of Mizo society have difficulties actively participating in mobile-based education. This shows that digital policies need to be more open to everyone. People are also worried about shorter attention spans and trouble with schoolwork because they spend too much time on social media and entertainment on their phones.

Despite these challenges, it is asserted that the expansion of mobile device services has enhanced Mizo education and society. The blending of initiatives such as Digital India, BharatNet and Samagra Shiksha, underpinned by the NEP 2020 and the RTE Act, has ensured that mobile technology serves not merely as a communication tool, but also as a significant medium for education. In the future, the potential implementation of 5G technology and enhanced digital literacy initiatives will ensure that mobile devices remain crucial in fostering a more inclusive, dynamic and future-oriented educational landscape in Mizoram.

1.2 NEED AND IMPORTANCE OF THE STUDY

The field of education has long acknowledged that students differ significantly in how they acquire, process and retain information. These differences are categorized under the concepts of learning styles and types of learning which shape the educational needs, preferences and outcomes of individual learners (Husain, 2016; Pashler et. Al., 2008). In this context, the rise of mobile learning , the use of portable devices such as laptops, smartphones and tablets to support learning, offers an opportunity to address this diversity in more flexible, personalized and inclusive ways (Traxler, 2009). In regions like Mizoram, where access to traditional educational infrastructure may be limited due to geography and resources, mobile learning not only enhances accessibility but also allows educational content to be tailored to the varied learning preferences of students (Crompton & Burke, 2018).

Learners exhibit different styles such as visual, auditory, verbal, kinesthetic, logical, social and solitary (Husain, 2016). Visual learners benefit from materials like charts, videos and infographics; auditory learners engage more effectively with spoken instructions and discussions; kinesthetic learners learn best through practical activities and verbal learners favor reading and writing. Mobile learning platforms support all these modalities through apps that offer diverse content formats such as videos, podcasts, interactive simulations and textual explanations (Al-Emran et. al., 2016). This technological flexibility is especially important in higher education, where students are expected to engage in self-directed, experiential and collaborative learning (Johnson et. al., 2016).

In addition to learning styles, learners also engage through various types of learning, including cognitive, behavioral, observational, experiential and social learning. Mobile technology facilitates these approaches by providing dynamic environments for information processing (cognitive learning), interactive quizzes and rewards (behavioral learning), video-based modeling (observational learning), real-life simulations (experiential learning) and peer collaboration through forums and messaging tools (social learning) (Bandura, 1977; Skinner, 1963; Kolb, 1984).

The need for this study becomes particularly evident when viewed against this backdrop of learning diversity. While mobile learning holds promise for supporting differentiated instruction, little is known about how effectively it caters to the various learning styles and types of learning among degree college students in Mizoram. Most existing studies on mobile learning in India have focused on urban populations or generic technology use without analyzing how mobile tools align with learners' cognitive, emotional and behavioral needs (Singh & Thurman, 2019). There is a pressing need to examine whether mobile learning in Mizoram is inclusive, adaptive and pedagogically responsive.

Furthermore, the National Education Policy (NEP) 2020 emphasizes personalized and experiential learning, blended with technology, to promote holistic student development (Ministry of Education, 2020). NEP envisions flexible curricula and learner-centered approaches that are enhanced by digital platforms. However, implementing such a vision requires ground-level understanding of how different types of learners interact with mobile technologies. This study aims to address this gap by examining how mobile learning supports various learning styles and enhances diverse learning processes among degree college students in the region.

The importance of this study also lies in its potential to inform educators and institutions on how to optimize mobile-based instruction. If students with different learning preferences are not equally benefiting from mobile learning, instructional designers and teachers need to adapt content accordingly (Husain, 2016; Pashler et. al., 2008). For example, courses heavily reliant on reading may not suit kinesthetic or auditory learners unless supplemented with interactive activities or audio content.

Likewise, socially inclined learners may require platforms that support collaboration and discussion such as online forums or group projects. Understanding these nuances can lead to more equitable and effective educational experiences (Al-Emran et. al., 2016).

Moreover, mobile learning offers solutions for experiential and project-based learning which are increasingly valued in higher education for developing critical thinking and real-world problem-solving skills (Kolb, 1984; Thomas, 2000). These approaches can be supported through mobile simulations, augmented reality apps, field data collection tools and multimedia storytelling platforms (Johnson et. al., 2016; Crompton & Burke, 2018). However, the extent to which such opportunities are available and utilized in Mizoram remains unclear. This research will examine whether mobile learning tools are being used in a way that truly supports experiential and hands-on learning for students with different preferences.

Research Gap

A critical review of the existing literature on mobile learning indicates several significant gaps at conceptual, contextual and methodological levels. Although prior studies have extensively examined the role of mobile technologies in enhancing learning outcomes and student engagement, such investigations are largely confined to technologically advanced and urban contexts. Consequently, there is a marked lack of empirical evidence concerning the nature, extent and patterns of mobile learning among degree college students in geographically peripheral regions such as Mizoram.

Further, the majority of existing studies adopt a unidimensional focus on learners' perceptions and attitudes with relatively limited attention to the systematic assessment of mobile device usage for learning through standardized measurement tools. The absence of rigorously developed and validated scales to measure mobile learning usage represents a critical methodological gap thereby limiting the reliability and comparability of findings across studies.

In addition, while demographic variables such as gender and socio-economic status have been explored in some contexts, there remains insufficient analysis of

how multiple background variables- such as academic streams, locale, family income and father's educational background- collectively influence mobile learning practices. This indicates a lack of comprehensive comparative frameworks that can capture disparities in usage patterns across diverse student groups.

Moreover, the relationship between mobile device usage for learning and academic achievement has not been adequately established in region-specific contexts. Existing studies often produce generalized conclusions without accounting for contextual variables, thereby necessitating more localized and empirically grounded investigations.

Another notable gap pertains to the limited exploration of the types of mobile devices used by students and the extent to which these devices are utilized for educational purposes. The literature also inadequately addresses the underlying factors contributing to disparities in mobile learning adoption, particularly in regions characterized by infrastructural and socio-economic constraints.

Finally, there is a scarcity of studies examining the alignment between university curricula and the integration of mobile learning. Specifically, the suitability of curricula- such as that of Mizoram University- in facilitating or hindering mobile learning practices remains largely unexplored.

In view of these identified gaps, the present study seeks to: investigate students' opinions regarding mobile learning; assess the extent and patterns of mobile device usage; compare usage across selected demographic and socio-economic variables; examine its relationship with academic achievement; identify the types of devices used; analyze factors contributing to disparities and evaluate the suitability of the existing curriculum in supporting mobile learning. Through this comprehensive approach, the study aims to generate context-specific, methodologically robust and empirically grounded insights into mobile learning among degree college students in Mizoram.

The outcomes of this study can provide guidance for:

- Educators, as educators are involved in designing mobile-compatible curricula and adapting teaching strategies to accommodate various learning styles.
- Policymakers, in ensuring that digital education initiatives promote inclusive and equitable learning outcomes.
- EdTech developers, in creating tools that respond to the real learning needs of diverse student populations.
- Institutions as it offers training and support to both teachers and students to enhance pedagogical alignment with technology.

In conclusion, this study is timely and necessary. It responds to the need for personalized and inclusive education by exploring how mobile learning platforms address or fail to address the variety of learning styles and types of learning among degree college students in Mizoram. The findings will help bridge the gap between technological implementation and pedagogical effectiveness, thereby contributing to the development of a learner-centered digital education system that aligns with national priorities and local realities.

In addition to the aforementioned significance of the study, the investigator seeks to address the following research questions:

1) What are the opinions of degree college students regarding mobile learning?

2) To what extent do degree college students in Mizoram make use of mobile learning?

3) What are the effects of gender, academic stream, locale, family income and father's educational background on the use of mobile devices for learning among degree college students in Mizoram?

4) What types of mobile learning devices are used by degree college students and to what extent are they utilized?

5) Does mobile learning usage have an impact on the academic performance of degree college students in Mizoram?

6) What are the factors contributing to disparities in mobile learning usage among degree college students in Mizoram?

7) Is the Mizoram University Curriculum suitable for mobile learning?

1.3 STATEMENT OF THE PROBLEM

Considering the research questions that demanded prompt responses, the current study is stated as: "**Mobile Learning among Degree College Students of Mizoram: An Analytical Study.**"

1.4 OBJECTIVES OF THE STUDY

The objectives of the study are as follows:

1) To investigate the opinion of degree college students in Mizoram regarding mobile learning.

2) To construct and standardize a mobile device use for learning scale.

3) To assess the extent of mobile device usage for learning among degree college students in Mizoram.

4) To compare the use of mobile devices for learning by degree college students of Mizoram in relation to gender, academic streams, locale, family income and father's educational background.

5) To find out the relationship between the use of mobile devices for learning and the academic achievement of degree college students of Mizoram.

6) To identify the types of mobile devices used and the extent of their usage among degree college students in Mizoram.

7) To investigate the factors contributing to disparities in mobile device usage for learning among degree college students in Mizoram.

8) To examine the suitability of the Mizoram University curriculum for supporting mobile learning.

1.5 NULL HYPOTHESES OF THE STUDY

The following null hypotheses are formulated for statistical analysis:

1) There is no significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram.

2) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams.

3) There is no significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram.

4) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income.

5) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

1.6 OPERATIONAL DEFINITIONS OF THE TERMS USED

The key terms used in the title of the study are operationally defined as follows:

Mobile learning : Mobile learning is learning that takes place through mobile technologies using handheld devices such as smartphones, tablets, portable notebooks, e-book readers, iPads, etc.

Mobile learning devices: Mobile learning devices are handheld devices and may be classified as cell phones (mobile phones), laptop computers, tablets, Kindles, Personal Digital Assistants (PDAs), etc.

Degree College Students: Students who are studying in an institution in Mizoram that offers undergraduate degrees in the field of arts, science and commerce.

1.7 DELIMITATIONS OF THE STUDY

The present study is delimited to degree college students in Mizoram for the academic year 2024-2025 and does not include students enrolled in professional or vocational courses.

CHAPTER – II

REVIEW OF RELATED LITERATURE

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CHAPTER – II

REVIEW OF RELATED LITERATURE

2.1 INTRODUCTION

In any research endeavour, reviewing relevant literature has become a vital step in understanding the existing body of knowledge. A literature review offers a comprehensive overview of previously conducted studies related to a chosen topic. It involves examining scholarly books, articles and other credible sources connected to the field of inquiry. Through this process, the researcher develops a theoretical foundation and identifies the specific direction of the study. By acknowledging earlier contributions, the literature review assures readers that the current research is grounded in well-established knowledge and thoughtfully developed. It also implies that the researcher has read, evaluated and integrated prior work related to the topic.

The term review of literature is made up of two components: review and literature (Yadav & Pankaj, 2013). Generally, the word *literature* denotes bodies of written works, for example Hindi, English, or Sanskrit literature. In research methodology, the term *literature* refers to the body of existing knowledge within a discipline, including theoretical perspectives, practical insights and the findings of previous studies. The word review refers to the systematic organization and critical assessment of existing information to show how a new study will contribute to the field.

Conceptual literature consists of theoretical or non-empirical sources such as books, essays and conceptual discussions that help explain ideas or models relevant to a study (Grove et al., 2015). In contrast, empirical literature includes data-based works like research articles, theses and dissertations that present findings derived from observation or experimentation (Grove et al., 2015; Research-Methodology, n.d.).

According to W.R. Borg, a literature review forms the essential foundation for all future research in any field. Without building upon the existing body of

knowledge, new work risks being superficial, uninformed, and likely to repeat studies that others have already carried out more effectively.

The following are the review of related literature for the present study:

2.2 STUDIES CONDUCTED ABROAD:

Eshet-Alkalai (2004), in his work titled *"Digital Literacy: A Conceptual Framework for Survival Skills in the Digital Era"* conducted in Israel, argued that digital competence should not be regarded as a single, uniform skill. Instead, digital literacy is proposed as a broad, multidimensional construct that encompasses technical, cognitive and socio-emotional components. The study outlines key forms of literacy such as photo-visual literacy, information literacy, branching literacy and critical evaluation skills that individuals need in order to navigate digital environments effectively. The framework highlights the importance of advanced competencies, particularly the capacity to interpret, assess and integrate online information for meaningful participation in digital learning contexts. Eshet-Alkalai's conceptualization helps explain why learners lacking these higher-order digital skills may find it difficult to fully engage with and benefit from mobile or online learning systems.

McConatha and Praul (2008) conducted a study titled *"Mobile Learning in Higher Education: An Empirical Assessment of a New Educational Tool"* at a midsized state university in the northeastern United States. The study aimed to examine how mobile learning (M-learning) could be integrated into a university classroom and to empirically evaluate its effectiveness. A total of 112 students enrolled in an introductory sociology survey course were given access to an M-learning product developed by HotLava Software to help them prepare for two scheduled exams. Through Learning Mobile Author, practice and review questions were made available on smartphones, web-enabled phones, PDAs and other internet-capable mobile devices. Out of the 112 students, 42 opted to use their personal devices to access the materials and their responses were tracked. The researchers then compared the course final grades of students who used the M-learning tool with

those who did not. The findings showed that students who engaged with the mobile learning software demonstrated a higher level of mastery of the course content than their peers who chose not to use the tool.

Fahad (2009), in his study *"Students' Attitudes and Perceptions Towards the Effectiveness of Mobile Learning in King Saud University, Saudi Arabia,"* examined how students perceive mobile learning and how effective they believe it is. The study revealed that students held positive attitudes toward mobile learning, expressing enthusiasm for its use in academic settings. Most participants stated that wireless networks provide flexible access to learning materials and eliminate dependence on limited resources such as computer labs or library PCs. The findings indicate that implementing mobile learning can be an effective strategy for improving retention rates among both B.A. and M.D. students by enhancing the overall teaching and learning experience.

Kukulska-Hulme et al. (2009) conducted *"An international survey of mature students' uses of mobile devices in life and learning"* of students enrolled in master's and doctoral programmes in the UK, Sweden, Portugal, Hong Kong and Australia to examine the emerging role of mobile devices in supporting flexible and personalized learning. The study emphasized that mobile technologies allow learners to access educational content "anytime and anywhere," breaking the limitations of traditional classroom settings. The study noted that mobility enhances learner autonomy, supports situated learning and encourages continuous engagement with academic material. The study also highlighted that mobile learning can improve motivation and facilitate deeper interaction with theoretical concepts, making it a valuable supplement to formal education.

Traxler (2009), in his article *"Learning in a Mobile Age,"* provides an early and comprehensive analysis of how mobile technologies are transforming education worldwide. Drawing on a conceptual framework rather than empirical data, Traxler highlights that mobile learning offers flexibility by enabling access to educational content across varied contexts, transcending traditional limits of time and place. Traxler emphasizes that widespread adoption of mobile devices fosters more

personalized, situated and context-aware learning. The study also notes challenges in integrating mobile technologies into formal education, including issues of equity, digital readiness and pedagogical adaptation.

Traxler's (2010) studied *"Students and Mobile Devices"* in the UK, at King's College London. The study offers one of the foundational discussions on the expanding role of mobile technologies in education. In this work, Traxler highlights how mobile learning extends educational opportunities beyond formal classroom boundaries, enabling personalised, contextual, and situated learning experiences. He argues that mobility represents more than a technological development—it signifies a pedagogical transformation that supports learner autonomy, flexibility and real-world engagement. The study offers valuable insights into how mobile learning transforms traditional education, making learning more continuous, flexible, and accessible.

Valk et al. (2010), in their study *"Using Mobile Phones to Improve Educational Outcomes: An Analysis of Evidence from Asia,"* examined the impact of mobile phone use on learning across several Asian countries. The study found that mobile learning can enhance education by providing access to content outside the classroom, increasing student engagement supporting personalized learning, and overcoming geographic and infrastructural barriers in remote areas. The authors noted that the effectiveness of mobile learning depends on factors such as instructional design, teacher support and students' familiarity with technology. The study highlights that when implemented thoughtfully, mobile devices can positively influence educational outcomes.

Park (2011), in the study *"A Pedagogical Framework for Mobile Learning: Categorizing Educational Applications of Mobile Technologies into Four Types"* conducted in the USA, compared mobile learning (m-learning) with electronic learning (e-learning) and ubiquitous learning (u-learning). The study examined the technological features and pedagogical affordances of mobile learning as identified in previous research. Additionally, the researcher adapted and modified the transactional distance (TD) theory, proposing it as a relevant theoretical framework for applying mobile learning in the context of distance education.

Sarrab et al. (2012), in their study *"Mobile Learning (M-Learning) and Educational Environments,"* explored the evolution of mobile learning, its applications in enhancing e-learning systems and its potential benefits and drawbacks. M-learning facilitates the integration of technology with education, enabling the development of mobile infrastructures that support nomadic learning and create new opportunities within the e-learning and communications sectors. The study highlighted that M-learning can help address challenges faced by traditional educational institutions. It also emphasized that both teachers and students require effective and practical strategies to support communication and teaching processes. Overall, M-learning was found to be a valuable tool for improving the educational experience.

Sha et al. (2012) conducted a study titled *"Understanding Mobile Learning from the Perspective of Self-Regulated Learning"* in Singapore as part of a mobile-supported science learning programme in secondary schools. The study offered further support for the role of mobile devices in developing learners' self-regulatory capacities. Their findings demonstrated that mobile devices function as both cognitive and metacognitive tools, enabling students to plan tasks, monitor their progress and engage in reflective learning more effectively. The study highlighted that features such as real-time feedback, portability and immediate access to learning resources significantly enhance students' ability to manage their own learning processes. These insights reinforce the notion that mobile learning environments can meaningfully strengthen self-paced and independent learning when appropriate support structures are in place.

Tayebinik and Puteh (2012) examined *"Mobile Learning to Support Teaching English as a Second Language",* which was conducted at the Universiti Teknologi, Malaysia . In this study, they evaluated the effectiveness of mobile learning and teaching in an English language classroom. The results of the investigation showed that small-segment quizzes may be distributed using mobile devices. It has been found that podcasts are incredibly helpful for learning languages,

especially for providing and capturing correct content. Students have discovered how easy it is to exchange texts, photographs and audio/video files with their classmates and teachers using iPods to quickly download language learning software. It was discovered that students were downloading and using this website on their PDAs and mobile phones.

Wood et al. (2012), in their study *"Examining the Impact of Off-Task Multi-Tasking with Technology on Real-Time Classroom Learning,"* conducted at Wilfrid Laurier University in Waterloo, Ontario, Canada, investigated the effects of mobile device use in a natural university classroom setting. Their findings showed that, although mobile devices provide convenient access to information, engaging in off-task multitasking such as texting, browsing or using unrelated applications significantly impaired students' comprehension and retention of lecture content. The authors attributed this decline to cognitive overload and frequent task-switching, both of which interfere with sustained attention. The study highlighted the potential negative academic consequences of mobile device use when students participate in non-academic activities during class time.

Gikas and Grant (2013), in their study *"Mobile Computing Devices in Higher Education: Student Perspectives on Learning with Cellphones, Smartphones, and Social Media,"* explored how university students at three institutions in the U.S. used mobile devices for academic purposes. Their research indicated that while students appreciated the flexibility and constant connectivity provided by mobile technologies, they also encountered several challenges that affected learning effectiveness. These challenges included distractions from the devices themselves, fewer opportunities for in-person interaction and varying levels of digital literacy, all of which made it harder for students to focus and engage deeply with course content. The authors concluded that such limitations could reduce the perceived comparability of mobile learning to traditional classroom instruction helping to explain why some students might question its overall effectiveness.

Lynnette and Cabanban (2013) in their study *"Development of mobile learning using android platform"* attempted to find out teacher and student readiness and perceptions regarding the usage of mobile devices for learning, which was conducted at Hebron University, Palestine. The results of this study indicated that additional literature on technological acceptability is needed. It is also thought that doing so would make it possible to design a new study that would help researchers understand, clarify and forecast the factors that affect people's attitudes towards mobile learning. The findings of this study could inform future research on respondents' aspirations to use mobile devices for learning as well as the development of mobile learning systems on the Android platform.

MacCallum and Jeffrey (2013), in their research titled *"The influence of students' ICT skills and their adoption of mobile learning,"* examined the effect of tertiary students' ICT skills on their adoption of mobile learning in New Zealand. The study revealed that certain ICT competencies influenced students' willingness to engage with mobile learning. Specifically, both fundamental ICT skills and advanced mobile technology proficiency were found to significantly affect students' intention to use mobile learning. However, the findings indicated no support for the claim that advanced ICT skills directly influenced actual mobile learning usage.

Martin and Ertzberger (2013), in their study *"Here and Now Mobile Learning: An Experimental Study on the Use of Mobile Technology"* at a Southeastern U.S. university, examined the impact of mobile learning on student achievement and attitudes compared to computer-based instruction (CBI). The study also compared learning via tablets, smartphones and iPods. Results showed that CBI led to higher achievement and less distraction than mobile devices while students found mobile technology engaging. Attitude surveys revealed that the iPad group had the most positive attitudes, CBI the least and no significant differences were observed between iPad and iPod groups. Overall, the study highlighted that mobile learning provides authentic learning experiences, maintains engagement and can support both formal and informal education.

Narayanasamy and Mohamed (2013), in their study *"Adaptation of Mobile Learning in Higher Educational Institutions of Saudi Arabia,"* examined students' awareness and use of mobile learning in education. The findings revealed that students at Jazan University had a good understanding of mobile learning, were ready to embrace its role in their education, and possessed the necessary technological skills. The university also had adequate infrastructure to support m-learning. One of the key benefits identified was providing students with instant access to information regardless of their location.

Oberer and Erkollar (2013) in their study *"Mobile learning in higher education: A marketing course design project in Austria"* revealed a technique for including mobile learning modules in higher education. The results show that 92% of all students used tablets to access social media sites like Google and Facebook and to communicate within their groups. The Huddles function was demonstrated in two groups to be helpful for group communication (mostly for management students). Additionally, it was found that two groups, largely made up of law and design students, made an effort to use huddles but ultimately gave up on them for the majority of the group project. According to statistics, 89% of students worldwide want to utilise Google Hangouts in the future.

Rueckert et al. (2013), in their study *"Students' Perceptions and Experiences of Mobile Learning,"* explored how students use mobile devices outside the classroom to support individualized learning. The findings indicated that mobile technologies create new learning opportunities and increase students' willingness to integrate technology into their personal and professional lives, particularly in English teaching. T-test results showed statistically significant changes in students' attitudes toward mobile learning after participating in the activities.

Thomas et al. (2013), in their study *"The Utility of the UTAUT Model in Explaining Mobile Learning Adoption in Higher Education in Guyana,"* explored university students' perceptions and adoption of mobile learning using the UTAUT framework. Conducted in higher education institutions in Guyana, the study examined how performance expectancy, effort expectancy, social influence and facilitating conditions influenced students' willingness to adopt mobile learning. Findings showed that performance expectancy and facilitating conditions were the strongest predictors, indicating that students were more likely to use mobile learning when it improved academic performance and when institutional support was available. The study highlights the importance of supportive infrastructure and clear academic benefits for promoting mobile learning adoption in developing-country contexts.

Ally and Prieto-Blazquez (2014) in their study titled *"What Is the Future of Mobile Learning in Education?"*, explored the challenges and prospects of mobile learning across different educational contexts. The study was conducted through a collaborative analysis between Athabasca University in Canada and the Open University of Catalonia in Spain. The study highlighted that learners in rural regions often face barriers such as unstable internet connectivity, limited digital infrastructure and less structured learning environments. These contextual challenges, according to the authors can heighten the likelihood of distraction and interruptions during mobile learning activities. Their findings help explain why rural students may experience slightly higher distraction rates as technological and environmental inconsistencies can reduce their ability to maintain focus and fully engage with mobile learning tasks.

UNESCO (2013), in its report titled "*Information and Communication Technologies in Education: Analytical Survey"* emphasizes the critical role of localized and culturally relevant digital resources in promoting effective learning. The survey highlights that ICT integration in education is most impactful when instructional materials reflect local languages, cultural norms and contextually meaningful examples. By fostering contextual relevance, such resources enhance

learner engagement, inclusivity and comprehension. This recommendation is particularly pertinent in regions like Mizoram where digital content in indigenous languages such as Mizo is limited, underscoring the need for the development of locally aligned, curriculum-focused educational tools that support equitable access and participatory learning.

Baran (2014), in the study *"A Review of Research on Mobile Learning in Teacher Education"* at Iowa State University, conducted a qualitative synthesis of quantitative and qualitative studies to examine trends and gaps in integrating mobile learning into teacher education. Six key findings emerged: (a) mobile learning integration is increasing; (b) theoretical and conceptual frameworks are rarely reported; (c) perceptions, attitudes, and usage patterns vary; (d) engagement with mobile learning is generally beneficial; (e) challenges are infrequently discussed; and (f) multiple pedagogical affordances support mobile learning adoption. These findings provide guidance for designing mobile learning experiences and integrating them into teacher education programs.

Foti and Mendez (2014), in their study *"Mobile Learning: How Students Use Mobile Devices to Support Learning,"* examined the use of mobile devices by graduate students in an Occupational Therapy program at The Richard Stockton College of New Jersey, USA. The study aimed to determine how mobile devices support learning and help students achieve academic goals. Of the 46 respondents, 45 reported using mobile devices for academic purposes with 91% feeling comfortable using them and 97% using them frequently. The findings indicate that students employ various strategies with mobile devices to enhance their learning outside the classroom and support their academic success.

Kopackova (2014) did research on "*Preparedness for mobile learning at higher education"*. The aim of this research was to explore the possibility of incorporation of mobile technology into university course environment. The findings revealed that almost all students own a notebook and 81% of them have smartphones and it also revealed that a notebook was the primary study instrument. The study also

found that the readiness of university students to use mobile applications was 81,51%.

Sharples et al. (2014) in their theoretical study *"A Theory of Learning for the Mobile Age"* observed that mobile devices expand opportunities for learning beyond the confines of the classroom. They emphasized that when students are motivated and supported with adequate resources, mobile learning can promote flexibility, collaboration and personalized learning. Their study demonstrated how the growing availability of affordable smartphones and improved internet connectivity enhance the acceptance and adoption of mobile learning among students.

Van Deursen and Van Dijk (2014) in their foundational work titled "*Digital Skills: Unlocking the Information Society*," offer an empirically grounded framework for understanding digital literacy, drawing on large-scale assessments conducted in the Netherlands. Their study moves beyond general notions of "computer skills" by distinguishing four distinct categories of digital competence: operational skills, formal skills, information skills and strategic skills. Operational skills refer to basic technical abilities such as using devices and navigating interfaces while strategic skills involve the ability to evaluate, select and apply digital information effectively to achieve specific goals. The authors demonstrate that although many users possess adequate operational skills, significant disparities emerge in higher-order competencies which are crucial for meaningful engagement in academic and professional settings. This hierarchical skill model is particularly relevant for educational research as it highlights that mere access to devices does not guarantee effective learning outcomes; rather, students' ability to critically interpret and utilize digital content plays a decisive role.

Alrasheedi and Capretz (2015), in their study *"Mobile Learning Adoption Model: A Critical Review and Future Research,"* conducted a comprehensive review of existing models to identify the key factors influencing the adoption of mobile learning in educational settings. Their synthesis highlighted crucial determinants such as technological readiness, user attitudes, perceived usefulness and institutional support, arguing that successful adoption depends on balancing both technical and

pedagogical considerations. Importantly, their analysis also noted that gender differences did not significantly influence mobile learning adoption, suggesting that factors driving acceptance are largely consistent across male and female learners. By identifying gaps in the literature and emphasizing the need for more context-specific and learner-centric frameworks, the study offers a crucial basis for comprehending the complex and multidimensional aspects of mobile learning adoption.

Alawi et al. (2015), in their study *"Interaction Triangle of Mobile Learning & E-Learning and Computer Tools (CUAELML) in the Basic Class: Attitudes & Opinions of Pre-Service Teachers,"* examined pre-service teachers' perspectives on the impact of mobile learning on computer use. The study found that pre-service teachers view the integration of mobile learning with e-learning as highly beneficial for learning in foundational classes. It also highlighted that widespread online resources enable educators and researchers to engage effectively with mobile, computer and online learning tools.

Alqahtani and Mohammad (2015), in their study *"Mobile Applications' Impact on Student Performance and Satisfaction,"* investigated the use of the mobile application *"Say Quran"* among 118 students at the College of Computer Science & Information Systems, Al Imam Muhammad Bin Saud Islamic University, Saudi Arabia. The study examined how behavioral factors and perceived usefulness of the app influenced students' perceived performance, satisfaction and learning behavior. Findings indicated a positive relationship between using the *Say Quran* app and students' perceived performance, satisfaction and engagement in studying the Holy Quran.

Boyinbode and Fasunon (2015), in their study *"Deploying an Interactive Mobile Learning System in the Classroom,"* examined students' responses to using mobile devices for educational purposes. An interactive web-based mobile learning system (IMLS) was introduced as a supplement to traditional classroom instruction at FUTA. The findings showed that students preferred mobile learning over conventional methods. Additionally, the use of IMLS was found to enhance student engagement and literacy skills while reducing lecturer fatigue.

Matimbwa and Anney (2016), in their study *"Teachers' and Students' Perceptions of Self-Driven Acceptance of Mobile Phone Use as an ICT Teaching Tool,"* examined teachers' and students' perceptions of using mobile phones for teaching and learning in Tanzanian secondary schools. The study found that both teachers and students viewed mobile phones as easy to use and educationally valuable, but emphasized the need for policy guidelines. The researchers concluded that mobile learning adoption should not be ignored and recommended its use after class hours to allow students with devices to access e-materials. They also suggested conducting a pilot study to prototype mobile phone use as a teaching tool.

Sung et al. (2016) in their study titled *"The effects of integrating mobile devices with teaching and learning on students' learning performance: A meta-analysis and research synthesis,"* conducted a comprehensive meta-analysis synthesising findings from 110 empirical studies on mobile-assisted learning. Their analysis demonstrated that the integration of mobile devices into instructional processes significantly enhances students' learning performance. Sung, Chang and Liu attributed these positive outcomes to the pedagogical affordances of mobile technologies such as portability, immediate access to digital content and increased opportunities for personalised and interactive learning. The authors emphasised that mobile learning interventions are most effective when thoughtfully designed and aligned with curricular objectives. Overall, the study provides strong evidence that mobile-assisted learning can meaningfully improve academic achievement.

Traxler (2016), in his study titled "*Inclusion in an Age of Mobility*," emphasized that the potential of mobile learning to enhance educational outcomes is not inherent and depends heavily on its integration within sound pedagogical frameworks. While mobile devices offer flexibility, accessibility and opportunities for learner autonomy, the study cautioned that without deliberate instructional design and teacher support, these technological tools may not translate into meaningful academic improvements. This perspective aligns with the minimal and statistically insignificant correlation between mobile device usage and academic achievement

reported in other studies, underscoring the need for careful pedagogical planning when implementing mobile learning interventions.

Krull and Duart (2017), in their study *"Research Trends in Mobile Learning in Higher Education: A Systematic Review of Articles (2011–2015),"* analyzed 233 peer-reviewed publications to identify emerging trends in mobile learning research. The study examined themes, approaches, learning environments, and technological advancements, comparing findings with previous reviews from 2001–2010. Major findings indicated that mobile learning in higher education is a growing field with increasingly diverse research topics and methods enabling m-learning applications and systems remains the most studied area and while mobile phones are still the most used devices, research is progressively exploring the use of multiple device types.

Al-Adwan, Al-Adwan, and Berger (2018), in their study *"Solving the Mystery of Mobile Learning Adoption in Higher Education,"* proposed a framework based on the UTAUT model to examine factors influencing students' intention to adopt mobile learning in developing countries like Jordan. Using 444 questionnaires from students at four Jordanian universities, the study found that effort expectancy, performance expectancy, trust expectancy, self-management of learning, system functionality, and social influence significantly predict mobile learning adoption explaining 64.8% of the variance in students' intentions. Gender and uncertainty avoidance were found to moderate some relationships. The findings provide important insights for both research and practice in mobile learning adoption.

Crompton and Burke (2018) in their study titled "*The Use of Mobile Learning in Higher Education: A Systematic Review*" examined the implementation and impact of mobile learning across diverse higher education contexts. The authors analyzed multiple studies to understand how mobile devices are integrated into teaching and learning, emphasizing that their effectiveness is strongly influenced by pedagogical strategies and curriculum design. The study highlighted that mobile learning can support active, collaborative and inquiry-based approaches, enhancing learner engagement and providing flexibility in accessing educational resources. However, the review also pointed out that without structured instructional

frameworks, the potential of mobile devices may not be fully realized and learning outcomes could remain inconsistent. By synthesizing evidence from numerous contexts, Crompton and Burke provided a comprehensive understanding of the conditions under which mobile learning can positively influence student learning thereby offering valuable guidance for educators seeking to implement technology-enhanced learning initiatives.

Demir and Akpinar (2018), in their study *"The Effect of Mobile Learning Applications on Students' Academic Progress and Attitudes Toward Mobile Learning,"* investigated students at the Buca Faculty of Education, Dokuz Eylul University. The findings indicated that mobile learning can enhance academic achievement and foster highly positive attitudes toward learning. Students also viewed mobile learning as a strategy that significantly boosts motivation. The study recommends that researchers and educators consider the impact of mobile learning on both academic performance and student motivation.

Traxler (2018), in his study *"Learning with Mobiles in Developing Countries: Research, Policy and Practice,"* explored the growing role of mobile technologies in improving access to education in low-resource contexts. Traxler highlighted that decreasing costs of mobile devices and data services have reduced socioeconomic barriers enabling students from diverse income backgrounds to use mobile devices for learning. This trend has contributed to the broader democratization of mobile learning in developing countries.

Camilleri and Camilleri (2019) studied *"Mobile Learning via Educational Apps: An Interpretative StudY"* at the University of Malta. The paper discussed about the opinions of children regarding the use of educational apps. This research paper adopts qualitative methodology in which data were collected from 54 students of 6-8 years age bar with help of organised, face to face interview meetings. Students reported that using educational app helps to improve their skill. Few students were not much comfortable with use of educational app. This could be due to different learning abilities.

Chuchu and Ndoro (2019) conducted a study titled *"An Examination of the Determinants of the Adoption of Mobile Applications as Learning Tools for Higher Education Students"* at a higher education institution in Pretoria, South Africa. The study aimed to evaluate the viability of mobile applications as learning tools for college students. Using a conceptual model based on the Technology Acceptance Model, the researchers collected quantitative data from 380 students aged 18 and above. The findings indicated that perceived usefulness, perceived ease of use, attitudes toward mobile applications and the intention to use them are key predictors of actual mobile app usage for learning.

Hrastinski (2019) in his study titled *"What Do We Mean by Blended Learning?"* provides a nuanced conceptualization of blended learning, emphasizing that it is not merely about time-split between online and offline learning but about thoughtfully combining modes of instruction to leverage their complementary strengths. He argues that effective blended learning should integrate face-to-face interaction with online elements in a way that enhances pedagogical coherence, student engagement and the flexibility of access. This conceptual framework supports the idea that for practical, hands-on subjects such as science or fine arts, blending physical laboratory or studio work with mobile-enabled virtual simulations can maintain experiential continuity while overcoming infrastructural constraints.

Hartley et al. (2020), in their study *"The Smartphone in Self-Regulated Learning and Student Success: Clarifying Relationships and Testing an Intervention,"* conducted at a large public university in the United States, examined how smartphone use affects students' self-regulated learning and academic outcomes. The study also tested an intervention to enhance self-regulatory strategies. Findings showed that when guided, smartphones can improve students' planning, monitoring and reflective practices contributing to better academic performance. The research highlights the potential of mobile devices as tools for promoting effective and autonomous learning in higher education.

Mohammadi et al. (2020) conducted a study titled *"Mobile Phone Use in Education and Learning by Faculty Members of Technical-Engineering Groups: Concurrent Mixed Methods Design"* at Shiraz University. Using a mixed-methods approach, the quantitative findings showed that faculty acceptance of mobile learning was above average in Ease of Use and Self-efficacy, moderate in Usefulness and below the desired level overall. Qualitative results revealed that mobile phones when used as teaching aids can enhance individual participation, serve as supplementary tools and support teaching management and planning.

UNESCO (2020) in its international report titled *"COVID-19: Education Response – Preparing the Reopening of Schools,"* provides a comprehensive global analysis of how education systems across member countries adapted to pandemic-related disruptions. Drawing on data from a wide range of national contexts, the report highlights the rapid shift toward blended, online and mobile-supported learning as governments implemented digital tools to sustain educational continuity. UNESCO further emphasises that these technology-enhanced approaches are expected to continue shaping educational practices in the post-pandemic era. This global perspective supports the broader recognition that mobile learning will remain integral to future teaching and learning frameworks.

Al-Rahmi et al. (2021) studied *"Exploring the Factors Affecting Mobile Learning for Sustainability in Higher Education"*to examine Malaysian university students' use of mobile learning. Using the Technology Acceptance Model (TAM), data from 200 students at UTHM University showed that attitudes and behavioral intentions significantly influence the sustainability of mobile learning. Factors such as perceived usefulness, ease of use, enjoyment, task-technology fit and actual usage were positively rated by both male and female students. The study validates the extended TAM by showing it effectively predicts students' attitudes and intentions toward mobile learning in higher education.

Kadel et al. (2021), in their study *"Mobile Learning Approaches and Its Impact on Students' Education – A Survey,"* reviewed the literature on the use of mobile technologies in teaching and learning in Australia. Their analysis categorized the studies into three areas: the impact and learning environment, specific applications and mobile learning frameworks. The assessment of mobile learning's impact and environment indicated that mobile technologies generally enhance students' knowledge and learning. Reviews of specific mobile learning applications highlighted positive effects across various sectors, though challenges such as implementation difficulties and the absence of standardized guidelines were noted. Additionally, the review of mobile learning frameworks revealed that while many frameworks exist for different applications, there is often a lack of integration between these frameworks and course development.

Kukulska-Hulme (2021), in her updated work *"Mobile-Assisted Language Learning [Revisited and Updated],"* explored the role of mobile technologies in education, emphasizing the digital divide between rural and urban learners. She found that urban students benefit from reliable internet access, affordability and exposure to advanced digital tools whereas rural students often encounter challenges such as limited infrastructure, inconsistent connectivity and reduced access to devices. These disparities underscore that despite the potential of mobile learning to expand educational access, inequalities in usage and opportunity persist.

Mergany, Dafalla, and Awooda (2021) conducted a study titled *"Effect of Mobile Learning on Academic Achievement and Attitude of Sudanese Dental Students: A Preliminary Study"* involving undergraduate dental students from two universities in Sudan. The study aimed to examine the impact of mobile learning as a supplement to traditional classroom lectures on students' academic performance and to assess their attitudes toward using a mobile application as a teaching tool in dental education. The results revealed significant differences in students' understanding of dental surgical forceps and overall, the students expressed positive attitudes toward using the mobile application for learning.

Okai-Ugbaje et al. (2022), in their study *"A Mobile Learning Framework for Higher Education in Resource-Constrained Environments,"* explored the effective integration of mobile learning in universities facing infrastructural and socio-economic challenges. Focusing on higher education institutions in Nigeria and similar low-resource contexts, the research examined the relationships between device availability, digital skills, institutional support and learner motivation. The study found that while mobile learning has strong potential to expand educational access its effectiveness relies on reliable digital infrastructure, affordable connectivity and students' ability to self-regulate their learning. The authors highlighted that disparities in internet access, device capabilities and digital competence can lead to unequal learning outcomes even when mobile devices are widely available. Their findings underscore the importance of a comprehensive framework that addresses infrastructure gaps, promotes digital literacy and ensures supportive learning environments to achieve equitable mobile learning experiences in resource-constrained settings.

Pinto and Leal (2022) in their study titled *"Mobile Learning and Its Effect on Learning Outcomes and Critical Thinking"*, synthesize evidence from multiple higher-education settings and demonstrate how mobile learning strategies, including concept mapping applications, peer interaction and collaborative tasks, systematically foster critical thinking and reasoned judgment among students. Analyzing a wide variety of mobile-assisted interventions across disciplines, they found consistent positive effects on learners' ability to analyze information, evaluate arguments and apply metacognitive strategies. The study underscores that when mobile tools are deliberately integrated with reflective activities and structured peer engagement, they go beyond mere content delivery to actively scaffold higher-order cognitive skills. Pinto and Leal's work lends strong support to pedagogical recommendations that encourage the use of interactive mobile learning tools to deepen understanding in theoretically rich subjects such as Arts and Commerce.

2.3 STUDIES CONDUCTED IN INDIA:

Paliwal and Sharma (2009) conducted a study titled *"Future Trend of Education – Mobile Learning: Problems and Prospects."* The study aimed to identify the challenges of integrating mobile learning into traditional classrooms and training programs and to propose potential solutions. The findings indicated that telecom companies did not view mobile learning as a significant source of revenue. The research also addressed broader issues related to incorporating mobile learning into conventional education and training systems.

Chandran (2010) conducted a study titled *"Sustainable Distance Education Through Mobile Learning: A Case Study in a Multicultural Context"* among distance learners at Vinayaka Missions University in Salem, India, using an experimental research design. The study found that mobile learning improved student performance regardless of differences in region, language or cultural background, demonstrating that technological advancements can help overcome educational disparities in multicultural populations. Additionally, mobile learning was shown to support cost-effective instruction and serve as a sustainable method for delivering remote education. The research also highlighted that mobile learning leverages the creativity and self-motivation of young learners when providing sustainable distance education to culturally diverse student groups.

Banerjee and Bose (2011) in their study *"Higher Education through Mobile Learning: An Analysis of Students from Kolkata"* tried to identify respondents who are interested in and the driving forces behind their choice for mobile-based education. The result showed 80% of respondents were aware of the M-learning platform, 78 percent of respondents are willing to take M-learning courses, 56% of respondents were interested to attend management courses via M-learning if the opportunity arose. They also found that the average preference for a management course given via M-learning is higher than usual.

Hemabala and Suresh (2013) conducted a study titled *"Mobile Learning for Undergraduate Engineering Students"* in Chennai. The study aimed to assess the level of acceptance of mobile learning among both students and teachers. The findings revealed that 92% of students owned portable devices or mobile phones, 80% had devices with video capabilities and 60% had internet access on their devices. Additionally, the study indicated a positive reception toward this new learning approach: 80% of students were willing to use their devices for learning and 84% believed that wireless portable devices positively influenced their learning while the remaining 15% did not comment, and no students reported a negative impact.

Bansal and Joshi (2014), in their study *"A Study of Students' Experiences of Mobile Learning,"* examined the attitudes of 34 B.Ed. students toward using WhatsApp for mobile learning, focusing on its educational benefits, collaborative learning opportunities, social interaction and overall student experience. The findings revealed that many stakeholders support the integration of mobile learning in educational settings. Most students reported that using WhatsApp enhanced their social interaction with teachers and peers, and they generally preferred WhatsApp-based mobile learning over traditional classroom methods.

Vyas and Nirban (2014) conducted a study titled *"Students' Perception on the Effectiveness of Mobile Learning in an Institutional Context"* at the Birla Institute of Technology and Science, Pilani. The primary objective of the study was to understand and assess students' attitudes and perceptions regarding the effectiveness of mobile learning. The research examined 100 students enrolled in undergraduate and postgraduate programs to explore their views on using mobile technology in education. Despite noting some limitations, the majority of students expressed strong support for adopting mobile learning as a part of their instructional experience.

Halder et al. (2015) conducted a study titled *"Undergraduate Students' Use of Mobile Phones: Exploring Use of Advanced Technological Aids for Educational Purposes."* The research examined undergraduate students' attitudes toward using mobile phones for educational activities. Focusing on usability, barriers and preferences, the study aimed to assess students' satisfaction with mobile-assisted learning and to explore whether attitudes differed based on gender, medium of instruction, academic discipline and location. The findings revealed significant differences in attitudes based on gender, type of education and place of residence, while no significant differences were observed concerning academic discipline.

Saxena and Saxena (2015) conducted a study titled *"A Viewpoint and Attitudes of Students Towards the Future of Mobile Learning in the Education Industry of India."* The research aimed to compare male and female students' perspectives on the future of mobile learning in India's education sector and to provide an overall understanding of student attitudes toward mobile learning. The findings indicated no significant differences between male and female students' views. Most students expressed a positive opinion of mobile learning and generally agreed on its benefits, recognizing it as an effective and valuable medium for learning.

Ansari and Tripathi (2017) conducted a study titled *"An Investigation of Effectiveness of Mobile Learning Apps in Higher Education in India."* The researchers administered a structured questionnaire using a 5-point Likert scale to students from various Indian universities. The study revealed that mobile learning apps are increasingly important to learners and can be highly effective in higher education. Additionally, the findings indicated that students possess adequate knowledge and skills to utilize mobile technologies and the internet for educational purposes. The study highlights the growing popularity of mobile learning apps among Indian college students and demonstrates their potential for effective use in higher education settings.

Fouzdar and Behera (2017) conducted a study titled *"Attitude of Post Graduate Students Towards Mobile Learning"* to examine the attitudes of postgraduate students at Sidho-Kanho-Birsha University in Purulia District, West Bengal, India. The study considered variables such as gender, rural-urban residence, semester, stream and caste. The findings indicated that students generally held an average or satisfactory attitude toward mobile learning. No significant differences were observed based on gender, rural-urban status, caste or semester. However, the study revealed a significant difference in attitudes among students from different academic streams.

Jagadeeswari (2017) in her study *"Attitude towards mobile learning among undergraduate college students in Chennai City"* sought to know attitude of Undergraduate students towards mobile learning regarding various variables like-gender, religion, family type, course, family size and amount spent on mobile. The result indicates that 63% students have favourable attitude towards mobile learning. Regarding gender, family types, course, amount spent on mobile and involvement on m-learning have no significant differences, religion, family size have different attitude towards mobile learning.

Ligi and Raja (2017), in their study *"Mobile Learning in Higher Education,"* explored the role of mobile learning in modern educational contexts. The conceptual paper highlights how m-learning fosters student-centered learning and offers more flexible approaches to higher education. Mobile learning introduces innovative teaching and learning methods that enhance students' educational experiences. The integration of mobile devices and wireless technologies in learning environments enables students to achieve more and provides opportunities for learning anytime and anywhere thereby increasing flexibility and accessibility in education.

Senthilkumaran (2017), in his study *"A Study of Attitude Towards Mobile Learning, Teaching Profession, and Self-Efficacy Among Prospective Teachers,"* found that prospective teachers generally hold a positive and high attitude toward mobile learning. The study also revealed significant differences in attitudes based on residential locality, college location, type of college and the devices used. The research concluded that the growth of institutions, the expanding mobile workforce and the increasing reliance on mobile devices are key drivers for adopting mobile learning. Furthermore, it recommended further studies on teachers' preferences for mobile learning strategies, challenges in implementing mobile learning in schools and colleges, experimental research on how mobile devices enhance learning and comparative studies of traditional learning versus mobile learning at the college level.

Prasad and Aithal (2017) conducted a study titled *"A Study on Online Education Model Using Location-Based Adaptive Mobile Learning"*. The study aimed to explore a conceptual model for location-based mobile learning utilizing GPS, as well as to examine the advantages, limitations and challenges of the model. The findings indicated that mobile learning provides learners with substantial flexibility, allowing them to study anytime and anywhere without being constrained by physical boundaries. Additionally, the model can be enhanced using location-based information to further support learning.

Vaishnav and Sinha (2017) conducted a study titled *"Effectiveness of Mobile-Learning Module for Teaching Environmental Education"* to examine B.Ed. trainee teachers' ability to learn Environmental Education in the Indian context using a mobile learning module delivered via the EDMODO app. The experimental study involved 50 B.Ed. teacher trainees from a college in Nagpur and employed a pre-test and post-test control group design. The findings revealed a significant positive impact on the trainees' learning outcomes when using the mobile learning module for teaching environmental education.

Kumar and Madhu (2018) in their study *"Perceptions of Higher Education Students towards the Effectiveness of Mobile Learning in West Bengal"* tried to measure the perception of higher education students towards m-learning concerning different variables like stream, gender, locality and level of education. The results indicated that higher education students have a moderate level of perception toward mobile learning, and no significant differences were observed between the variables.

Mandal (2018) carried out a study titled *"A Study on Attitude of College Students Towards Mobile Learning"* involving 200 college students from the Bankura district of West Bengal. The study found that students' attitudes toward mobile learning were generally moderate, neither highly favorable nor unfavorable. The research suggested that a more in-depth investigation would be necessary to gain a comprehensive understanding of students' true attitudes toward mobile learning.

Pande (2018) conducted a study titled *"Investigating the Attitude Towards the Use of Mobile Learning in Open and Distance Learning: A Case Study of Uttarakhand Open University"*. The research evaluated learners' attitudes and self-efficacy toward mobile learning through a baseline survey. The findings revealed that students generally held a positive attitude toward using mobile learning. Participants believed that mobile devices could enhance their knowledge in distance learning programs. They found audio-video lectures particularly motivating and reported that this approach facilitated easier communication with peers. The learners were attracted to mobile learning due to its various advanced features and considered it an engaging and effective method of study.

Sao et al. (2018) conducted a study titled *"Attitude of B.Ed. Student-Teachers Towards Mobile Learning"* among B.Ed. student-teachers in the Purulia region of West Bengal. The research found that these student-teachers generally held an average attitude toward mobile learning. The study also indicated significant differences in attitudes based on gender and whether students were government-sponsored or privately enrolled. However, no notable differences were observed in mobile learning attitudes among student-teachers based on factors such as rural

versus urban location, pre-service versus in-service status, social category (General, ST, or OBC) or stream of study (Arts versus Science).

Raja and Shirley (2019) conducted a study titled *"Attitude Toward M-Learning Concerning Academic Performance Based on Gender, Locality, and Stream"* in Tamil Nadu. The study found that pre-service teachers generally exhibited a moderate attitude toward mobile learning. Female pre-service teachers demonstrated a higher level of positive attitude compared to their male counterparts. No significant differences were observed between pre-service teachers in the arts and sciences streams. Additionally, urban pre-service teachers showed a greater inclination toward mobile learning than those from rural areas. The findings also indicated that while mobile learning attitudes had a modest effect on academic achievement, they moderately influenced overall academic performance.

Chatterjee et al. (2020) conducted a study titled *"Adoption of Mobile Applications for Teaching-Learning Process in Rural Girls' Schools in India: An Empirical Study"* focusing on rural girls' schools in India. The research aimed to identify factors influencing the adoption of mobile applications in the teaching-learning process. The findings indicated that among other factors, the students' intentions to use mobile apps were largely unaffected by cost considerations. The study also noted that the explanatory power of the proposed model which accounted for 81% of the variation, could potentially be improved by including additional predictors, as only a limited number of factors were examined.

Sunitha and Elina (2020), in their study titled *"A Study on Mobile Applications in Education,"* examined the effectiveness of integrating mobile devices into the teaching and learning process. The findings indicated that using mobile applications can enhance students' critical and analytical thinking skills. Given that most higher education students own mobile phones, mobile apps have gained widespread popularity, making it easier for students to access information related to their studies and address academic challenges.

Dhara and Bandyopadhyay (2021) in their research *"Mobile learning: It's factors and challenges: A literature review"* highlighted to give a clearer perspective on the idea, development, determinants and problems with adopting mobile learning. In this study, they emphasised different m-learning models that aid to identify the reasons for embracing this trend learning and they concentrated on numerous m-learning variables that may be effective on the educational system.

Mondal (2021) conducted a study titled "Attitude of Postgraduate Students Towards Using Mobile." The research aimed to examine the attitudes of postgraduate students at the University of Kalyani in the Nadia District of West Bengal, India toward mobile device usage. The study revealed notable differences between male and female students in their attitudes toward using mobile phones. The analysis focused on the data collected regarding students' perceptions of mobile usage and highlighted several significant findings.

Naskar and Naskar (2021) investigated *"A Study on the Usefulness of Mobile Learning in the Higher Education System in the Present Scenario in West Bengal"*. The primary aim of this study was to evaluate the effectiveness of mobile learning in higher education, focusing on four key aspects: its overall usefulness, the relationship between mobile learning and academic success, students' attitudes toward mobile learning and the factors influencing its enhancement in higher education. The findings showed that m-learning has a number of benefits, the majority of students believe it improves their success rate, students have a positive attitude and factors like cost effectiveness, time flexibility, creating learning plans, enhancing communication, time management, creating an environment that encourages group study, etc. guarantee the success of m-learning.

Thaker and Vaghela (2021) investigated *"Students' perceptions towards mobile learning during COVID-19 tried to find out perceptions among Postgraduate students towards m-learning in Surat, Gujarat through Technology Acceptance Model"*. The result showed that attitudes and usefulness towards mobile learning are strong. The result also indicates that behavioural intention does not significantly differ between subjective norm and perceived.

2.4 STUDIES CONDUCTED IN NORTHEAST INDIA:

Lalthlamuana (2017) in his study titled "*Mobile Communication and Society in Mizoram*" investigated how mobile devices influence communication and information access within the regional context of Mizoram. The study highlighted that mobile devices are increasingly integrated into daily life, providing new opportunities for accessing educational resources and supporting informal learning. The study emphasized that while mobile communication can enhance connectivity and learner engagement, unstructured or excessive use may also lead to distractions that hinder academic focus. These insights underline the significance of integrating mobile technology thoughtfully into the contexts of education, ensuring that its potential to support learning is realized without compromising attention or academic outcomes.

Ali (2019) did research on *"Role of Digital Pedagogy in Enhancing Learner Engagement at Primary Level in India with Reference to Assam"* to investigate how digital tools and interactive teaching methods influence student engagement in primary schools across Assam, a state in Northeast India. Employing a mixed-methods approach that included surveys, interviews and classroom observations in both rural and urban schools, the study found that incorporating gamified content, audiovisual tools and other digital resources substantially enhances students' attention, engagement and understanding of concepts. However, the study also highlights major structural barriers such as the digital divide, insufficient teacher training, inconsistent infrastructure and the lack of localized content in Assamese or tribal languages. The paper recommends capacity-building initiatives, stronger infrastructural support and contextually relevant digital content to ensure sustainable and inclusive deployment of digital pedagogy in Assam.

Choudhury and Senapati (2021) in their study titled *"Digital Education and Assam: A Case Study of KKHSOU"* examine how Krishna Kanta Handiqui State Open University (KKHSOU), the only state open university in Assam, deploys digital education to sustain academic delivery during crises such as the COVID-19 pandemic. Their study reports that KKHSOU leveraged its in-house mobile application which was available since 2015 and other e-learning tools to maintain continuity of learning when physical classes were disrupted. However, they also highlight significant challenges concerning infrastructure, digital access and inequality, particularly in rural parts of Assam. The authors argue that to strengthen digital education, the university must invest in reliable internet connectivity, faculty training and contextually relevant content, thereby ensuring that remote and disadvantaged learners benefit from blended and mobile learning initiatives.

Hauminlun and Singh (2022) in their study titled *"Impact of Smartphone Among Postgraduate Students of Manipur University"*, examine postgraduate students' patterns of smartphone use at Manipur University, Imphal, Manipur. Their survey found that nearly all participants (100%) owned smartphones, predominantly running Android and used them extensively for both general purposes (messaging, browsing, social media) and academic activities (downloading class materials, attending online classes, preparing assignments, interacting with faculty). Interestingly, only a small fraction used educational apps for learning tasks. The authors also report that while many students agreed that smartphones helped improve their learning skills, a significant number did not see them as tools for active classroom participation or innovative thinking. Moreover, negative effects such as habitual overuse and difficulty refraining from phone usage were also noted among respondents suggesting a complex, dual role of smartphones in both enabling and distracting academic life.

Lalduhawma et al. (2022) in their study titled *"Effectiveness of Online Learning during the COVID-19 Pandemic in Mizoram"*, conducted a survey of 356 students and 60 teachers across secondary and higher secondary schools in Mizoram to evaluate perceptions, readiness and challenges of online learning. Their analysis revealed that while many participants used smartphones to attend online classes, significant barriers such as poor internet connectivity, limited data and expensive devices undermined the effectiveness of online education. Moreover, they found that mathematics emerged as the most difficult subject to teach or learn remotely. The authors argue that these infrastructural and resource-related constraints must be addressed to improve the inclusivity and quality of online learning in the state.

Council for Social and Digital Development (2023) reported *"The State of Access, Digital Connectivity and Inclusion in the North-Eastern Region of India"* offers a comprehensive assessment of digital infrastructure across all eight Northeastern states. Conducted region-wide, the study reveals persistent disparities in internet availability, network reliability and device accessibility when compared to the national average. The findings indicate that rural and remote areas in states such as Mizoram, Nagaland, Manipur and Arunachal Pradesh face particularly severe connectivity challenges, resulting in inconsistent digital access for students. The report emphasizes that these infrastructure deficiencies considerably limit students' capacity to effectively engage with digital and mobile learning platforms. By identifying these systemic challenges, the study underscores the critical need for focused policy measures and increased investment in digital infrastructure to promote equitable, technology-driven education in the region.

Bajwa (2023) studied "*Need and Necessity of Digital Media Literacy in North-East India"*. The study examined the complex interplay of geography, culture and digital transformation in India's Northeastern region. The study highlights that despite significant youth engagement with social media and digital platforms, there remains a worrying gap in critical media skills such as discerning misinformation and navigating content responsibly. Bajwa argues that this gap is especially pronounced among students in the "Land of the Seven Sisters" (the Northeastern states), who face not only limited infrastructure but also low exposure to structured media-literacy education. The author recommends a multifaceted strategy for closing this divide, including organizing workshops, faculty development programs and community-level training initiatives to build a digitally literate citizenry capable of leveraging the benefits of internet access meaningfully.

Vanlalruati and Chuaungo (2023) in their study titled *"Practices of College Students in Mizoram for Integration of ICT in Learning in Terms of Stream of Studies"*, explored how college students in Mizoram use ICT across different academic streams (Arts, Science, Commerce). The research involved a large sample of 1,085 students selected via multi-stage random sampling. The findings reveal mobile phones as the most frequently used ICT device for academic activities. Students commonly used WhatsApp, Google Classroom and email while Learning Management Systems (LMS) were rarely accessed for downloading materials or submitting assignments. The study also identified significant barriers to ICT integration, including slow Wi-Fi, poor internet signals at home and unreliable power supply. Notably, Arts stream students exhibited the lowest level of ICT engagement followed by Commerce and then Science students. These results provide critical insight into how stream of study, infrastructure and student behavior intersect to affect mobile and digital learning approaches in higher education in Mizoram.

Boro et al. (2024) studied *"Examining Digital Literacy Skills Among Gen Z Students of Mizoram University: The Impact of the Internet in the Academic Environment"* conducted at Mizoram University, Aizawl. The authors surveyed 250 Gen Z students to assess their digital literacy skills (such as information evaluation, research and digital communication) and how these competencies interact with their use of the Internet for academic purposes. Using SPSS to analyze the data collected via structured online questionnaires, they found that high digital literacy enables efficient access to online resources and critical assessment of information but emphasized that the Internet also intensifies the need for strong digital skills due to the vast information available. The study suggests strategically building these skills among students to maximize the academic benefit of ubiquitous connectivity.

2.5 META ANALYSIS

A meta-analysis provides a rigorous synthesis of the existing research base by systematically integrating findings from multiple studies to identify trends, convergence and divergence in the literature. Given the rapid growth of mobile learning research internationally and within India and the increasing relevance of such technologies in Mizoram, a formal meta-analytic synthesis is necessary to contextualize the present investigation. The purpose of this meta-analysis is to critically evaluate empirical studies discussed in the literature review and to derive comprehensive insights regarding attitudes toward mobile learning, usage patterns, academic impacts, disparities and curriculum alignment.

2.5.1 Methodological Framework of the Meta-Analysis

1) Nature of Meta-Analysis

Since most of the studies summarized in the compiled literature employed descriptive, survey-based or qualitative approaches and did not report effect sizes, this chapter follows a qualitative meta-synthesis model. This approach integrates patterns across diverse methodologies while maintaining the rigor of systematic review principles.

2) Sources of Data

The meta-analysis is based entirely on the studies compiled in this chapter. These include:

- Studies conducted abroad
- Studies conducted in India
- Studies conducted in the Northeastern region

Together, these constitute more than 84 empirical and conceptual studies.

3) Analytical Procedure

The studies were categorized into five thematic domains:

1. Attitudes and Perceptions Toward Mobile Learning
2. Patterns, Types and Extent of Mobile Learning Usage
3. Impact of Mobile Learning on Academic Achievement
4. Digital Divide, Barriers and Disparities
5. Curriculum and Pedagogical Alignment for Mobile Learning

Within each domain, findings were coded, compared and synthesized to produce higher-order generalizations.

2.5.2 Meta-Analytic Results

1. Attitudes and Perceptions Toward Mobile Learning

Consistent Findings Across Contexts

Across global, national and regional studies, the dominant trend reveals favourable attitudes toward mobile learning.

- International studies consistently show students perceive mobile learning as flexible, engaging and beneficial (e.g., Fahad 2009; Narayanasamy & Mohamed 2013; Thomas et al. 2013).
- Indian studies affirm a positive inclination toward mobile learning despite some limitations (Bansal & Joshi 2014; Vyas & Nirban 2014; Fouzdar & Behera 2017).

- Studies from the Northeast including Manipur, Assam and Mizoram report similar positive orientations, although contextual constraints reduce effectiveness.

Meta-Analytic Interpretation

The convergence of results indicates that student acceptance of mobile learning is universally high, suggesting that attitudinal barriers in Mizoram are minimal.

2. Patterns, Types and Extent of Mobile Learning Usage

High Ownership and Frequent Educational Use

Studies overwhelmingly report:

- High smartphone ownership (80–100% in most samples).
- Frequent engagement with academic apps, online classes and communication platforms.
- Use of phones as the *primary academic ICT tool*

International studies highlight multitasking and ubiquitous usage. Indian studies identify WhatsApp-based academic communication as predominant. Mizoram and Northeast studies show heavy reliance on mobile devices due to lack of alternatives.

Meta-Analytic Interpretation

Mobile devices are deeply integrated into student learning behaviour, especially in resource-constrained environments.

3. Impact of Mobile Learning on Academic Achievement

Patterns Identified

The impact of mobile learning on academic performance shows both positive and conditional findings:

- Many studies identify improvement in achievement when mobile devices are used pedagogically (Sung et al. 2016; McConatha & Praul 2008; Mergany et al. 2021).

- Some studies highlight the detrimental effect of off-task device use (Wood et al. 2012).
- Other research stresses that the positive effect depends on instructional design, teacher facilitation and digital discipline (Traxler 2016).

Meta-Analytic Interpretation

Mobile learning has a moderately positive academic impact, though outcomes depend heavily on pedagogical structure and learner self-regulation.

4. Digital Divide, Barriers and Disparities

Structural and Socio-Economic Disparities

A cross-section of studies reveals persistent disparities due to:

- Rural–urban divide in network connectivity.
- Socio-economic constraints such as cost, device quality and data affordability.
- Parental education and digital support.
- Institutional gaps especially in the Northeast (Mizoram included).

Regional studies consistently report that poor connectivity, power instability and financial constraints limit mobile learning effectiveness.

Meta-Analytic Interpretation

Digital disparities are systemic and multi-dimensional. The literature confirms that disparities in Mizoram are comparable to or greater than those in other Northeastern states.

5. Curriculum, Pedagogical Alignment and Institutional Readiness

Findings Across Literature

- International frameworks emphasize *constructive alignment* and explicit mobile-friendly learning outcomes.
- Studies from India point to the lack of systematic integration of mobile learning in higher education institutions.

- Mizoram and Northeast-based studies reveal that students rely heavily on informal platforms (WhatsApp, social media) because formal curricular provisions for mobile learning are minimal.

Meta-Analytic Interpretation

The literature demonstrates a misalignment between university curricula and mobile learning practices indicating that curriculum suitability remains an underdeveloped area.

2.5.3 Moderator Variables Identified in the Meta-Analysis

1) *Gender:* Most studies report negligible gender-based differences in attitudes or usage.
2) *Academic Stream:* ICT engagement varies significantly by stream with Science > Commerce > Arts, including in Mizoram.
3) *Locale (Urban vs Rural):* Rural students show reduced access and lower digital readiness due to infrastructural disadvantages.
4) *Family Income and Parental Education:* These variables significantly influence accessibility, academic use and digital literacy.
5) *Institutional and Pedagogical Support:* Teacher training, LMS availability and structured mobile pedagogy strongly moderate mobile learning outcomes.

2.5.8 Overall Meta-Analytic Conclusions

1) Positive attitudes toward mobile learning are consistent across nearly all studies.
2) High levels of mobile usage for academic purposes are universally observed, particularly in resource-limited regions.
3) Mobile learning can enhance academic achievement, though the effect depends on self-regulation and pedagogical design.
4) Digital disparities remain profound, especially in Mizoram and similar regions, due to infrastructural and socio-economic constraints.

5) Curriculum alignment is weak, necessitating systematic evaluation of Mizoram University's curriculum for mobile learning compatibility.
6) The synthesized findings provide strong justification for all objectives of the present study, particularly Objectives 5, 7 and 8 where disparities and curricular gaps are prominent.

2.5.4 Implications for the Present Study

1) The meta-analysis validates the relevance of assessing student opinions, usage patterns, types of use and academic relationships as planned in Objectives 1, 3, 4 and 6.
2) The clear evidence of inequalities in access and digital skills reinforces the importance of Objective 7.
3) The identified gap in curriculum–technology alignment strongly supports Objective 8.
4) The absence of standardized tools in the reviewed studies further justifies Objective 2 emphasizing the need for the construction and validation of a new scale specific to Mizoram.

CHAPTER - III

METHODOLOGY

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CHAPTER III

METHODOLOGY

3.1 INTRODUCTION

Every research endeavour requires a clear and deliberate plan of action to ensure that its objectives are achieved with accuracy and integrity. This chapter sets out the methodological path that guided the present study, explaining the reasoning behind the chosen strategies and their alignment/adherence to the aims of the investigation. The methodology forms the backbone of the research process, offering a structured framework for collecting, organising and interpreting data. By establishing this framework, the study ensures that its findings are not only credible but also capable of addressing the central questions with clarity and depth.

3.2 METHOD OF STUDY

In this study, a sequential explanatory mixed-methods design was employed. This approach consists of two consecutive phases: a quantitative phase followed by a qualitative phase. The quantitative phase was carried out first to collect numerical data, identify patterns and establish broad trends. After the quantitative results were obtained, the qualitative phase was implemented to further explore and clarify these findings. By using qualitative insights to explain the initial numerical results, this design allows for a more thorough and meaningful interpretation of the data, offering both breadth and depth in understanding the research problem. This approach was selected to measure the extent of mobile learning usage among degree college students in Mizoram and to gain deeper insights into their experiences, perceptions and the contextual factors influencing their engagement with mobile learning..

Descriptive survey method was employed for the quantitative component of the study, for which a “Mobile Device Use for Learning” scale was developed to evaluate mobile learning practices among students in degree colleges in Mizoram. This phase focused on identifying the types and extent of mobile device usage for learning, analysing relationships and differences across various demographic and academic groups and examining the correlation between mobile learning practices and students’ academic performance.

The qualitative phase explored students' perspectives on mobile learning, the factors that contribute to variations in mobile device use for educational purposes and the extent to which the Mizoram University curriculum supports or aligns with mobile-based learning practices.

3.3 POPULATION AND SAMPLE

3.3.1 Population

In the present study, the population comprised of all degree college students enrolled in institutions affiliated with Mizoram University as well as the teachers in these institutions. Based on data from the Higher and Technical Education Department, Government of Mizoram, a total of 30 colleges are affiliated with Mizoram University, comprising an overall student population of 18,530 and 999 teachers. The details of the population are presented in the following tables.

Table 3.1

District-wise statistics of degree college students in Mizoram

District	Male	Female	Total
Aizawl	6622	5980	12602
Lunglei	886	816	1702
Kolasib	408	330	738
Champhai	445	391	836
Serchhip	232	270	502
Lawngtlai	547	257	804
Siaha	272	269	541
Mamit	121	128	249
Hnahthial	102	76	178
Khawzawl	53	52	105
Saitual	112	161	273
		TOTAL	**18530**

Source: Higher & Technical Education Department, Government of Mizoram 2023-24

Table 3.2

District-wise statistics of degree college teachers in Mizoram

District	Male	Female	Total
Aizawl	191	269	460
Lunglei	77	72	149
Kolasib	29	29	58
Champhai	28	32	60
Serchhip	30	22	52
Lawngtlai	42	24	66
Siaha	11	14	25
Mamit	27	23	50
Hnahthial	13	13	26
Khawzawl	15	9	24
Saitual	11	18	29
		TOTAL	**999**

Source: Higher & Technical Education Department, Government of Mizoram 2023-24

3.3.2 Sample

For the quantitative part of the study, multistage random sampling was utilised. Five (5) Districts - Aizawl, Kolasib, Mamit, Lunglei and Champhai were randomly selected, each representing a distinct geographical region namely Central, North, West, South and East. From each selected district, respondents were randomly chosen for a total sample of 500. For the qualitative part of the study, purposive sampling was used to select a smaller group comprising 33 students and 26 teachers. The following table presents the details of the samples selected.

Table No. 3.3

Details of the sample selected for the quantitative study (N= 500)

Name of the District	Male			Female			Total		
	Arts	Science	Commerce	Arts	Science	Commerce	Arts	Science	Commerce
Aizawl	108	72	38	98	65	34	206	137	72
Lunglei	18	0	0	8	0	0	26	0	0
Mamit	3	0	0	5	0	0	8	0	0
Champhai	7	7	0	7	6	0	14	13	0
Kolasib	7	6	0	6	5	0	13	11	0
							267	**161**	**72**
Total							**500**		

Table No. 3.4

Details of the student sample selected for the interview (N=33)

Name of District	No. of Students
Aizawl	9
Lunglei	9
Mamit	3
Champhai	6
Kolasib	6
Total	**33**

Table No. 3.5

Details of the teacher sample selected for interview (N=26)

Name of Stream	Number of Teachers
Arts	11
Science	8
Commerce	7
Total	26

3.4 TOOLS USED

The following tools developed by the researcher were employed for the present study:

1. Opinionnaire for Degree College students on mobile learning.
2. Mobile device use for learning scale.
3. Interview schedule for Degree College students.
4. Interview schedule for College teachers on the suitability of Mizoram University Curriculum.

1. Opinionnaire for degree college students on mobile learning:

The investigator designed an opinionnaire to investigate the views of degree college students in Mizoram regarding mobile learning. The tool was specifically developed to gather data on students' attitudes, experiences and views regarding the utilization of mobile devices in educational settings. The questionnaire comprises eight (8) questions, with two response options for the respondents. The questions were constructed to be concise, easy to understand and relevant to the objective of the study.

Prior to its final administration, the opinionnaire was subjected to content validation by a panel of experts from the fields of education and information technology. The experts reviewed the items to ensure their clarity, relevance, and consistency with the study's objectives. Based on their suggestions, appropriate revisions were made to refine the wording and structure of several items. The validation approach confirmed that the tool accurately measured the target constructs and was appropriate for use with college students.

Degree college students are among the primary users and beneficiaries of mobile learning technologies in academic settings. Their experiences, preferences and challenges provide valuable insights into the effectiveness and usability of mobile learning tools. In light of this, the investigator created and verified the opinionnaire to acquire trustworthy and significant data that accurately represent students' opinion on mobile learning.

A copy of the Students' Opinionnaire regarding mobile device usage for learning is included in Appendix 1.

2. Mobile Device Use for Learning Scale:

To assess the level of usage of mobile device for learning among degree college students in Mizoram, the investigator developed and standardized a mobile device use for learning scale. The usage scale comprised of 21 items. The scale is designed according to Likert's five-point scale, with a maximum score of 105 and a minimum score of 21. The reliability of the scale was determined to be 0.76 using both the split-half and test-retest methods. The procedures involved in developing the usage scale is clearly provided in the Analysis and Interpretation chapter (Chapter IV).

Appendix 2 includes a sample of the Mobile Device Use for Learning Scale.

3. Interview Schedule for Degree College Students.

The investigator designed an interview schedule containing eight (8) questions aimed at uncovering the factors that lead to differences in mobile device use for learning among degree college students in Mizoram. To ensure clarity and thorough coverage of the topic, the interview questions were grouped into six thematic components, each focusing on a specific dimension of mobile learning disparities.:

1) Device and Internet Access
2) Skills and Confidence
3) Learning context
4) Usage and challenges
5) Language and Content Accessibility
6) Perceptions and inclusivity

The interview schedule underwent content validation by a panel of experts in education and information technology. The experts assessed the

questions for clarity, relevance and alignment with the objectives of the study. Based on their recommendations, minor revisions were made to improve the accuracy and comprehensiveness of the questions.

Degree college students represent a diverse group in terms of digital access, learning habits and exposure to technology. To understand the disparities in mobile learning, it was essential to gather qualitative data directly from students who may have experienced these challenges and opportunities firsthand. The interview schedule, therefore, served as an effective tool for exploring the multifaceted nature of digital inequality and its implications for inclusive education in Mizoram.

A sample of Interview Schedule for Degree College students is attached in Appendix 3.

4. Interview Schedule for College Teachers on the suitability of Mizoram University curriculum

The investigator developed an interview schedule specifically for college teachers to evaluate the suitability of the Mizoram University curriculum. The questions were designed to explore teachers' perspectives on the relevance, adequacy, implementation and adaptability of the existing curriculum in relation to students' learning needs and current educational demands. The interview schedule comprised six (6) open-ended questions, organized under four key components to ensure a focused and comprehensive exploration of the topic.

1) Curriculum Relevance and Alignment.
2) Pedagogical Integration and Teaching Methods.
3) Assessment and Practical Application.
4) Existing Practices and Experience

Prior to its administration, the interview schedule was reviewed by experts in education and information technology for content validity to ensure that the questions were clear, relevant and aligned with the objectives of the

study. Based on the feedback that experts provided, minor adjustments were made to the questions in order to improve overall phrasing and sequencing in order to ensure it successfully captured the teacher's views on the appropriateness of the curriculum.

College teachers play a vital role in the implementation and evaluation of university curricula. Their direct experience in classroom teaching and curriculum delivery provides them with valuable insights into the strengths and limitations of the existing framework. In consideration, the investigator used the interview schedule as a qualitative instrument to collect authentic and context-specific data on the suitability of the Mizoram University curriculum. The information gathered through these interviews contributed to a deeper understanding of curriculum effectiveness from a practitioner's perspective.

A sample of Interview Schedule for College Teachers is provided in Appendix 4.

3.5 COLLECTION OF DATA

For the quantitative data collection, the investigator personally visited the selected colleges in Mizoram. Upon receiving permission from the respective Principals, the "Mobile Device Use for Learning Scale" and the opinionnaire were administered to the students. For the qualitative component, interviews were conducted with both students and teachers using the interview schedules developed for the study.

To analyze the relationship between the use of mobile devices for learning and the academic achievement, the academic scores of degree college students were obtained from the college administration with proper authorization. These data were recorded in their original form to maintain accuracy and ensure validity.

3.6 TABULATION OF DATA

The collected data were thoroughly scrutinized and systematically classified. Each respondent's score on the usage scale was computed in accordance with the established scoring procedure. After scrutiny, classification and scoring, the data

were tabulated by entering them into Excel sheets for subsequent statistical analysis. In alignment with the study's objectives, the tabulated data were analyzed using appropriate statistical techniques.

3.7 STATISTICAL TECHNIQUES USED

In this study, the investigator used descriptive statistical techniques such as measures of central tendency and percentage analysis to examine score distributions, summarize frequency patterns and classify respondents into various categories.

The differences in mean scores among various groups based on gender, academic stream, locale, family income and father's educational qualification were tested using the t-test for significance and ANOVA. Additionally, to establish the validity and reliability of the constructed usage scale and to examine the relationship between mobile device usage for learning and the academic achievement of degree college students in Mizoram, the Pearson Product-Moment Correlation was employed.

CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

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CHAPTER IV

ANALYSIS AND INTERPRETATION OF DATA

This chapter presents a comprehensive examination and interpretation of the data collected from degree college students in Mizoram. It aims to present the findings in a systematic manner, highlighting patterns, trends and relationships in the data. The chapter also discusses the implications of these findings in relation to the objectives of the study, offering insights into the usage of mobile devices for learning among the students. The study employed the Mobile Device Usage for Learning Scale, an opinionnaire and interview schedules for both teachers and students.

The responses obtained from the respondents were categorized, organized and analyzed using the standard scoring procedure. Then, using standard statistical techniques, these scores were organized, tabulated and carefully analyzed, with the analysis being in accordance with the study's objective. In order to gather qualitative findings, an interview was held. The findings were interpreted in a meaningful manner. The research findings in this chapter are presented in accordance with the objectives laid out in the first chapter.

1) To investigate the opinion of degree college students in Mizoram regarding mobile learning.

2) To construct and standardize a mobile device use for learning scale.

3) To assess the extent of mobile device usage for learning among degree college students in Mizoram.

4) To compare the use of mobile devices for learning by degree college students in Mizoram in relation to gender, academic streams, locale, family income and father’s educational background.

5) To find out the relationship between the use of mobile devices for learning and the academic achievement of degree college students of Mizoram.

6) To identify the types of mobile devices used and the extent of their usage among degree college students in Mizoram.

7) To investigate the factors contributing to disparities in mobile device usage for learning among degree college students in Mizoram.

8) To examine the suitability of the Mizoram University curriculum for supporting mobile learning.

4.1 Objective No. 1: To investigate the opinion of degree college students in Mizoram towards mobile learning.

In order to explore the opinion of degree college students towards mobile learning, the investigator developed an opinionnaire, which was then distributed to a total of 500 degree college students. The opinionnaire contained a total of 8 questions that were related to mobile learning. A tabulation and item-wise analysis of the responses provided by degree college students is shown in the following analysis.

4.1.1 Opinion of degree college students on distraction and concentration during mobile learning activities

The opinion of degree college students on distraction and concentration during mobile learning activities are presented in following table 4.1. Figure 4.1 presents a visual representation of the data.

Table 4.1
Opinion of degree college students on distraction and concentration during mobile learning activities
(N=500)

Q.1 Learning with mobile devices affect my concentration.	
Yes	**No**
276 (55.2%)	224 (44.8%)

The analysis of students' opinion on distraction and concentration in mobile learning reveals a mixed perspective among degree college students. Out of 500 participants, 276 (55.2%) state that mobile learning interferes with their concentration, while 224 (44.8%) believe it does not. This suggests that although

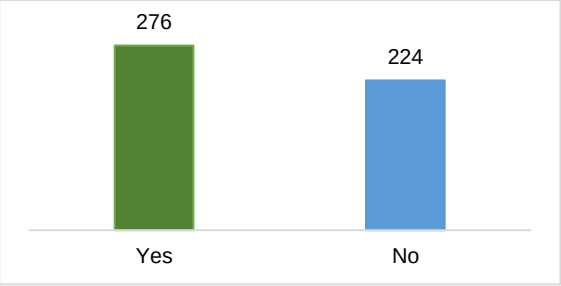
mobile devices provide convenient access to educational materials, they can also reduce focus because of constant notifications, social media and multitasking tendencies. Some students, however, report no such issues, emphasizing that learning habits, self-control and technology use vary from person to person. Certain learners are able to stay focused and use their mobile devices productively without becoming distracted.

These findings carry important implications for educational practice, emphasizing the need for institutions to promote digital well-being, provide support to minimize distractions and design structured mobile learning activities that help maintain focus. In addition, factors such as the nature of the task, the learning environment and students' personal motivation may influence how they experience distraction during mobile learning.

The findings suggest that mobile learning creates a paradox; while it expands access to educational opportunities and offers greater flexibility, it can also make it more challenging for students to stay focused. This underscores the importance of finding ways to balance its benefits with the potential drawbacks.

Figure 4.1

Opinion of degree college students on distraction and concentration during mobile learning activities



The data is presented in a bar graph, as above, showing the responses of participants to a question with two options: Yes and no. The horizontal axis displays these two response categories while the vertical axis represents the number of respondents.

The bar corresponding to Yes is higher, showing 276 respondents whereas the No category shows 224 respondents. This indicates that a greater number of respondents answer “Yes” compared to those who answer “No”.

4.1.1.1 Opinion of degree college students on distraction and concentration during mobile learning activities based on gender

The opinion of degree college students on distraction and concentration during mobile learning activities based on gender are presented in following table 4.2 and figure 4.2. presents a visual representation of the data.

Table 4.2

Opinion of degree college students on distraction and concentration during mobile learning activities based on gender

Male (N = 257), Female (N=243)

Q.1 Learning with mobile devices affect my concentration.			
Male		**Female**	
Yes	No	Yes	No
142 (55.25%)	115 (44.75%)	134 (55.14%)	109 (44.86%)

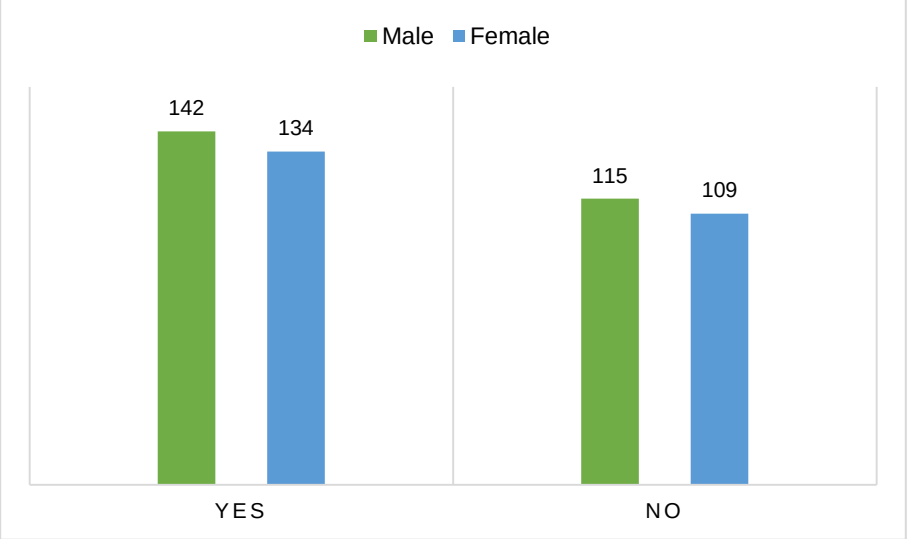
Table 4.2 presents the opinion of degree college students regarding the impact of mobile learning on their concentration, classified according to gender. Among the 257 male students, 142 (55.25%) report that mobile learning affects their concentration whereas 115 (44.75%) indicate that it does not. Likewise, out of 243 female students, 134 (55.14%) state that mobile learning influences their concentration while 109 (44.86%) report no such effect. The data reveal a marginal difference of only 0.11% between male and female responses indicating that both groups share almost identical perceptions. This close similarity suggests that gender does not play a significant role in shaping students’ views regarding the influence of mobile learning on concentration and distraction.

The nearly uniform distribution of responses suggests that while a slight majority of students perceive mobile learning as a source of distraction, a considerable proportion do not share this perception. This variation implies that

factors such as individual learning habits, levels of concentration, the nature of mobile learning activities and the learning environment may exert a stronger influence than gender. The data further reveal that students often encounter distractions when engaging in learning through mobile devices although this experience is not universal.

Figure 4.2

Opinion of degree college students on distraction and concentration during mobile learning activities based on gender



The data is presented in a clustered bar graph as shown in figure 4.2, highlighting the opinion of male and female degree college students regarding the impact of mobile learning on their concentration. The horizontal axis represents two response categories, *Yes* and *No* while the vertical axis indicates the number of respondents.

Each response category contains two bars, one representing male students (in green) and the other representing female students (in blue). For the *Yes* category, 142 male and 134 female students report that mobile learning affects their concentration. In the *No* category, 115 male and 109 female students indicate that it does not.

The visual representation highlights that both genders share nearly similar opinion with only slight variations in their responses. The *Yes* responses slightly

outnumber the *No* responses suggesting that more students, regardless of gender, believe mobile learning influences their concentration.

4.1.1.2 Opinion of degree college students on distraction and concentration during mobile learning activities based on locale

The opinion of degree college students on distraction and concentration during mobile learning activities based on locale are presented in following table 4.3 and figure 4.3 presents the visual representation of the data.

Table 4.3

Opinion of degree college students on distraction and concentration during mobile learning activities based on locale

Urban (N=222) Rural (N=278)

Q.1 Learning with mobile devices affect my concentration.			
Urban		**Rural**	
Yes	No	Yes	No
115 (51.80%)	107 (42.20%)	161 (57.91%)	117 (42.09%)

Table 4.3 presents important insights into degree college students' opinion regarding distraction and concentration during mobile learning activities, categorized by locale. Among urban students, 115 (51.80%) report that learning through mobile devices affects their concentration whereas 107 (42.20%) disagree. Similarly, among rural students, 161 (57.91%) indicate that their concentration is affected while 117 (42.09%) report no such impact.

The findings reveal that both urban and rural students experience challenges in maintaining focus while engaging in mobile learning with rural students showing a slightly higher tendency toward distraction. This indicates that although mobile learning enhances flexibility and accessibility, it can also introduce distractions that hinder concentration, particularly in rural contexts where structured learning environment and institutional support may be less consistent.

The relatively similar responses from both groups underscore the dual aspects of mobile learning providing chances for participation but also presenting dangers of diminished attention due to the diverse functionalities of mobile devices. This discovery highlights the necessity for effective strategies including guided usage policies, organized mobile-based learning activities and digital discipline to assist students from both urban and rural in optimizing the educational advantages of mobile technology while minimizing its potential to disrupt concentration.

Figure 4.3

Opinion of degree college students on distraction and concentration during mobile learning activities based on locale

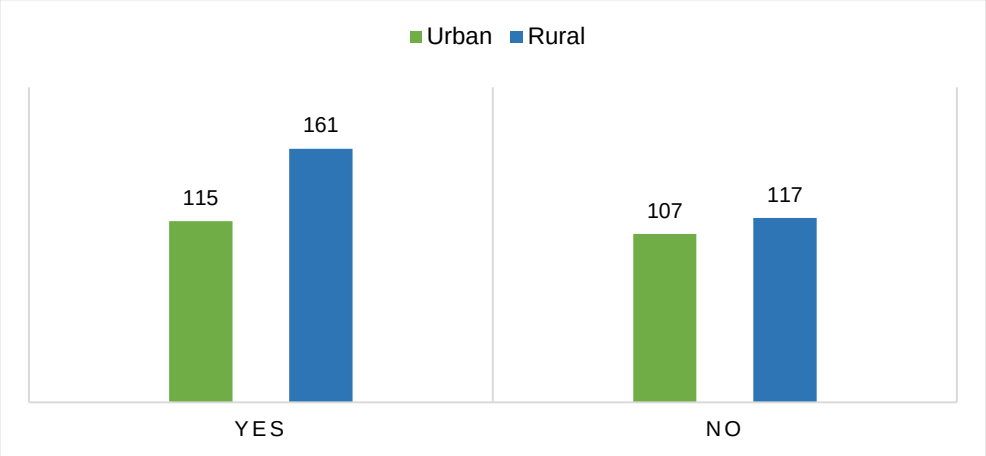


Figure 4.3 presents a clustered bar graph showing the opinion of degree college students from urban and rural areas regarding the impact of mobile learning on their concentration. The horizontal axis represents the two response categories — *Yes* and *No* — while the vertical axis indicates the number of respondents.

Each category contains two bars: one representing urban students (in green) and the other representing rural students (in blue). For the *Yes* category, 115 urban and 161 rural students report that mobile learning affects their concentration. In the *No* category, 107 urban and 117 rural students indicate that it does not.

The figure clearly shows that a higher number of rural students perceive mobile learning as a distraction compared to urban students. However, both groups display similar response patterns showing that difficulties in maintaining

concentration during mobile learning are experienced by students from both locales though slightly more evident among those from rural areas.

4.1.1.3 Opinion of degree college students on distraction and concentration during mobile learning activities based on academic stream

The opinion of degree college students on distraction and concentration during mobile learning activities based on academic stream are presented in table 4.4. and the data is represented visually in Figure 4.4.

Table 4.4

Opinion of degree college students on distraction and concentration during mobile learning activities based on academic stream

Arts (N=410), Science (N=60), Commerce (N=30)

Q.1 Learning with mobile devices affect my concentration.					
Arts		**Science**		**Commerce**	
Yes	No	Yes	No	Yes	No
232 (56.59%)	178 (43.41%)	30 (50%)	30 (50%)	14 (46.67%)	16 (53.33%)

The above table reveals a notable variation in opinion across academic streams. Among Arts students, a majority of 232 (56.59%) report that mobile learning affects their concentration, whereas 178 (43.41%) disagree. This shows that more than half of the Arts students perceive mobile-based learning as distracting possibly because their subjects often require extensive reading and critical analysis where interruptions from mobile devices become more apparent.

In contrast, Science students display an even distribution of opinion with 30 (50%) agreeing and 30 (50%) disagreeing that mobile learning influences their concentration. This balanced response indicates that Science students may experience both the advantages and drawbacks of mobile learning while some benefit from

interactive digital resources such as simulations and virtual labs, others may find mobile-based distractions challenging to manage.

Commerce students, on the other hand, tend to hold a slightly different perspective. A small majority of 16 (53.33%) disagree that mobile learning affects concentration while 14 (46.67%) agree. This pattern suggests that Commerce students might find mobile devices more supportive for task-oriented learning where structured digital tools and applications enhance focus rather than diminish it.

Overall, the findings demonstrate that while mobile learning is widely adopted across disciplines its influence on concentration differs by stream. Arts students report higher susceptibility to distraction; Science students exhibit a balanced experience and Commerce students appear relatively adaptable to mobile learning without a significant decline in concentration.

Figure 4.4

Opinion of degree college students on distraction and concentration during mobile learning activities based on academic stream

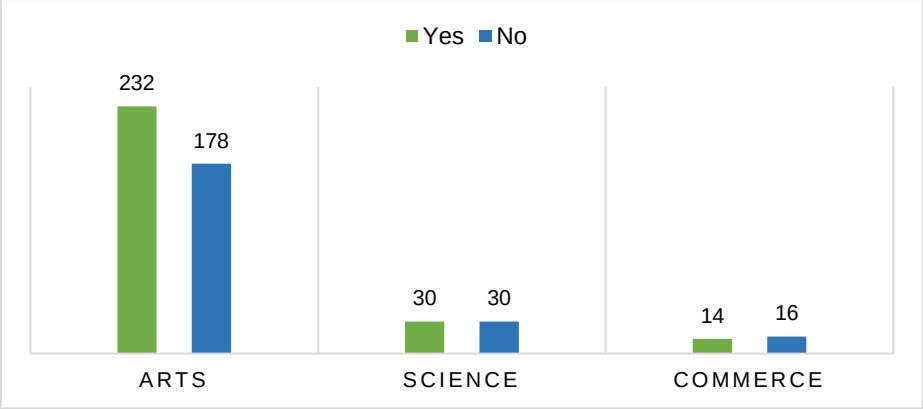


Figure 4.4 presents the opinion of degree college students from different academic streams—Arts, Science and Commerce, regarding the impact of mobile learning on their concentration. The horizontal axis represents the three streams of study while the vertical axis shows the number of respondents. Each stream is represented by two bars: one for students who respond *Yes* (in green) and another for those who respond *No* (in blue).

Among Arts students, 232 agree that mobile learning affects their concentration while 178 disagree. In the Science stream, an equal number of students, 30 (50%), respond *Yes* and *No* indicating a balanced opinion. For Commerce students, 14 agree and 16 disagree, showing a slight inclination toward the view that mobile learning does not significantly affect concentration.

The figure clearly illustrates variations across disciplines with Arts students showing greater susceptibility to distraction, Science students exhibiting a balanced perception and Commerce students demonstrating relatively better adaptability to mobile learning environments.

4.1.2 Opinion of degree college students on the enhancement of theoretical learning through mobile learning

The opinion of degree college students on the enhancement of theoretical learning through mobile learning are presented in following table 4.5.

Table 4.5

Opinion of degree college students on the enhancement of theoretical learning through mobile learning

N=500

Q.2 Mobile Learning can enhance the theoretical part of the subject.	
Yes	**No**
374 (74.80%)	126 (25.20%)

The findings from the data presented in table 4.5 highlight that a significant majority of degree college students perceive mobile learning as an effective tool for enhancing the theoretical aspects of their subjects. Out of 500 respondents, 374 students, accounting for 74.80%, state that mobile learning contributes positively to their theoretical understanding while 126 students (25.20%) express an opposite opinion.

The positive response indicates that mobile platforms provide students with opportunities to revisit theoretical content, access diverse resources and engage with

digital materials beyond classroom boundaries, thereby reinforcing their comprehension. However, the dissenting 25.20% highlights that challenges still exist, possibly linked to issues such as lack of concentration, preference for traditional methods or difficulties in navigating digital tools. This contrast emphasizes the need for a blended approach ensuring that while mobile learning is integrated to strengthen theoretical knowledge, complementary strategies are also applied to address the concerns of students who may not find it equally beneficial.

Figure 4.5

Opinion of degree college students on the enhancement of theoretical learning through mobile learning

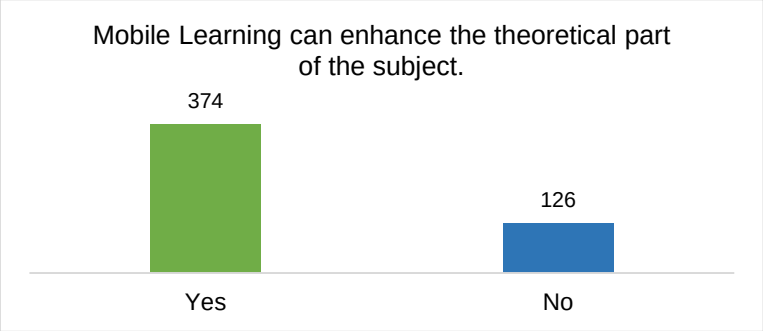


Figure 4.5 illustrates degree college students' opinion on whether mobile learning enhances the theoretical aspects of their subjects. The horizontal axis displays two response categories — *Yes* and *No*, while the vertical axis represents the number of respondents.

The figure shows that a large majority, 374 students agree that mobile learning strengthens their theoretical understanding whereas 126 students disagree with this view. The visual presentation clearly indicates that most students recognize the potential of mobile platforms in reinforcing theoretical learning by providing easier access to study materials, references and digital resources.

This trend indicates that mobile learning plays a significant role in supporting academic comprehension, although a smaller group of students remains unconvinced possibly due to challenges such as limited engagement, digital distractions or personal learning preferences.

4.1.2.1 Opinion of degree college students on the enhancement of theoretical learning through mobile learning based on gender

The opinion of degree college students on the enhancement of theoretical learning through mobile learning based on gender are presented in following table 4.6 and figure 4.6 provides a visual representation of the data.

Table 4.6

Opinion of degree college students on the enhancement of theoretical learning through mobile learning based on gender

Male (N = 257), Female (N=243)

Q.2 Mobile Learning can enhance the theoretical part of the subject.			
Male		**Female**	
Yes	No	Yes	No
195 (75.88%)	62 (24.12%)	179 (73.66%)	64 (26.34%)

The results presented in table 4.6 highlight the opinion of degree college students on whether mobile learning enhances the theoretical aspects of their subjects, analyzed from a gender perspective. The findings reveal that a significant majority of both male and female students acknowledge the effectiveness of mobile learning in reinforcing theoretical understanding. Specifically, 195 (75.88%) of male students and 179 (73.66%) of female students respond positively, whereas 62 (24.12%) of males and 64 (26.34%) of females express disagreement.

These results demonstrate that the perception of mobile learning as a valuable tool for theoretical enhancement is consistently shared across genders with only minimal variation in response percentages. The close alignment between male and female viewpoints indicates that gender exerts little influence on students' acceptance of mobile learning for theoretical purposes.

Overall, the analysis reflects a broad consensus among students that mobile learning serves as an effective complement to traditional classroom instruction,

facilitating deeper engagement with theoretical content and bridging potential gaps in conventional teaching methods.

Figure 4.6

Opinion of degree college students on the enhancement of theoretical learning through mobile learning based on gender

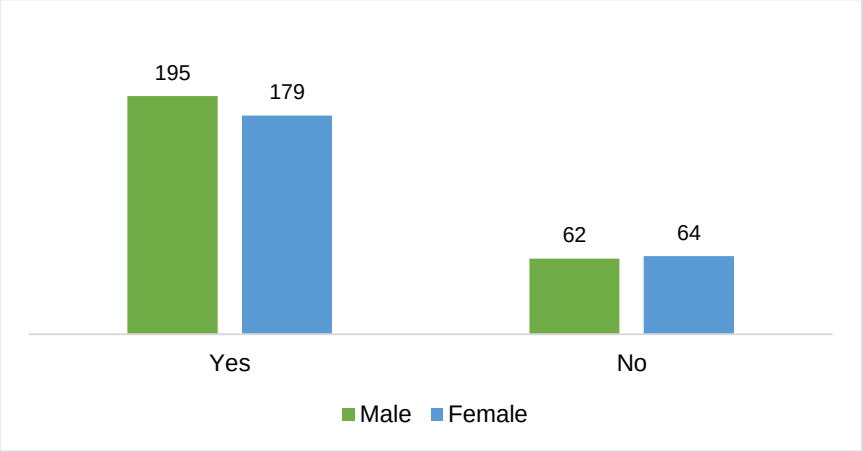


Figure 4.6 presents the opinion of degree college students regarding whether mobile learning can enhance the theoretical aspects of their subjects, analyzed by gender. The figure reveals that both male and female students predominantly agree with the statement. Among males, 195 students express agreement, while 62 disagree. Similarly, among females, 179 students agree and 64 disagree.

The visual comparison shows that the number of students who respond "*Yes*" is significantly higher than those who respond "*No*" in both groups, highlighting a common belief in the usefulness of mobile learning for strengthening theoretical understanding. The minimal difference between male and female responses suggests that gender does not play a major role in shaping students' opinion on this matter. Overall, the figure indicates a shared perception across genders that mobile learning serves as an effective supplementary tool for understanding theoretical content.

4.1.2.2 Opinion of degree college students on the enhancement of theoretical learning through mobile learning based on locale

The opinion of degree college students on the enhancement of theoretical learning through mobile learning based on locale are presented in following table 4.7. Figure 4.7 presents the visual representation of the data.

Table 4.7

Opinion of degree college students on the enhancement of theoretical learning through mobile learning based on locale

Urban (N=222) Rural (N=278)

Q.2 Mobile Learning can enhance the theoretical part of the subject.			
Urban		**Rural**	
Yes	No	Yes	No
165 (74.32%)	57 (25.68%)	209 (75.18%)	69 (24.82%)

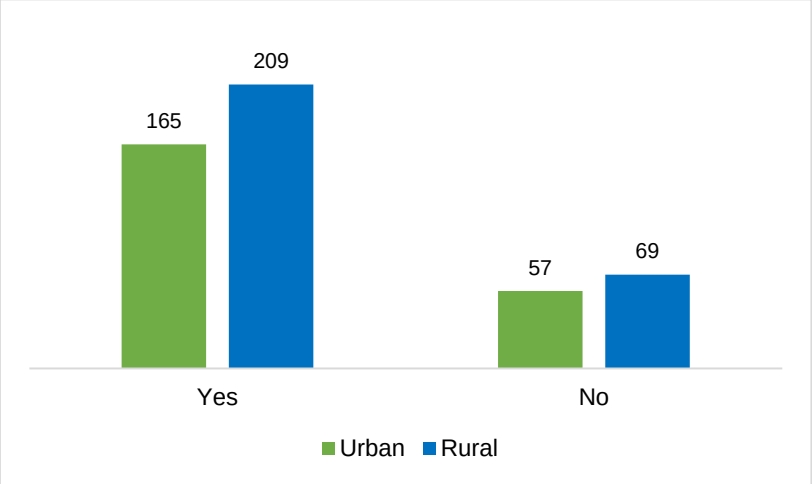
Table 4.7 reveals that both urban and rural degree college students largely agree that mobile learning enhances the theoretical part of their subjects. Among urban students, 165 (74.32%) respond positively while 57 (25.68%) disagree. Similarly, 209 (75.18%) rural students agree, whereas 69 (24.82%) do not. The nearly identical responses indicate that locale has little influence on students' perceptions regarding the role of mobile learning in strengthening theoretical knowledge. This reflects a broad acknowledgment of the usefulness of mobile devices in accessing, reinforcing and clarifying theoretical content, regardless of geographical context.

A possible explanation for this consistency is the widespread availability of mobile devices and internet connectivity across both urban and rural areas allowing students equal exposure to digital learning opportunities. The close alignment of responses further indicates that mobile learning is helping bridge the educational gap by providing equitable access to theoretical resources.

Overall, the findings demonstrate that mobile learning serves as an effective complementary tool for theoretical education across locales though its continued success depends on addressing the challenges experienced by a small proportion of students.

Figure 4.7

Opinion of degree college students on the enhancement of theoretical learning through mobile learning based on locale



The above figure 4.7 presents a clear comparison of urban and rural degree college students' opinion regarding whether mobile learning enhances the theoretical aspects of their subjects.

The figure shows that a larger number of rural students (209) agree that mobile learning helps in improving theoretical understanding, compared to 165 urban students who share the same opinion. Conversely, fewer rural students (69) and urban students (57) disagree with the statement.

4.1.2.3 Opinion of degree college students on the enhancement of theoretical learning through mobile learning based on academic stream

The opinion of degree college students on the enhancement of theoretical learning through mobile learning based on academic stream are presented in following table 4.8 and the data is presented visually in figure 4.8.

Table 4.8

Opinion of degree college students on the enhancement of theoretical learning through mobile learning based on academic stream

Arts (N=410), Science (N=60), Commerce (N=30)

Q.2 Mobile Learning can enhance the theoretical part of the subject.					
Arts		**Science**		**Commerce**	
Yes	No	Yes	No	Yes	No
308 (75.12%)	102 (24.88%)	43 (71.67%)	17 (28.33%)	23 (76.67%)	7 (23.33%)

The results show clear variations across academic streams. A large proportion of students from Arts, Science and Commerce acknowledge that mobile learning supports the theoretical aspects of their subjects. Among Arts students, 308 (75.12%) agree that mobile learning enhances theoretical learning while 102 (24.88%) disagree. In the Science stream, 43 (71.67%) students express agreement whereas 17 (28.33%) hold a contrary opinion. Commerce students reflect the highest level of agreement, with 23 (76.67%) affirming the benefits of mobile learning and only 7 (23.33%) disagreeing. Overall, the findings suggest a strong consensus across streams that mobile learning strengthens theoretical understanding, although Science students show slightly less agreement compared to Arts and Commerce.

These variations may be linked to the differing learning demands of each discipline. Arts and Commerce subjects often depend on conceptual and text-based materials that are easily supported through mobile platforms. In contrast, Science education typically involves experiments and practical applications that mobile tools

may not fully accommodate. Nevertheless, the overall high rate of positive responses across all disciplines highlights the growing acceptance of mobile learning as an effective medium for engaging with theoretical content in higher education.

Figure 4.8

Opinion of degree college students on the enhancement of theoretical learning through mobile learning based on academic stream

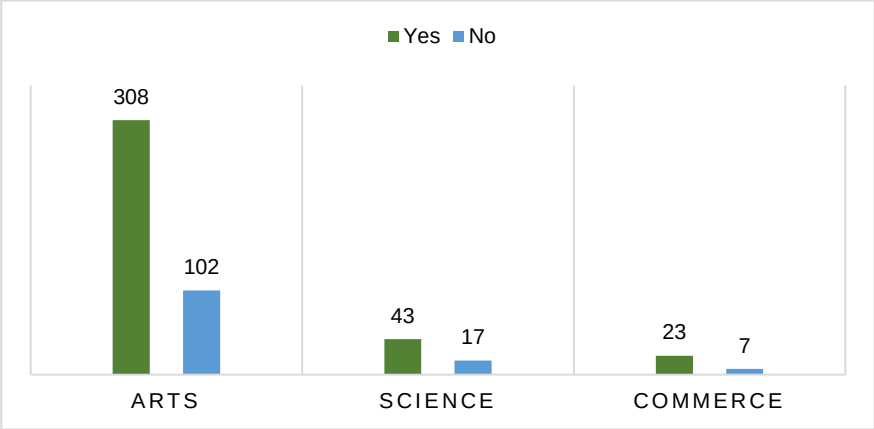


Figure 4.8 visually illustrates the opinion of Arts, Science, and Commerce students on whether mobile learning enhances the theoretical component of their subjects. The chart clearly shows that the majority of students across all streams respond positively.

Each stream is represented by two vertical bars. The green bar represents students who answered "*Yes*", indicating that mobile learning helps in improving their theoretical understanding. The blue bar represents students who answered "*No*", indicating that they do not believe mobile learning contributes positively to theoretical learning.

The height of each bar corresponds to the number of students in each response category. For instance, the green bar in the Arts section is the tallest with 308 students agreeing while the blue bar beside it represents 102 students who disagree. Similarly, in the Science stream, the green bar (43) is noticeably higher than the blue one (17), showing more positive responses. In Commerce, the green bar (23) is also higher than the blue bar (7) reflecting strong agreement among Commerce students.

4.1.3 Opinion of degree college students on the influence of mobile learning on the value of classroom instruction

The opinion of degree college students on the influence of mobile learning on the value of classroom instruction are presented in the following table 4.9. Figure 4.9 shows the data in a visual format.

Table 4.9

Opinion of degree college students on the influence of mobile learning on the value of classroom instruction

N=500

Q3. Mobile learning decreases the value or importance of classroom instruction.	
Yes	**No**
265 (53%)	235 (47%)

The findings presented in table 4.9 indicate that degree college students hold divided opinion on whether mobile learning diminishes the value of classroom instruction. Among the 500 respondents, 265 (53%) believe that mobile learning undermines classroom learning while 235 (47%) disagree. This nearly equal distribution highlights the ongoing tension between traditional and digital modes of education.

The slight majority who view mobile learning as devaluing classroom instruction may associate it with overreliance on technology, reduced in-person interaction and diminished engagement in classroom activities. They might feel that the unique benefits of classroom learning such as direct discussion, mentorship and collaborative experiences cannot be fully replicated through mobile platforms.

Conversely, the significant minority who disagree show that many students perceive mobile learning as a complementary tool rather than a replacement. They may recognize its ability to enhance flexibility, improve access to resources and provide interactive and personalized learning opportunities.

Overall, the findings reveal a balanced perspective among students indicating that while mobile learning continues to gain acceptance, traditional classroom instruction remains an essential and valued component of higher education.

Figure 4.9

Opinion of degree college students on the influence of mobile learning on the value of classroom instruction

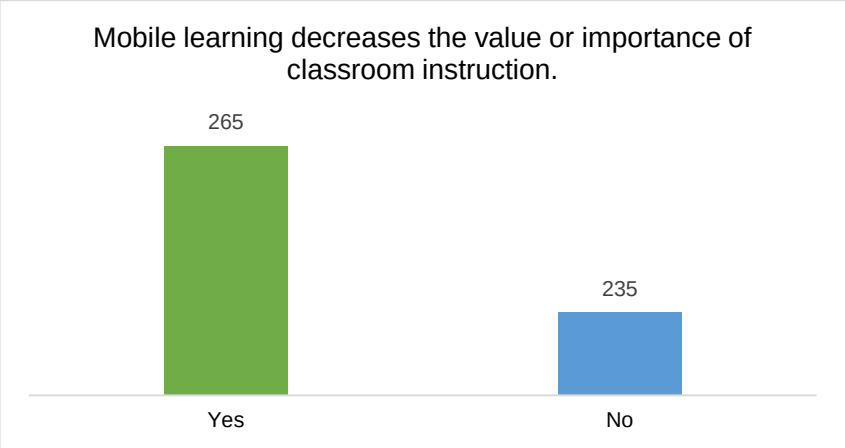


Figure 4.9 illustrates degree college students' opinion on whether mobile learning reduces the value or importance of classroom instruction. The bar chart contains two vertical bars — the green bar, representing students who responded "*Yes*" and the blue bar, representing those who responded "*No*."

The green bar, corresponding to 265 students, stands taller indicating that a slight majority (53%) believe mobile learning diminishes classroom learning. In contrast, the blue bar, representing 235 students (47%) is slightly shorter showing that a large minority disagree with this view.

The visual contrast between the two bars demonstrates a near balance of opinion among students, showing that while many still value traditional face-to-face teaching, a considerable number also acknowledge mobile learning as an effective educational tool. Overall, the figure effectively conveys the coexistence of both supportive and skeptical perspectives toward mobile learning's influence on classroom instruction.

4.1.3.1 Opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on gender

The opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on gender are presented in following table 4.10 and figure 4.10 shows the data in a visual format.

Table 4.10

Opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on gender

Male (N = 257), Female (N=243)

Q.3 Mobile learning decreases the value or importance of classroom instruction.			
Male		**Female**	
Yes	No	Yes	No
134 (52.14%)	123 (47.86%)	131 (53.91%)	112 (46.09%)

The analysis of table 4.10 reveals that degree college students' opinion on whether mobile learning reduces the value of classroom education show only minimal variation between male and female respondents. Among 257 male students, 134 (52.14%) agree that mobile learning makes classroom instruction less significant, while 123 (47.86%) disagree. Similarly, of the 243 female students, 131 (53.91%) share the same view whereas 112 (46.09%) do not.

The nearly equal distribution of responses across genders indicates that gender has little influence on students' perceptions. Both male and female students are almost evenly divided with a slight majority in each group believing that mobile learning may lessen the importance of traditional instruction.

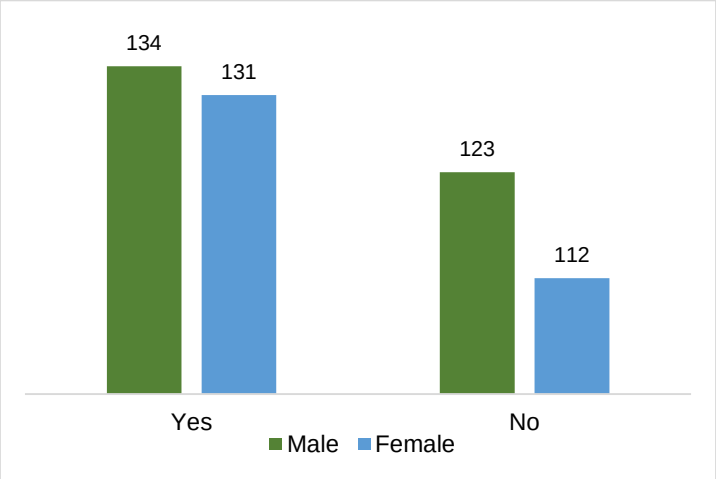
This slight inclination toward agreement could indicate a shared concern among students that while mobile learning offers flexibility and accessibility, it may also risk diminishing the interpersonal and structured nature of classroom-based learning. Conversely, the substantial number of students who disagree reflects an

openness to blending digital and classroom approaches viewing mobile learning as a complementary tool rather than a replacement.

Overall, the findings highlight a balanced perspective across genders, showing both cautious acceptance and critical reflection on how mobile learning interacts with conventional educational practices.

Figure 4.10

Opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on gender



The bar graph illustrates the opinion of male and female degree college students on whether mobile learning decreases the value of classroom instruction.

The green bars represent male students and the blue bars represent female students. As shown in the figure, 134 male and 131 female students responded "*Yes*," indicating they believe mobile learning reduces the importance of classroom teaching. Meanwhile, 123 male and 112 female students answered "*No*," indicating they do not think mobile learning undermines classroom instruction.

Overall, both genders display a nearly balanced viewpoint with only a slight majority in each group agreeing with the statement. The small difference between male and female responses suggests that gender has little influence on students' perceptions. Both groups express mixed feelings, acknowledging the benefits of

mobile learning while also showing concern about its potential to weaken traditional classroom interaction and participation.

4.1.3.2 Opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on locale

The opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on locale are presented in following table 4.11. Figure 4.11 shows visual representation of the data.

Table 4.11

Opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on locale

Urban (N=222) Rural (N=278)

Q.3 Mobile learning decreases the value or importance of classroom instruction.			
Urban		**Rural**	
Yes	No	Yes	No
123 (55.41%)	99 (44.49%)	142 (51.08%)	136 (48.92%)

The findings reveal that out of 222 urban students, 123 (55.41%) agree that mobile learning reduces the value of classroom instruction, while 99 (44.59%) disagree. Likewise, among 278 rural students, 142 (51.08%) feel that mobile learning lessens the importance of classroom teaching whereas 48.92% hold the opposite view.

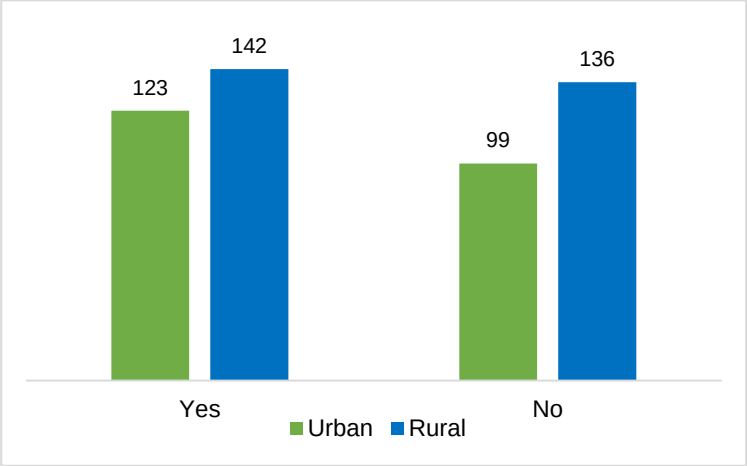
The data indicates that both groups share similar perspectives with a slight majority expressing concern that mobile learning may undermine traditional classroom instruction. However, the difference between agreement and disagreement is narrow, particularly among rural students where the gap is less than 3%. This near balance indicates that opinion remain divided, reflecting the ongoing debate about how best to integrate mobile technology into education.

Urban students' slightly higher agreement rate may be linked to their greater exposure to digital tools which might make them view mobile learning as overlapping with or replacing classroom activities. In contrast, rural students' more evenly distributed opinion could point to a cautious acceptance of mobile learning coupled with continued appreciation for in-person teaching due to limited access to digital infrastructure.

Overall, the results portray a complex and evolving perception: while mobile learning is widely recognized for its flexibility and accessibility, students still place high value on classroom instruction, viewing it as an essential space for interaction, discipline and deeper learning engagement.

Figure 4.11

Opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on locale



The bar chart above illustrates the opinion of urban and rural degree college students on whether mobile learning decreases the value of classroom instruction. The green bars represent urban students while the blue bars correspond to rural students. Among urban students, 123 responded "*Yes,*" indicating that they believe mobile learning reduces the importance of classroom instruction whereas 99 said "*No*," showing disagreement. Among rural students, 142 agreed (Yes) and 136 disagreed (No).

The figure shows that both groups are closely divided in their opinion with a slightly higher proportion of rural students (142) agreeing compared to urban students (123). However, the differences are not large suggesting that students from both settings share mixed attitudes toward mobile learning's influence on classroom teaching.

The relatively similar bar heights for both "*Yes*" and "*No*" categories highlight that, regardless of location, students are almost evenly split in their perceptions, reflecting a balanced debate between valuing traditional classroom instruction and embracing mobile-based learning.

4.1.3.3 Opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on academic stream

The opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on academic stream are presented in following table 4.12 and figure 4.12 shows the data in a visual format.

Table 4.12

Opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on academic stream

Arts (N=410), Science (N=60), Commerce (N=30)

Q.3 Mobile learning decreases the value or importance of classroom instruction.					
Arts		**Science**		**Commerce**	
Yes	No	Yes	No	Yes	No
223 (54.39%)	187 (45.61%)	30 (50%)	30 (50%)	12 (40%)	18 (60%)

The findings presented in table 4.12 provide valuable insights into how students from different academic streams view the influence of mobile learning on the importance of classroom instruction. Among Arts students, a slight majority of 223 (54.39%) feel that mobile learning lessens the value of classroom teaching, while 187 (45.61%) disagree. This indicates that Arts students may perceive mobile learning as a possible replacement rather than a supplement to traditional teaching

possibly because their learning depends largely on discussion, interpretation and direct interaction with teachers.

For Science students, opinion are evenly divided with 30 (50%) agreeing and 30 (50%) disagreeing. This balance likely reflects the dual nature of scientific education where theoretical understanding benefits from classroom instruction while mobile learning enhances experimentation and self-paced exploration through digital simulations.

In contrast, Commerce students appear more supportive of classroom-based instruction with 18 (60%) disagreeing that mobile learning diminishes its importance and only 12 (40%) agreeing. This may be due to the practical and applied orientation of Commerce subjects where classroom engagement especially in areas such as business communication, accounting and case discussions remains vital even alongside digital learning tools.

Overall, the results show that perceptions differ across disciplines shaped by each field's specific learning needs and instructional approaches.

Figure 4.12

Opinion of degree college students on the influence of mobile learning on the value of classroom instruction based on academic stream

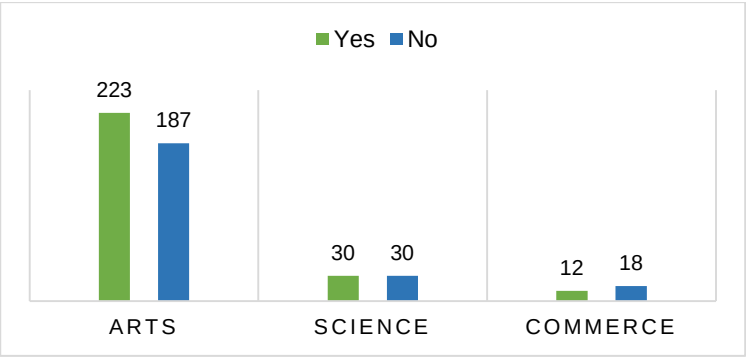


Figure 4.12 illustrates students' opinion across different academic streams regarding whether mobile learning reduces the value of classroom instruction. The green bars represent the number of students who agreed (Yes) while the blue bars represent those who disagreed (No).

As shown in the figure, Arts students have the highest number of "*Yes*" responses (223) compared to 187 "*No*" responses indicating that a slight majority feel mobile learning devalues traditional classroom teaching. In the Science stream, both the "*Yes*" and "*No*" bars are equal at 30 each reflecting a perfectly divided opinion on the matter. Meanwhile, Commerce students show a reverse trend with more students (18) disagreeing than agreeing (12) indicating they place greater importance on classroom-based learning.

4.1.4 Opinion of degree college students regarding the potential of mobile learning to enhance their success rates

The opinion of degree college students regarding the potential of mobile learning to enhance their success rates are presented in the following table 4.13. Figure 4.13 provides visual presentation of the data.

Table 4.13

Opinion of degree college students regarding the potential of mobile learning to enhance their success rates

N=500

Q.4 Using mobile devices for learning increases my success rate.	
Yes	**No**
352 (70.40%)	148 (29.60%)

The findings presented in table 4.13 show that a significant majority of degree college students 352 (70.40%) believe that the use of mobile devices for learning enhances their academic success while a smaller proportion 148 (29.60%) disagree with this view. This strong positive response shows that students increasingly perceive mobile learning as a valuable educational tool rather than merely a source of communication or entertainment.

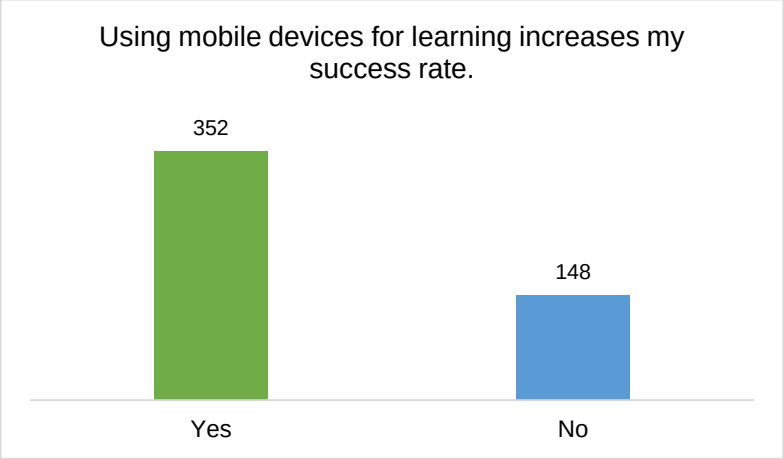
The large number of students who agree indicates growing recognition of mobile learning's advantages such as easy access to digital study materials, online assessments, interactive applications and the flexibility to learn at one's own pace. However, the nearly one-third of respondents who express disagreement imply that

certain barriers still exist. These may include distractions from non-academic content, insufficient digital literacy or limited internet access, factors that can diminish the overall effectiveness of mobile learning.

Overall, the data highlight that while mobile learning is widely appreciated for improving academic performance, addressing these challenges is essential to ensure equitable and efficient integration into the educational process

Figure 4.13

Opinion of degree college students regarding the potential of mobile learning to enhance their success rates



The bar chart illustrates students' opinion on whether using mobile devices for learning improves their academic success rate.

The green bar, representing students who responded "*Yes*," shows that 352 students believe mobile learning contributes positively to their academic performance. In contrast, the blue bar, indicating those who responded "*No*," accounts for 148 students who do not perceive such an improvement.

The visual difference between the two bars clearly demonstrates that a large majority of students recognize the benefits of mobile learning in enhancing their academic outcomes. The higher green bar highlights a strong positive attitude toward mobile-based education indicating that most students find it helpful for flexible study, better access to learning materials and independent learning. Meanwhile, the smaller blue bar shows that a minority still remain unconvinced possibly due to

concerns such as distraction, limited network access or preference for traditional learning methods.

4.1.4.1 Opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on gender

The opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on gender are presented in following table 4.14. Figure 4.14 presents visual representation of the data.

Table 4.14

Opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on gender

Male (N = 257), Female (N=243)

Q.4 Using mobile devices for learning increases my success rate.			
Male		**Female**	
Yes	No	Yes	No
184 (71.60%)	73 (28.40%)	168 (69.14%)	75 (30.86%)

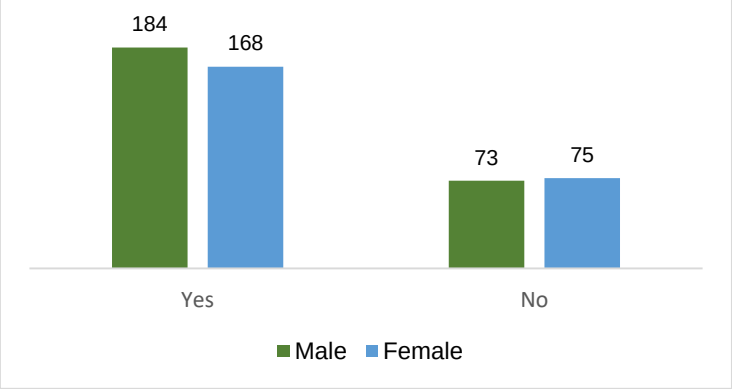
The analysis based on gender reveals that both male and female degree college students share similar perceptions regarding the impact of mobile learning on academic success with only a minor variation in their levels of agreement. Among male students, 184 (71.60%) agree that mobile learning enhances their success rate, while 73 (28.40%) disagree. Similarly, among female students, 168 (69.14%) express agreement, whereas 75 (30.86%) do not.

This small difference shows that male students are slightly more optimistic about the benefits of mobile learning but the gap is not significant enough to imply a gender-based difference in attitude. The close percentages demonstrate that both genders generally acknowledge the academic value of mobile technologies, recognizing advantages such as continuous access to educational materials, opportunities for online collaboration and platforms that support self-paced or personalized learning.

The modestly higher disagreement among female students might stem from factors like concerns about screen fatigue, difficulty balancing multiple digital tasks or variations in access to devices and internet connectivity. Nevertheless, the overall findings indicate that mobile learning is widely accepted by both male and female students as a supportive and effective approach to improving academic performance.

Figure 4.14

Opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on gender



The bar chart above illustrates male and female degree college students' opinion on whether mobile learning increases their academic success rate.

The green bars represent male students and the blue bars represent female students. For the response "*Yes*," 184 male students and 168 female students agree that using mobile devices for learning contributes to better academic performance. For the response "*No*," 73 male students and 75 female students disagree with this statement.

The chart clearly shows that both male and female students largely agree with the positive impact of mobile learning with only a small difference in their responses. Male students show a slightly higher level of agreement indicating a marginally stronger belief in the academic benefits of mobile technology. However, the overall similarity in bar heights under both categories (Yes and No) reflects a shared perception across genders that mobile learning plays a supportive role in enhancing academic success.

4.1.4.2 Opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on locale

The opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on locale are presented in following table 4.15. Figure 4.15 shows the data in a visual format.

Table 4.15

Opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on locale

Urban (N=222) Rural (N=278)

Q.4 Using mobile devices for learning increases my success rate.			
Urban		**Rural**	
Yes	No	Yes	No
156 (70.27%)	66 (29.73%)	196 (70.50%)	82 (29.50%)

The findings presented in table 4.15 reveal a striking similarity in the perspectives of urban and rural students regarding the influence of mobile learning on their academic success. Among urban students, 156 (70.27%) agree that mobile learning enhances their success rate while 66 (29.73%) disagree. Likewise, 196 (70.50%) of rural students share this positive perception with 82 (29.50%) holding an opposing view.

These nearly identical percentages show that mobile learning is perceived as equally effective by students across different locales. This outcome challenges the traditional digital divide often observed between urban and rural learners. The increasing availability of affordable smartphones, improved internet connectivity and government initiatives promoting digital literacy have likely contributed to this convergence. Overall, the table underscores the growing role of mobile technology as a democratizing tool in education, facilitating equitable access to learning resources and enhancing inclusivity in higher education.

Figure 4.15

Opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on locale

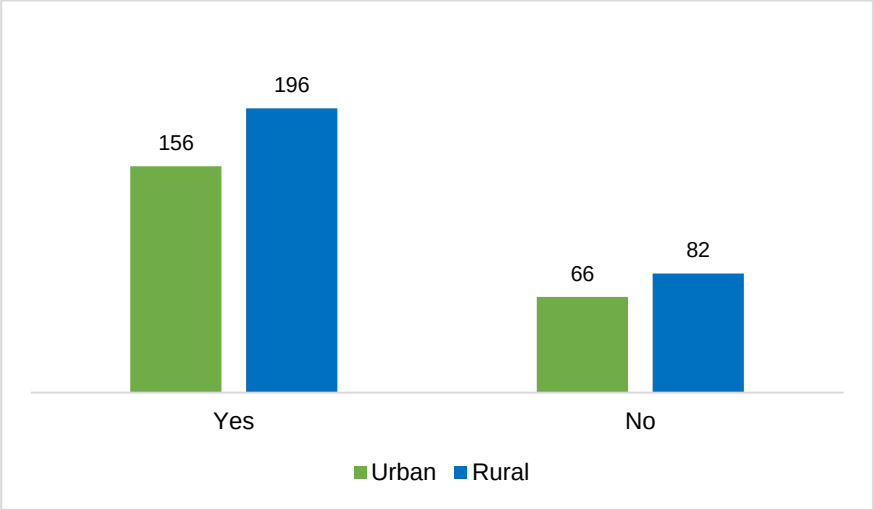


Figure 4.15 graphically presents the comparison between urban and rural students' opinion on the role of mobile learning in improving success rates. The green bars represent urban students while the blue bars denote rural students.

In the "*Yes*" category, the bars show that 156 urban and 196 rural students agree that mobile learning has increased their success rate. In the "*No*" category, 66 urban and 82 rural students disagree with this view. The visual proximity of the bar heights illustrates that both groups exhibit almost identical perceptions, with only marginal differences in their responses.

This close alignment signifies that the influence of locale on students' attitudes toward mobile learning is minimal. The figure visually reinforces the conclusion that mobile learning benefits students equally in both rural and urban settings emphasizing its role as a bridge for educational equality and accessibility.

4.1.4.3 Opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on academic stream

The opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on academic stream are presented in following table 4.16 and figure 4.16 shows the data in a visual format.

Table 4.16

Opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on academic stream

Arts (N=410), Science (N=60), Commerce (N=30)

Q.4 Using mobile devices for learning increases my success rate.					
Arts		**Science**		**Commerce**	
Yes	No	Yes	No	Yes	No
281 (68.54%)	129 (31.46%)	43 (71.67%)	17 (28.33%)	28 (93.33%)	2 (6.67%)

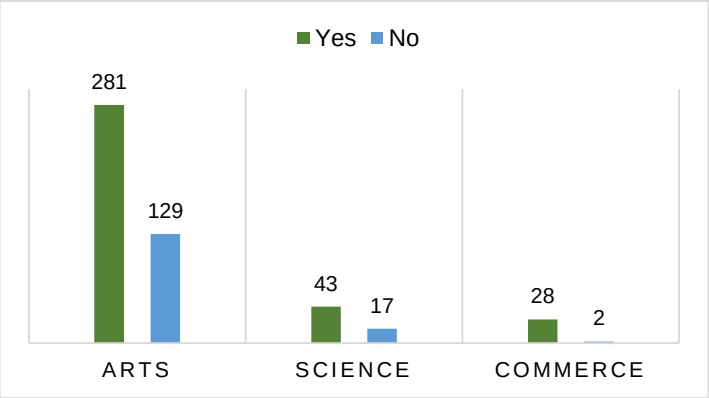
The stream-wise analysis reveals noticeable variations in students' perceptions of how mobile learning contributes to academic success. Among Arts students, who form the largest group, 281 (68.54%) agree that mobile learning enhances their success rate while 129 (31.46%) disagree. In contrast, 43 (71.67%) of Science students share this positive perception with 17 (28.33%) disagreeing. The most striking result is observed among Commerce students where 28 (93.33%) agree that mobile learning improves their academic success and only 2 (6.67%) hold an opposing view.

These findings show that the academic stream plays a significant role in shaping students' attitudes toward mobile learning. While Arts students recognize its usefulness, they may still rely heavily on traditional learning methods for tasks such as extensive reading, analytical writing and critical discussions. Science students, on the other hand, find mobile learning particularly advantageous for simulations, quick access to scientific data and problem-solving exercises. The strong acceptance among Commerce students may stem from the alignment of their curriculum with

digital tools such as accounting software, financial simulations and business applications which are easily accessible via mobile devices. Overall, the table underscores that mobile learning's perceived value varies across disciplines, being most positively received in Commerce, followed by Science and Arts.

Figure 4.16

Opinion of degree college students regarding the potential of mobile learning to enhance their success rates based on academic stream



The figure above graphically presents the distribution of responses from Arts, Science and Commerce students regarding whether mobile learning increases their academic success. It is evident that Commerce students exhibit the highest level of agreement (93.33%), followed by Science students (71.67%) and Arts students (68.54%).

The nearly unanimous agreement among Commerce students reflects the strong alignment of their subject area with mobile-based learning tools and digital resources. In contrast, Arts and Science students, while also largely positive, demonstrate slightly lower percentages of agreement, indicating that the extent of mobile learning's impact may depend on the specific nature of academic activities within each discipline.

4.1.5 Opinion of degree college students with respect to the future of mobile learning

The opinion of degree college students with respect to the future of mobile learning are presented in following table 4.17. Figure 4.17 provides visual representation of the data.

Table 4.17

Opinion of degree college students with respect to the future of mobile learning

N=500

Q.4 Using mobile devices for learning increases my success rate.	
Yes	**No**
392 (78.40%)	108 (21.60%)

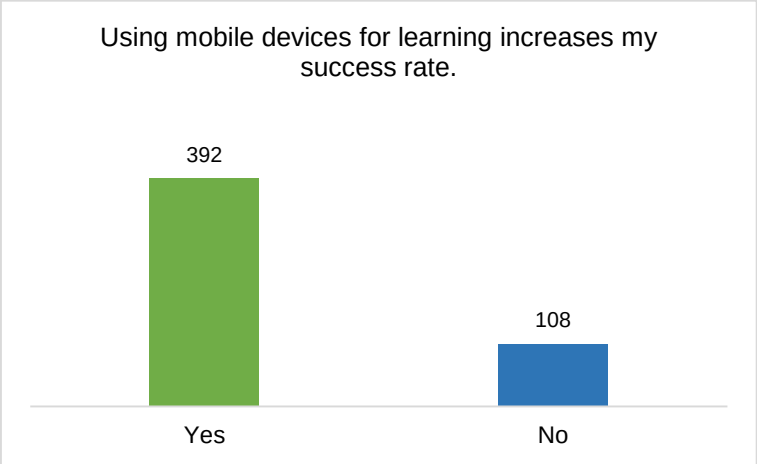
The findings reveal that a significant majority of students 392 (78.40%) believe that using mobile devices for learning enhances their success rate. This indicates a strong positive perception among degree college students regarding the contribution of mobile learning to academic achievement. The fact that more than three-fourths of the respondents recognize the educational benefits of mobile devices demonstrates how students are increasingly adapting their learning habits to incorporate digital and mobile technologies.

However, a smaller portion of 108 (21.60%) students disagree, indicating that certain challenges still persist. These may include issues such as digital distractions, lack of access to quality e-resources, poor internet connectivity or a preference for conventional classroom-based instruction.

Overall, the data underscores the transformative potential of mobile learning in higher education. It implies that the integration of mobile-based learning strategies could enhance student engagement, accessibility and learning outcomes. As digital tools continue to evolve, students are likely to rely more heavily on mobile devices for flexible, personalized and self-directed learning experiences.

Figure 4.17

Opinion of degree college students with respect to the future of mobile learning



The figure above visually represents the students' responses. The green bar represents students who responded "*Yes*" (392) while the blue bar shows those who responded "*No*" (108). The considerable height difference between the two bars clearly illustrates the predominance of positive opinion toward mobile learning.

The visual contrast highlights that most students perceive mobile learning as beneficial to their academic success indicating that digital education has become an integral part of the modern learning process.

4.1.5.1 Opinion of degree college students with respect to the future of mobile learning based on gender

The opinion of degree college students with respect to the future of mobile learning based on gender are presented in following table 4.18 and figure 4.18 shows the data in a visual format.

Table 4.18

Opinion of degree college students with respect to the future of mobile learning based on gender

Male (N = 257), Female (N=243)

Q.5 Use of mobile learning will increase in the near future.			
Male		**Female**	
Yes	No	Yes	No
207 (80.54%)	50 (19.46%)	185 (76.13%)	58 (23.87%)

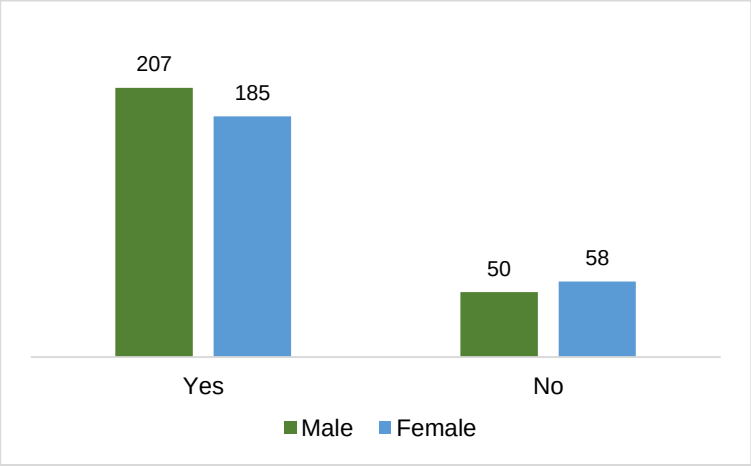
The above table indicates that both male and female students strongly support the growing use of mobile learning in the future. Among male students, 207 (80.54%) agree with this statement while 185 (76.13%) of female students express the same view. This slight variation shows that male students are marginally more optimistic about the expanding role of mobile learning compared to female students.

This difference could be influenced by factors such as variations in digital exposure, technological confidence or socio-cultural aspects affecting access and attitudes toward technology. Nevertheless, the overall positive responses from both genders reflect a shared acknowledgment of mobile learning as an inevitable and essential aspect of modern education.

The finding emphasizes that mobile learning has become a gender-neutral educational tool, offering equal opportunities for academic enhancement. With continued training, institutional support and equitable access to digital resources, the minimal gender gap in perception can be further reduced, fostering inclusive and technologically adaptive learning environments.

Figure 4.18

Opinion of degree college students with respect to the future of mobile learning based on gender



The figure above visually represents the responses of male and female students. The green bar represents males and the blue bar represents females. Both bars show relatively high values indicating strong agreement toward the future use of mobile learning.

The small difference between the bars suggests that gender has little influence on students' attitudes toward digital learning. Overall, the figure highlights a shared optimism about the integration of mobile learning into the educational landscape across both male and female groups.

4.1.5.2 Opinion of degree college students with respect to the future of mobile learning based on locale

The opinion of degree college students with respect to the future of mobile learning based on locale are presented in following table 4.19. Figure 4.19 provides the data in a visual format.

Table 4.19

Opinion of degree college students with respect to the future of mobile learning based on locale

Urban (N=222) Rural (N=278)

Q.5 Use of mobile learning will increase in the near future.			
Urban		**Rural**	
Yes	No	Yes	No
173 (77.93%)	49 (22.07%)	219 (78.78%)	59 (21.22%)

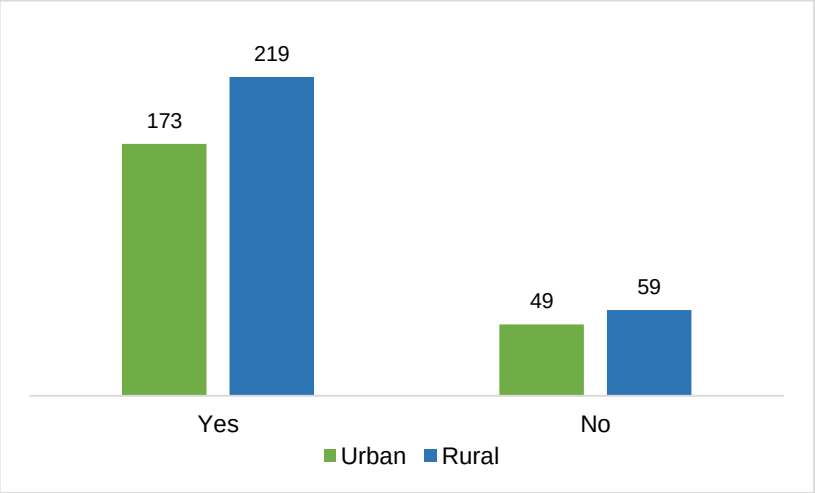
The above table reveals that urban and rural students exhibit nearly identical perspectives on the anticipated growth of mobile learning. Among urban students, 173 (77.93%) expect an increase in mobile learning also, 219 (78.78%) of rural students share this view. The close similarity in responses demonstrates that geographical location has little influence on students' attitudes toward mobile-based education.

This pattern is significant as it reflects the rapid digital expansion and technological accessibility that now extends to rural areas, traditionally perceived as less digitally equipped. The data indicates that the digital divide between urban and rural learners is steadily diminishing with students across both settings showing comparable readiness to embrace mobile-assisted learning.

Overall, the findings underscore that mobile learning has become a unifying educational medium, bridging geographical gaps and promoting educational inclusivity across diverse student populations.

Figure 4.19

Opinion of degree college students with respect to the future of mobile learning based on locale



The figure above illustrates students' perceptions based on locality. The green bar represents urban students and the blue bar represents rural students. Both bars show high and nearly equal values signifying a shared optimism about the growing adoption of mobile learning.

The minimal difference between the two bars highlights that urban and rural students are equally receptive to digital learning environments. This similarity visually reinforces the conclusion that mobile learning has become universally accepted, transcending regional boundaries and fostering equitable educational access for all learners.

4.1.5.3 Opinion of degree college students with respect to the future of mobile learning based on academic stream

The opinion of degree college students with respect to the future of mobile learning based on academic stream are presented in following table 4.20. Figure 4.20 shows visual representation of the data.

Table 4.20

Opinion of degree college students with respect to the future of mobile learning based on academic stream

Arts (N=410), Science (N=60), Commerce (N=30)

Q.5 Use of mobile learning will increase in the near future.					
Arts		**Science**		**Commerce**	
Yes	No	Yes	No	Yes	No
322 (78.54%)	88 (21.46%)	44 (73.33%)	16 (26.67%)	26 (86.67%)	4 (13.33%)

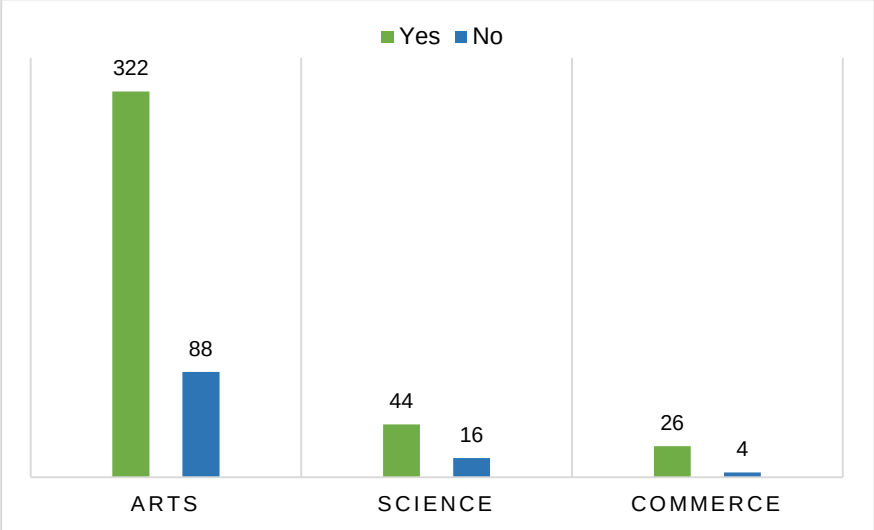
The table reveals that students across all academic streams express a positive outlook toward the growing use of mobile learning, although slight variations exist. Arts students (78.54%) and Science students (73.33%) show strong agreement while Commerce students (86.67%) demonstrate the highest level of support for the future expansion of mobile-based education.

This trend may be attributed to the nature of learning tasks and available digital resources within each discipline. Commerce students likely find mobile learning more advantageous due to the availability of business simulations, financial data applications and online case studies that directly align with their coursework. Science students while positive, may remain somewhat dependent on traditional laboratory-based practical learning which limits full reliance on mobile tools. Arts students, on the other hand, benefit from digital access to reading materials, reference sources and analytical discussions, making mobile learning a valuable supplement to their studies.

Overall, the findings highlight that disciplinary context influences students' perceptions of mobile learning. The higher acceptance among Commerce students shows that fields with greater digital adaptability perceive mobile-based instruction as a natural progression in higher education. As technology continues to evolve particularly with the advancement of virtual laboratories and interactive simulations students from all streams may increasingly depend on mobile learning for both theoretical and practical learning needs.

Figure 4.20

Opinion of degree college students with respect to the future of mobile learning based on academic stream



The figure visually represents the distribution of agreement and disagreement across three academic streams—Arts, Science and Commerce. The green bars represent students who agree that mobile learning will increase in the future. The blue bars represent those who disagree.

From the chart, it is evident that Commerce students show the strongest agreement, followed by Arts and then Science students. The noticeable height of the green bars compared to the blue ones across all streams indicates a widespread acceptance of mobile learning as an emerging educational trend.

The variation in bar heights reflects how the integration of technology into curriculum activities differs by subject area emphasizing that the perceived

usefulness of mobile learning is shaped by academic discipline and the type of learning tasks involved.

4.1.6 Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning

The opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning are presented in the following table 4.21. A visual depiction of the data is shown in figure 4.21.

Table 4.21

Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning

N=500

Q.6 Mobile learning is as effective as traditional learning.	
Yes	**No**
294 (58.80%)	206 (41.20%)

The findings indicate that a majority of students (294 or 58.80%) agree that mobile learning is as effective as traditional learning while 206 students (41.20%) do not share this perspective. This outcome reflects a positive inclination toward mobile learning emphasizing its growing acceptance among degree college students.

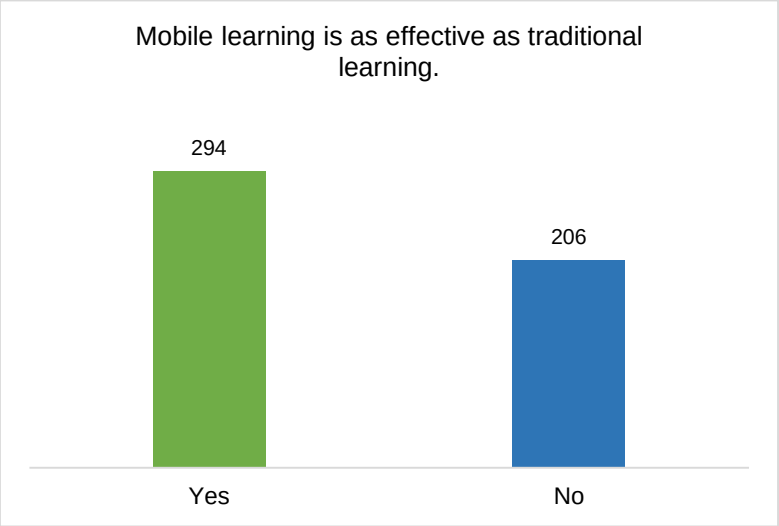
The fact that more than half of the respondents consider mobile learning equally beneficial may be attributed to factors such as flexibility, ease of access to resources, interactive content and self-paced study opportunities that mobile platforms offer. However, the significant minority who disagree shows that traditional classroom instruction continues to play an important role, especially in promoting face-to-face engagement, immediate feedback and structured learning environments.

Overall, the results point toward a transitional phase in higher education, where students value the advantages of digital learning while still recognizing the strengths of traditional methods. This underscores the importance of adopting

blended learning approaches that combine the best of both formats to maximize learning effectiveness.

Figure 4.21

Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning



The figure displays the comparison between students who perceive mobile learning as equally effective as traditional learning and those who do not. The green bar represents students who agree that mobile learning is as effective. The blue bar represents students who disagree.

As shown in Figure 4.21, the green bar (Yes = 294) is noticeably taller than the blue bar (No = 206), indicating that a larger proportion of students favour mobile learning's effectiveness. This visual trend highlights a clear shift in attitudes, where mobile learning is increasingly recognized as a viable alternative or complement to conventional classroom instruction.

4.1.6.1 Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on gender

The opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on gender are presented in following table 4.22. Figure 4.22 shows the data in a visual format.

Table 4.22

Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on gender

Male (N = 257), Female (N=243)

Q.6 Mobile learning is as effective as traditional learning.			
Male		**Female**	
Yes	No	Yes	No
147 (57.20%)	110 (42.80%)	147 (60.49%)	96 (39.51%)

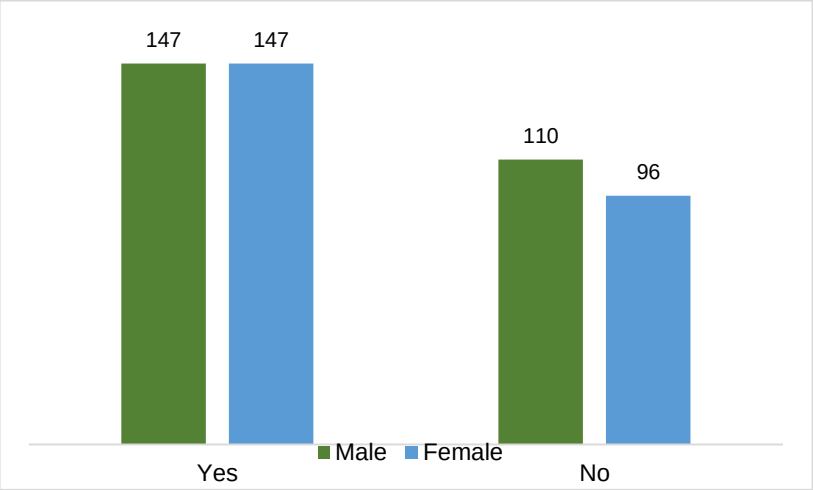
When analyzed by gender, both male and female students exhibit a largely similar perspective regarding the effectiveness of mobile learning. Among males, 147 (57.20%) consider mobile learning to be as effective as traditional learning, while 147 (60.49%) of females share the same view. The close alignment between the two groups shows that gender does not significantly influence students' perceptions of mobile learning effectiveness.

A slightly higher proportion of females express agreement which may be attributed to greater adaptability and comfort with interactive digital platforms. Nevertheless, the fact that nearly 40% of both genders continue to prefer traditional learning indicates that mobile learning may not suit every learner, particularly those who value the structured environment and direct engagement of classroom settings.

Overall, these findings imply that gender-specific interventions are unnecessary but efforts to raise awareness and build digital competence could help both male and female students become more confident and receptive toward mobile-based learning.

Figure 4.22

Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on gender



The figure presents a clear visual comparison of male and female students' opinion on the effectiveness of mobile learning relative to traditional classroom learning. The bars in the figure are almost parallel, emphasizing the consistency of opinion across genders. The slight difference with a marginally higher proportion of female students in agreement, may suggest that females are somewhat more open to adopting technology-mediated learning. This could be linked to factors such as greater engagement with collaborative learning platforms, higher participation in online academic communities or comfort with digital communication tools used in mobile learning environments.

4.1.6.2 Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on locale

The opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on locale are presented in following table 4.23 and a visual depiction of the data is shown in figure 4.23.

Table 4.23

Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on locale

Urban (N=222) Rural (N=278)

Q.6 Mobile learning is as effective as traditional learning.			
Urban		**Rural**	
Yes	No	Yes	No
126 (56.76%)	96 (43.24%)	168 (60.43%)	110 (39.57%

The analysis based on locale indicates that 126 (56.76%) urban students and 168 (60.43%) rural students perceive mobile learning as effective demonstrating a nearly equal level of acceptance between the two groups. Interestingly, rural students show a slightly higher agreement rate which may suggest that mobile technology is increasingly serving as a tool to bridge educational disparities in areas where conventional resources are limited.

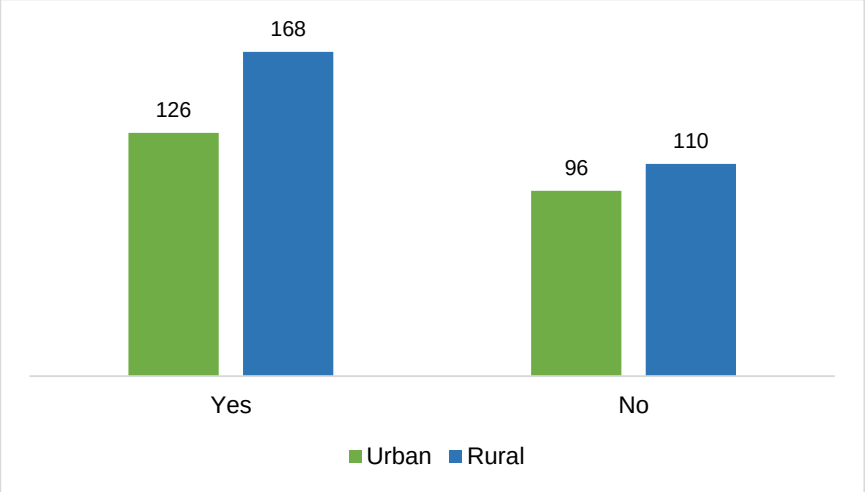
At the same time, a considerable number of respondents from both urban (96 or 43.24%) and rural (110 or 39.57%) areas disagree, highlighting the continued existence of challenges such as unstable internet connectivity, limited access to devices or individual preferences for face-to-face learning. Despite these constraints, the higher acceptance among rural students signifies a growing awareness of the educational potential of mobile learning and its ability to supplement or even substitute traditional methods when necessary.

Overall, the findings emphasize that mobile learning is gradually gaining recognition across locales with rural students increasingly embracing it as a practical

and accessible mode of education, despite infrastructural and technological limitations.

Figure 4.23

Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on locale



The figure presents a comparison between urban and rural students' perceptions of whether mobile learning is as effective as traditional learning.

As shown, 126 urban students agree (Yes) that mobile learning is effective, while 96 urban students disagree (No). In contrast, 168 rural students believe mobile learning is effective and 110 disagree.

Overall, the data indicates that rural students (60.43%) show slightly higher agreement than urban students (56.76%), indicating that mobile learning is gaining wider acceptance even in less technologically advanced areas. This may reflect how mobile technology is helping bridge educational gaps by providing rural learners greater access to digital resources and online lessons.

4.1.6.3 Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on academic stream

The opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on academic stream are presented in following table 4.24. Figure 4.24 shows visual representation of the data.

Table 4.24

Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on academic stream

Arts (N=410), Science (N=60), Commerce (N=30)

Q.6 Mobile learning is as effective as traditional learning.					
Arts		**Science**		**Commerce**	
Yes	No	Yes	No	Yes	No
232 (56.59%)	178 (43.31%)	42 (70%)	18 (30%)	20 (66.67%)	10 (33.33%)

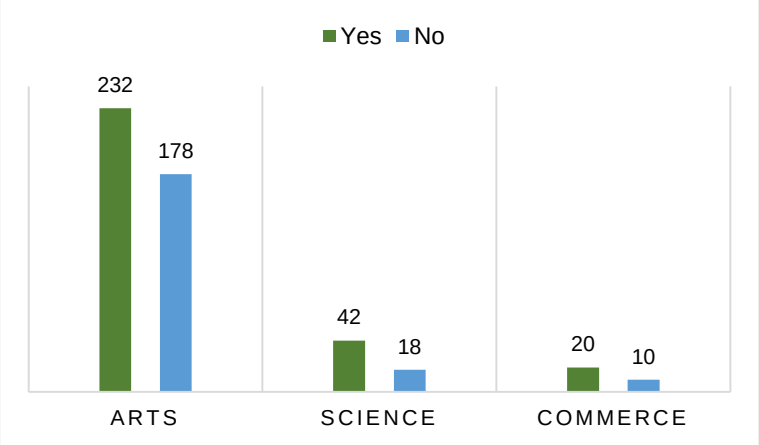
The analysis across academic streams reveals clear variations in how students view the effectiveness of mobile learning. Among Arts students, 232 (56.59%) agree that mobile learning is as effective as traditional learning while 178 (43.31%) disagree, showing a relatively balanced perspective. Science students show the highest level of approval with 42 (70%) agreeing, possibly because mobile platforms enhance their learning through simulations, experiments and interactive visual content that simplify complex concepts. Similarly, Commerce students demonstrate strong support with 20 (66.67%) agreeing, likely due to the relevance of digital tools for case studies, accounting exercises and financial analysis.

These results indicate that students' acceptance of mobile learning is influenced by the nature of their discipline. Streams that involve practical, data-driven or technology-oriented tasks tend to find mobile learning more beneficial and adaptable. In contrast, Arts students, who often engage in reading-intensive and interpretive learning may find mobile learning less comprehensive.

Overall, the findings emphasize the need for stream-specific innovations in mobile learning—particularly in Arts education—to enhance engagement and match the effectiveness perceived in Science and Commerce fields.

Figure 4.24

Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning based on academic stream



The figure above is a clustered bar chart representing students' opinion across academic streams -Arts, Science and Commerce on whether mobile learning is as effective as traditional learning.

The green bars represent the number of students who responded "Yes", indicating that they consider mobile learning equally effective. The blue bars represent the number of students who responded "No", showing that they do not view mobile learning as effective as traditional methods.

From the chart, it can be observed that:

1. In the Arts stream, the green bar (Yes = 232) is only slightly higher than the blue bar (No = 178) showing mixed opinion.
2. In the Science stream, the green bar (Yes = 42) stands noticeably taller than the blue bar (No = 18), suggesting strong support for mobile learning.
3. In the Commerce stream, the green bar (Yes = 20) also exceeds the blue bar (No = 10), reflecting a similar positive outlook.

Overall, the green bars dominate across all streams, visually emphasizing that a majority of students across disciplines believe mobile learning can be just as effective as traditional education.

4.1.7 Opinion of degree college students on motivation when employing mobile learning for educational purposes

The opinion of degree college students on motivation when employing mobile learning for educational purposes are presented in following table 4.25. A visual depiction of the data is shown in figure 4.25.

Table 4.25

Opinion of degree college students on motivation when employing mobile learning for educational purposes

N=500

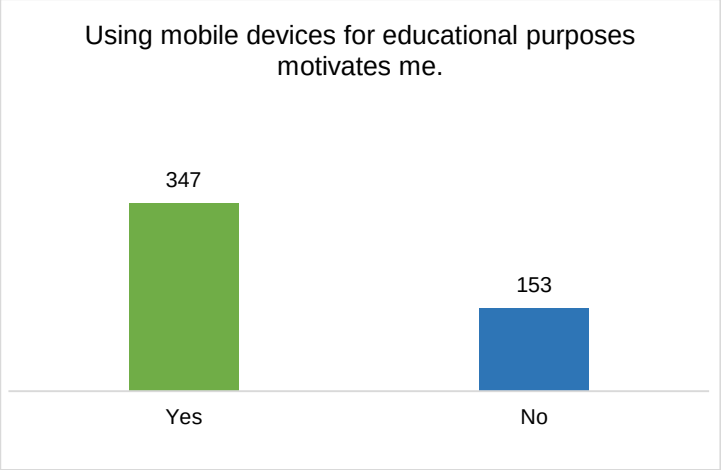
Q.7 Using mobile devices for educational purposes motivates me.	
Yes	**No**
347 (69.40%)	153 (30.60%)

The data presented in the table indicate that a large portion of students view mobile learning as a motivating approach. Among the 500 respondents, 347 (69.40%) reported that the use of mobile devices in education enhances their motivation whereas 153 (30.60%) disagreed. This shows that mobile technologies owing to their convenience, adaptability and interactive nature are broadly perceived as valuable tools for fostering students' enthusiasm toward learning.

These findings further imply that mobile learning can function as a form of positive reinforcement in educational settings, encouraging learners to engage with academic material beyond conventional classroom limits. Nonetheless, the response of nearly one-third of students who remain unmotivated highlights that the impact of mobile learning is not uniform and may vary according to factors such as individual learning preferences, levels of digital competence, and availability of technological resources.

Figure 4.25

Opinion of degree college students on motivation when employing mobile learning for educational purposes



The figure illustrates students' responses regarding whether using mobile devices for educational purposes motivates them. Out of a total of 500 participants, 347 students responded "Yes," while 153 answered "No." The green bar represents students who find mobile learning motivating, and the blue bar represents those who do not.

This visual clearly shows that a majority of students (69.40%) feel motivated when using mobile devices for learning, indicating that such tools enhance engagement through their accessibility, flexibility and interactive nature. However, the smaller proportion (30.60%) who disagree indicates that mobile learning may not be equally effective for all students, possibly due to differences in learning preferences, digital familiarity or availability of resources.

4.1.7.1 Opinion of degree college students on motivation when employing mobile learning for educational purposes based on gender

The opinion of degree college students on motivation when employing mobile learning for educational purposes based on gender are presented in following table 4.26. Figure 4.26 provides the data in a visual format.

Table 4.26

Opinion of degree college students on motivation when employing mobile learning for educational purposes based on gender

Male (N = 257), Female (N=243)

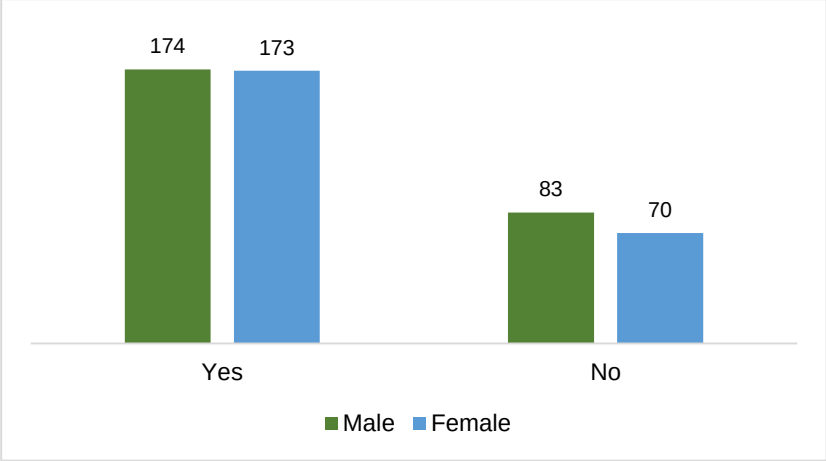
Q.7 Using mobile devices for educational purposes motivates me.			
Male		**Female**	
Yes	No	Yes	No
174 (67.70%)	83 (32.30%)	173 (71.19%)	70 (28.81%)

When analyzed by gender, the findings reveal a slight variation in motivation levels. Among male students, 172 (67.70%) agree that mobile learning enhances their motivation while 83 (32.30%) do not share this view. In contrast, 173 (71.19%) of female students report feeling motivated through mobile learning whereas 70 (28.81%) disagree. This shows that female students are somewhat more likely to view mobile devices as motivating tools in their educational experience.

The minor difference between genders may be attributed to distinct learning preferences, varying levels of engagement with digital tools or differences in subject-related learning needs. Despite this, both groups predominantly agree that mobile learning contributes positively to their motivation highlighting its overall effectiveness across genders.

Figure 4.26

Opinion of degree college students on motivation when employing mobile learning for educational purposes based on gender



The figure illustrates the gender-wise distribution of students' responses on whether mobile learning motivates them. The green bars represent male students while the blue bars represent female students.

According to the chart, 174 male students and 173 female students agree that using mobile devices for educational purposes motivates them. Meanwhile, 83 male and 70 female students disagree. This shows that both male and female students largely find mobile learning motivating though female students show a slightly higher percentage of positive responses (71.19%) compared to males (67.70%).

4.1.7.2 Opinion of degree college students on motivation when employing mobile learning for educational purposes based on locale

The opinion of degree college students on motivation when employing mobile learning for educational purposes based on locale are presented in following table 4.27 and a visual presentation of the data is shown in figure 4.27.

Table 4.27

Opinion of degree college students on motivation when employing mobile learning for educational purposes based on locale

Urban (N=222) Rural (N=278)

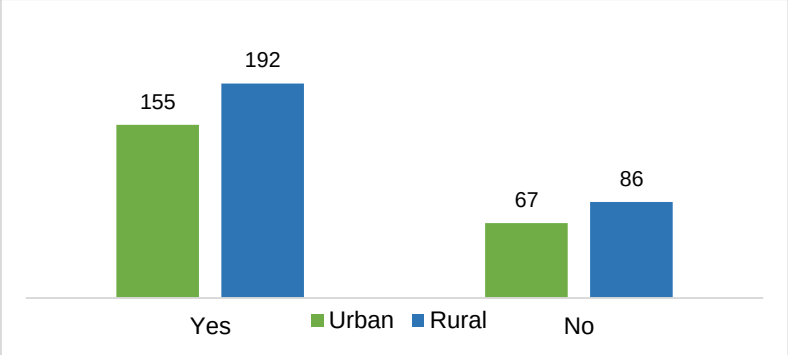
Q.7 Using mobile devices for educational purposes motivates me.			
Urban		**Rural**	
Yes	No	Yes	No
155 (69.82%)	67 (30.18%)	192 (69.06%)	86 (30.94%)

The locale-based analysis reveals a close similarity in motivation levels between urban and rural students. Among urban respondents, 155 (69.82%) agree that mobile learning motivates them while 67 (30.18%) disagree. Likewise, 192 (69.06%) of rural students report feeling motivated by mobile learning whereas 86 (30.94%) do not.

These results indicate that the motivational influence of mobile learning is nearly identical across urban and rural contexts. This similarity may be attributed to the increasing accessibility of smartphones and mobile internet in both areas which has helped reduce the digital gap. The consistent responses across locales suggest that mobile learning holds universal appeal and can effectively enhance student engagement regardless of socio-economic or geographical differences

Figure 4.27

Opinion of degree college students on motivation when employing mobile learning for educational purposes based on locale



The figure illustrates the distribution of students' responses regarding the motivational impact of mobile learning based on locale. The green bars represent urban students while the blue bars represent rural students.

As shown, 155 urban and 192 rural students agree that mobile learning motivates them whereas 67 urban and 86 rural students disagree. The difference between the two groups is minimal with both showing nearly equal levels of motivation among urban students (69.82%) and rural students 69.06%.

4.1.7.3 Opinion of degree college students on motivation when employing mobile learning for educational purposes based on academic stream

The opinion of degree college students on motivation when employing mobile learning for educational purposes based on academic stream are presented in following table 4.28. Figure 4.28 shows the data in a visual format.

Table 4.28

Opinion of degree college students on motivation when employing mobile learning for educational purposes based on academic stream

Arts (N=410), Science (N=60), Commerce (N=30)

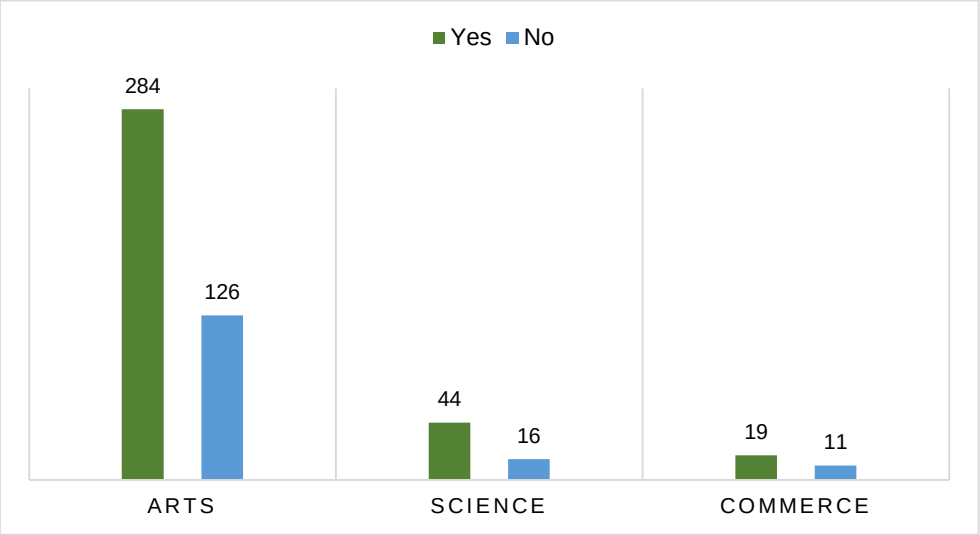
Q.7 Using mobile devices for educational purposes motivates me.					
Arts		**Science**		**Commerce**	
Yes	No	Yes	No	Yes	No
284 (69.27%)	126 (30.73%)	44 (73.33%)	16 (26.67%)	19 (63.33%)	11 (36.67%)

The analysis based on academic stream shows noticeable differences in how students perceive the motivational impact of mobile learning. Among Arts students, 284 (69.27%) feel motivated by mobile learning whereas 126 (30.73%) do not. Science students exhibit the highest level of motivation with 44 (73.33%) agreeing and only 16 (26.67%) disagreeing. In contrast, Commerce students show comparatively lower motivation with 19 (63.33%) agreeing and 11 (36.67%) disagreeing.

These variations may be linked to the distinctive learning requirements of each discipline. Science students likely benefit more from mobile-based tools such as simulations, virtual experiments and interactive applications that complement their practical learning. Conversely, Commerce students may find mobile platforms less engaging for subjects involving detailed calculations or collaborative analysis. Overall, the results emphasize the need to adapt mobile learning strategies to the academic context ensuring that instructional design and digital resources align with the specific demands of each stream.

Figure 4.28

Opinion of degree college students on motivation when employing mobile learning for educational purposes based on academic stream



The figure presents the distribution of students' responses regarding the motivational impact of mobile learning across different academic streams. The green bars represent students who agree that mobile learning motivates them (Yes) while the blue bars represent those who disagree (No).

As shown, 284 Arts students and 44 Science students report being motivated by mobile learning, compared to 126 and 16 respectively who do not. In the Commerce stream, 19 students agree that mobile learning motivates them, while 11 disagree.

4.1.8 Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom

The opinion of degree college students regarding the integration of mobile learning by teachers in the classroom are presented in following table 4.29. Figure 4.29 shows the data in a visual format.

Table 4.29

Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom

N=500

Q.8 Do you want your teachers to integrate mobile learning in the classroom?	
Yes	**No**
186 (37.20%)	314 (62.80%)

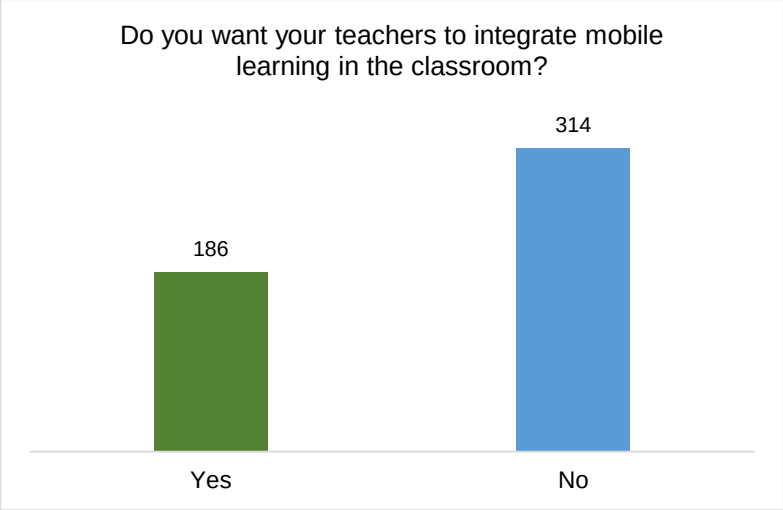
The overall findings reveal a considerable hesitation among degree college students toward incorporating mobile learning into classroom instruction. Out of 500 participants, 314 (62.80%) express opposition while only 186 (37.20%) support its integration. This indicates that mobile learning has yet to achieve widespread acceptance within formal educational environments.

One possible reason for this hesitation could be that some students perceive mobile devices as potential distractions during lectures as social media, messaging and gaming applications might occasionally draw their attention away from studies. In addition, a few students may feel that mobile learning somewhat overlaps with personal digital use which could make it harder to maintain academic focus. There is also a mild concern among some learners that mobile-based education may not provide the same level of structure or depth as traditional classroom teaching and printed resources.

Nevertheless, the 37.20% of students who favor mobile learning likely recognize its advantages such as flexibility, accessibility to diverse online resources and opportunities for interactive, self-directed learning. These differing viewpoints reflect a transitional phase where technology is deeply integrated into students' lives, yet its educational value continues to be viewed with a degree of caution.

Figure 4.29

Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom



The figure presents students' opinion on whether teachers should integrate mobile learning into classroom teaching. The green bar represents students who support the idea, while the blue bar represents those who oppose it.

As shown, 186 students (37.20%) are in favor of incorporating mobile learning whereas a larger group of 314 students (62.80%) are against it. This indicates that most students remain hesitant about using mobile devices in formal classroom settings.

4.1.8.1 Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on gender

The opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on gender are presented in following table 4.30. A visual representation of the data is shown in figure 4.30.

Table 4.30

Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on gender

Male (N = 257), Female (N=243)

Q.8 Do you want your teachers to integrate mobile learning in the classroom?			
Male		**Female**	
Yes	No	Yes	No
97 (37.74%)	160 (62.26%)	89 (36.63%)	154 (63.37%)

The gender-based findings show that male and female students hold nearly identical views on the integration of mobile learning in classrooms. Among male students, 97 (37.74%) support its inclusion while 160 (62.26%) oppose it. Similarly, 89 (36.63%) of female students agree with the idea and 154 (63.37%) disagree. The close similarity in responses indicates that gender does not significantly influence students' attitudes toward mobile learning integration.

This consistency may be due to the widespread and equal access to mobile technology among students of both genders, leading to comparable experiences and perceptions. However, the results also indicate a shared caution toward the use of mobile devices in formal educational settings. Although female students are sometimes perceived as more disciplined learners, their responses show similar reservations indicating that overall skepticism stems less from gender differences and more from mutual concerns about potential distractions, misuse and the lack of a clear institutional framework to support effective mobile learning.

Figure 4.30

Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on gender

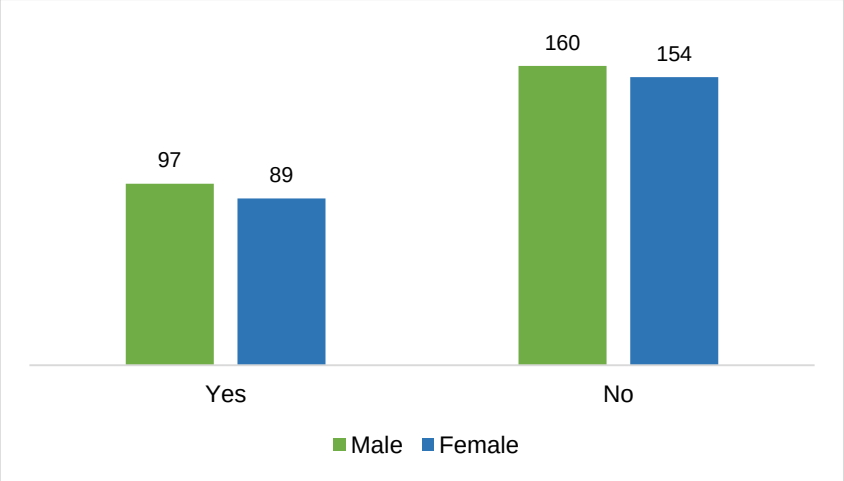


Figure 4.30 illustrates the responses of male and female participants to a question with two possible answers: "*Yes*" and "*No*."

Among male respondents, 97 answered "*Yes*," while 160 answered "*No*." In comparison, among female respondents, 89 responded "*Yes*," and 154 responded "*No*."

Overall, the figure shows that a higher number of both male and female participants chose "*No*" compared to "*Yes*." Although males slightly outnumber females in both response categories, the difference between genders is minimal, indicating a similar trend of opinion across both groups with a general inclination toward a negative (No) response.

4.1.8.2 Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on locale

The opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on locale are presented in following table 4.31. A visual depiction of the data is shown in figure 4.31.

Table 4.31

Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on locale

Urban (N=222) Rural (N=278)

Q.8 Do you want your teachers to integrate mobile learning in the classroom?			
Urban		**Rural**	
Yes	No	Yes	No
83 (37.39%)	139 (62.61%)	103 (37.05%)	175 (62.95%)

When comparing the opinion of degree college students from urban and rural areas on the integration of mobile learning by teachers in classrooms, the findings reveal a consistent pattern across both groups. Among urban students, 83 (37.39%) supported the use of mobile learning while 139 (62.61%) did not. Similarly, among rural students, 103 (37.05%) agreed with the idea and 175 (62.95%) expressed disagreement.

The close similarity in these percentages indicates that differences in access to technology or infrastructure have minimal influence on students' views regarding mobile learning. Although urban students generally have better exposure to digital devices and internet connectivity, they share similar concerns as rural students about possible distractions and misuse in classroom settings. On the other hand, rural students who may face more technological constraints also show hesitation which could stem from limited institutional support or lesser familiarity with formal digital learning platforms.

Figure 4.31

Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on locale

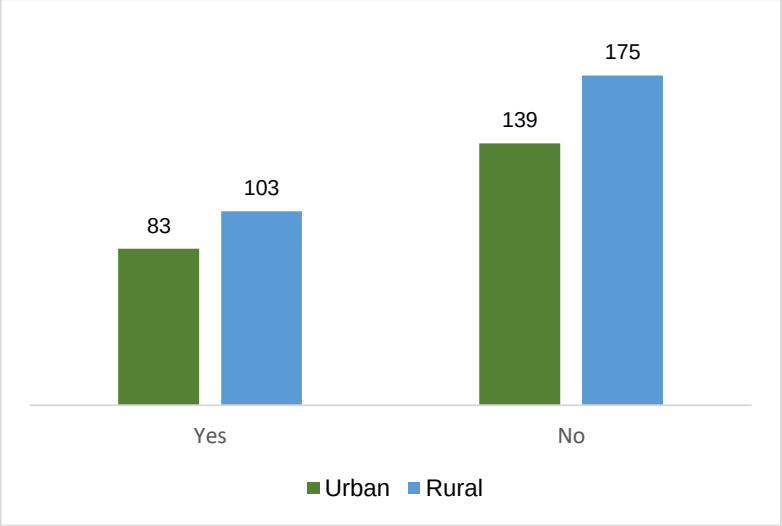


Figure 4.31 shows the comparison of opinion between urban and rural degree college students regarding the integration of mobile learning by teachers in classrooms, represented by two different colors.

The green bars indicate responses from urban students while the blue bars represent rural students. Among urban students (green), 83 agreed (Yes) with the use of mobile learning whereas 139 disagreed (No). Among rural students (blue), 103 answered "*Yes*," supporting mobile learning while 175 responded "*No*," showing disapproval.

The chart clearly demonstrates that for both groups, the "*No*" bars are taller than the "*Yes*" bars, signifying that a majority of students both urban and rural oppose the use of mobile learning in classrooms. The close alignment between the green and blue bars in both categories also suggests that urban and rural students share similar perspectives on the issue, despite differences in access to technology and resources.

4.1.8.3 Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on academic stream

The opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on academic stream are presented in following table 4.32. Figure 4.32 shows the data in a visual format.

Table 4.32

Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on academic stream

Arts (N=410), Science (N=60), Commerce (N=30)

Q.8 Do you want your teachers to integrate mobile learning in the classroom?					
Arts		**Science**		**Commerce**	
Yes	No	Yes	No	Yes	No
149 (36.34%)	261 (63.66%)	24 (40%)	36 (60%)	13 (43.33%)	17 (56.67%)

When examining the responses across various academic streams, a more nuanced pattern emerges. Among Arts students, who make up the largest portion of the sample, only 149 (36.34%) supported the integration of mobile learning in classrooms while 261 (63.66%) opposed it. Science students showed slightly greater acceptance with 24 (40%) in favor and 36 (60%) against. Commerce students expressed the highest level of support with 13 (43.33%) agreeing and 17 (56.67%) disagreeing.

These differences show that students' views on mobile learning are shaped by the nature and needs of their academic disciplines. In fields like Science and Commerce where experimentation, data analysis and practical application play a vital role, mobile devices can enhance learning by offering access to simulations, analytical tools and subject-specific applications. Students in these areas may find mobile learning beneficial as it complements hands-on and interactive learning methods.

Conversely, Arts students, whose studies often emphasize reading, interpretation and discussion-based learning may find mobile tools less integral to their academic experience. This contrast highlights the importance of tailoring mobile learning initiatives to align with the unique learning styles, pedagogical goals and practical needs of each academic stream.

Figure 4.32

Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom based on academic stream

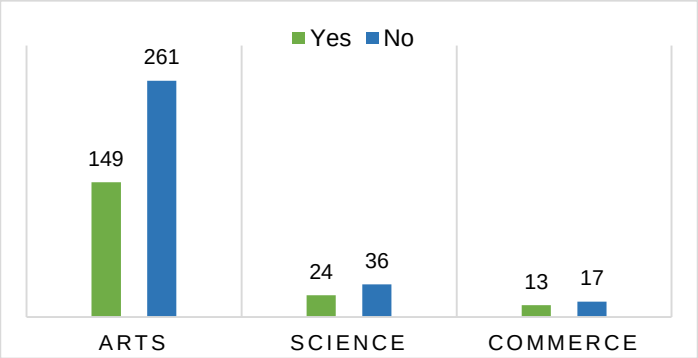


Figure 4.32 illustrates the opinion of students from different academic streams Arts, Science and Commerce regarding the integration of mobile learning by teachers in classrooms.

In the figure, the green bars represent the "*Yes*" responses (support for mobile learning) while the blue bars represent the "*No*" responses (opposition). Among Arts students, 149 responded "*Yes*," and 261 responded "*No*," showing the least support. Science students showed slightly more acceptance with 24 in favor and 36 against. Commerce students displayed the highest level of approval with 13 agreeing and 17 disagreeing.

The pattern shown in the figure indicates that students' attitudes toward mobile learning differ by academic stream. While Science and Commerce students appear somewhat more receptive possibly due to the practical and applied nature of their studies, Arts students show stronger resistance, perhaps because their learning relies more on reading, interpretation and discussion rather than digital tools. The overall

trend emphasizes the need to tailor mobile learning approaches according to the distinct learning styles and academic requirements of each stream.

4.2 Objective No. 2: To construct and standardize mobile device use for learning scale

The investigator developed and standardized a scale by taking into account the social, cultural, educational, and regional characteristics of the study population. A five-point Likert scale was employed to assess the usage of mobile devices for learning. The development of the Mobile Device Use for Learning Scale followed the steps outlined below:

4.2.1 Collection of Statements:

After conducting a thorough review of the existing and pertinent literature on mobile learning, the investigator gathered as many statements as possible from a wide variety of sources. In addition to this, the investigator gathered the opinion of professionals in the field, such as Professors at university. An item pool consisting of 40 statements was brought together after receiving feedback from professionals working in the field of education as well as other sources of information. The draft statements were distributed in a random order and then distributed to twelve (12) experts in the field for the purpose of conducting an in-depth analysis and evaluation of the statement's content validity and relevance. A total of nineteen elements were removed from the initial draft of the scale after receiving feedback from experts and other statements were altered and reorganized as a result of these changes. After revising and refining the draft scale, a total of 21 items were selected for the first tryout of the scale.

4.2.2 First Try-out of the scale

To evaluate the first version of the scale, twenty (20) degree college students were selected to determine whether the statements were comprehensible and to identify any terms that might be difficult for the target group to understand. This preliminary administration aimed primarily to assess the suitability of the items for

the students. Following minor revisions, including the replacement of certain terms and some grammatical adjustments, the draft scale was finalized for the second tryout.

4.2.3 Second Try-out of the scale

For the second try-out, the usage scale which consisted of 21 items was given to a total of 130 degree college students. Following the administration of the scale to students, scoring was done by the investigator. Students who selected the option "Always" were given a score of 5. In the same way, a score of 4,3,2 and 1 was assigned to the categories of frequently, sometimes, rarely and never respectively. In contrast to the process that was used for the positive items, the scoring technique for the negative items was carried out in reverse.

4.2.4 Item Discrimination and Selection of Statements

Following the administration of the second tryout, the scale was scored using the Likert scoring procedure. The scores of all 130 students were arranged in ascending order, and the upper 27% and lower 27% of the sample were selected for item analysis and discrimination. The mean and standard deviation for each statement on the usage scale were calculated separately for both the top and bottom groups. The discriminative power of each of the 21 items was determined using the *t*-test. Items with a *t*-value above 2.64, significant at the 0.01 level of confidence, were retained for the final scale. Consequently, the final scale comprised all 21 statements. Table 4.33 presents the mean and standard deviation values for both the top and bottom groups for each item, along with the corresponding discriminative *t*-values.

Table – 4.33

Mean, Standard Deviation and *t*-Values of the Top 27% and Bottom 27% Groups on All Items of the Mobile Device Use for Learning Scale

Item No.	Top 27%		Bottom 27%		T Value	Significance
	Mean	SD	Mean	SD		
1	4.25	0.927	3.275	0.847	4.912	**
2	4.65	0.580	3.25	0.899	8.280	**
3	4.45	0.932	2.95	0.783	7.793	**
4	4.65	0.736	3.075	0.888	8.637	**
5	4.925	0.267	3.625	1.005	7.909	**
6	4.675	0.730	2.75	0.954	10.135	**
7	3.8	1.181	1.85	0.921	8.234	**
8	3.925	1.047	2	0.784	9.304	**
9	3.6	1.172	2.275	0.816	5.867	**
10	4.775	0.660	3.825	1.010	4.981	**
11	4.225	1.000	2.175	0.781	10.221	**
12	4.8	0.564	3.175	0.844	10.126	**
13	4.625	0.667	3.4	0.871	7.059	**
14	4.65	0.622	3.35	0.949	7.247	**
15	3.925	1.347	2.75	0.981	4.460	**
16	4.725	0.506	3.05	0.904	10.224	**
17	4.675	0.526	3.125	0.911	9.320	**
18	4.7	0.564	2.825	0.675	13.482	**
19	4.2	0.911	2.55	0.959	7.886	**
20	4.6	0.841	3.1	0.841	7.974	**
21	4.875	0.335	3.8	0.966	6.649	**

***** Significant level at 0.01, * Significant level at 0.05, NS – Not significant***

Following the completion of the item discrimination procedures and the selection of statements for the final scale, the items were categorized into positive and negative statements. This classification ensured a balanced representation of

items, allowing the scale to measure usage patterns accurately while minimizing response biases. As shown in table 4.34, the next table provides the serial number of both positive and negative statements included in the scale.

Table No. 4.34

Serial Numbers of Positive and Negative Statements in the Mobile Device Use for Learning Scale

Sl. No.	Statements	Serial No. of Statements
1	Positive Statements	1, 2, 4, 5, 7, 8, 10, 11, 13, 15, 16, 17, 18, 19, 20
2	Negative Statements	3, 6, 9, 12, 14, 21

4.2.5 Establishment of Reliability of the Scale

When it comes to evaluating tools, reliability refers to the extent to which they deliver results that are reliable and consistent. Any standardized scale that is used should be reliable enough to produce findings that can be trusted. This is an important consideration. In order to determine whether or not the scale is reliable, it was administered once more to 130 degree college students. The investigator utilized the test-retest method as well as the Split-Half Method in order to determine the reliability of the scale.

Test-Retest Reliability: The researcher evaluated the usage of a group of 130 undergraduate students using the mobile device use for learning scale. The same sample was given the usage scale once more by the investigator after a duration of two weeks had passed since the initial administration. The correlation coefficient between the two sets of scores was calculated using the Pearson Product-Moment Correlation Method. The scale demonstrated a reliability coefficient of 0.756, which was statistically significant at the 0.01 level. It was clear from this that the scale that was used to quantify the utilization of mobile devices for learning purposes is reliable. The scores obtained from the test-retest in order to determine the reliability index of the scale are presented in the table as given below.

Table 4.35

Test-Retest scores for obtaining reliability

Sl. No.	Test1 score	Test2 score	Sl. No.	Test1 score	Test2 score	Sl. No.	Test1 score	Test2 score
1	76	74	**26**	72	69	**51**	72	68
2	63	57	**27**	76	72	**52**	69	64
3	87	86	**28**	63	79	**53**	76	69
4	70	72	**29**	89	88	**54**	66	70
5	61	69	**30**	80	84	**55**	75	89
6	76	74	**31**	80	78	**56**	78	72
7	71	65	**32**	73	65	**57**	61	64
8	73	71	**33**	72	68	**58**	79	85
9	70	61	**34**	68	83	**59**	78	67
10	92	101	**35**	60	72	**60**	100	95
11	89	73	**36**	71	70	**61**	91	78
12	92	95	**37**	80	84	**62**	85	79
13	66	68	**38**	77	77	**63**	70	63
14	72	77	**39**	103	101	**64**	65	65
15	75	71	**40**	62	62	**65**	63	60
16	76	76	**41**	85	86	**66**	78	85
17	87	85	**42**	77	73	**67**	78	93
18	87	71	**43**	63	68	**68**	75	91
19	58	60	**44**	80	65	**69**	69	79
20	99	94	**45**	65	76	**70**	63	62
21	80	75	**46**	83	71	**71**	79	71
22	60	59	**47**	70	63	**72**	79	88
23	70	65	**48**	77	79	**73**	93	86
24	71	61	**49**	68	69	**74**	70	73
25	78	80	**50**	68	67	**75**	64	63

76	55	57	**95**	72	66	**114**	82	75
77	72	79	**96**	97	94	**115**	66	76
78	83	73	**97**	65	77	**116**	86	77
79	65	77	**98**	80	73	**117**	94	96
80	72	72	**99**	75	74	**118**	74	61
81	85	89	**100**	62	66	**119**	76	70
82	75	77	**101**	72	70	**120**	77	75
83	69	66	**102**	60	63	**121**	70	70
84	85	86	**103**	73	62	**122**	73	62
85	65	72	**104**	72	65	**123**	70	78
86	83	80	**105**	70	63	**124**	89	75
87	70	65	**106**	91	92	**125**	79	73
88	65	62	**107**	58	60	**126**	104	100
89	66	69	**108**	80	72	**127**	57	61
90	73	73	**109**	71	67	**128**	79	64
91	71	69	**110**	67	65	**129**	72	73
92	60	75	**111**	71	77	**130**	68	68
93	67	65	**112**	89	89			
94	89	81	**113**	74	73			

Split-Half Reliability: To further substantiate and validate the reliability of the scale, the investigator employed the split-half method. This method involved dividing the score of each individual into two parts, one for each individual based on the odd and even number of items. A Pearson Product Moment Method was used to determine the coefficient of correlation and the dependability index between the two halves was found to be 0.764. This value is significant at the .01 level of significance. According to this, the scale is reasonably reliable for determining the use of mobile devices for learning. Presented in the accompanying table 4.36 are the split-half scores used to determine the dependability of the usage scale

Table 4.36

Split-half scores for obtaining reliability

Sl. No.	Score on 1st half	Score on 2nd half	Sl. No.	Score on 1st half	Score on 2nd half	Sl. No.	Score on 1st half	Score on 2nd half
1	38	38	**26**	38	34	**51**	38	34
2	37	39	**27**	38	38	**52**	33	36
3	34	29	**28**	33	30	**53**	41	35
4	44	43	**29**	47	42	**54**	37	29
5	36	34	**30**	39	41	**55**	39	36
6	32	29	**31**	41	39	**56**	41	37
7	38	33	**32**	36	37	**57**	30	31
8	38	35	**33**	40	32	**58**	41	38
9	44	26	**34**	36	32	**59**	39	39
10	49	43	**35**	29	31	**60**	50	50
11	45	44	**36**	39	32	**61**	45	46
12	48	44	**37**	41	39	**62**	42	43
13	33	33	**38**	39	38	**63**	40	30
14	38	34	**39**	53	50	**64**	35	30
15	41	34	**40**	32	30	**65**	32	31
16	41	35	**41**	41	44	**66**	40	38
17	41	46	**42**	37	40	**67**	38	40
18	41	46	**43**	33	30	**68**	42	33
19	29	29	**44**	42	38	**69**	34	35
20	49	50	**45**	33	32	**70**	35	28
21	41	39	**46**	43	40	**71**	37	42
22	27	33	**47**	37	33	**72**	41	38
23	36	34	**48**	40	37	**73**	47	46
24	39	32	**49**	34	34	**74**	37	33
25	42	36	**50**	35	34	**75**	31	33

76	27	28	**95**	38	34	**114**	44	38
77	36	36	**96**	49	48	**115**	33	33
78	42	41	**97**	33	32	**116**	45	41
79	35	30	**98**	38	42	**117**	49	45
80	43	29	**99**	37	38	**118**	38	36
81	45	40	**100**	30	32	**119**	38	38
82	39	36	**101**	41	31	**120**	37	40
83	38	31	**102**	31	29	**121**	36	34
84	43	42	**103**	38	35	**122**	37	36
85	32	33	**104**	36	36	**123**	39	31
86	43	40	**105**	36	34	**124**	45	44
87	37	33	**106**	47	44	**125**	41	38
88	36	29	**107**	31	27	**126**	54	50
89	35	31	**108**	45	35	**127**	29	28
90	38	35	**109**	37	34	**128**	40	39
91	37	34	**110**	35	32	**129**	39	33
92	30	30	**111**	35	36	**130**	35	33
93	32	35	**112**	47	42			
94	44	45	**113**	38	36			

4.2.6 Scoring Procedure

The usage scale is a five-point Likert scale, with each statement offering five response options: Always, Frequently, Sometimes, Rarely and Never. A score of 5, 4, 3, 2 and 1 is assigned for positive response whereas a score of 1, 2, 3, 4 and 5 is assigned for negative response. A lower number implies the use of mobile devices for learning is unfavourable while a higher score suggests the usage is more positive. On this scale, the maximum possible score is 105 (5 × 21), while the minimum possible score is 21 (1 × 21).

4.2.7 Norm for interpretation of the scale

The newly developed usage scale was administered to a sample of 500 undergraduate students drawn from four regions of Mizoram. The investigator first transformed the raw score into z-score. The z-Score norms have been prepared based on the statistical results presented in table 4.37. z-Score Norms have been presented in table 4.38.

Table 4.37
Norms for the interpretation of usage of mobile device
Mean: 74.574. SD: 10.416. N: 500

Sl. No.	Raw Score	z-Score	Sl. No.	Raw Score	z-Score	Sl. No.	Raw Score	z-Score
1	21	-5.143	**21**	41	-3.223	**41**	61	-1.303
2	22	-5.047	**22**	42	-3.127	**42**	62	-1.207
3	23	-4.951	**23**	43	-3.031	**43**	63	-1.111
4	24	-4.855	**24**	44	-2.935	**44**	64	-1.015
5	25	-4.759	**25**	45	-2.839	**45**	65	-0.919
6	26	-4.663	**26**	46	-2.743	**46**	66	-0.823
7	27	-4.567	**27**	47	-2.647	**47**	67	-0.727
8	28	-4.471	**28**	48	-2.551	**48**	68	-0.631
9	29	-4.375	**29**	49	-2.455	**49**	69	-0.535
10	30	-4.279	**30**	50	-2.359	**50**	70	-0.439
11	31	-4.183	**31**	51	-2.263	**51**	71	-0.343
12	32	-4.087	**32**	52	-2.167	**52**	72	-0.247
13	33	-3.991	**33**	53	-2.071	**53**	73	-0.151
14	34	-3.895	**34**	54	-1.975	**54**	74	-0.055
15	35	-3.799	**35**	55	-1.879	**55**	75	0.041
16	36	-3.703	**36**	56	-1.783	**56**	76	0.137
17	37	-3.607	**37**	57	-1.687	**57**	77	0.233
18	38	-3.511	**38**	58	-1.591	**58**	78	0.329
19	39	-3.415	**39**	59	-1.495	**59**	79	0.425
20	40	-3.319	**40**	60	-1.399	**60**	80	0.521

61	81	0.617	**70**	90	1.481	**79**	99	2.345
62	82	0.713	**71**	91	1.577	**80**	100	2.441
63	83	0.809	**72**	92	1.673	**81**	101	2.537
64	84	0.905	**73**	93	1.769	**82**	102	2.633
65	85	1.001	**74**	94	1.865	**83**	103	2.729
66	86	1.097	**75**	95	1.961	**84**	104	2.825
67	87	1.193	**76**	96	2.057	**85**	105	2.921
68	88	1.289	**77**	97	2.153			
69	89	1.385	**78**	98	2.249			

Table 4.38

Norms for the interpretation of the level of mobile device use for learning scale

Sl No.	Range of Raw Score	Range of z-Score	Grade	Level of usage
1	96 and above	+2.057 and above	A	Very High Usage
2	81 to 95	+0.617 to +1.961	B	High Usage
3	66 to 80	-0.823 to +0.521	C	Average Usage
4	51 to 65	-2.263 to -0.919	D	Low Usage
5	50 and below	-2.359 and below	E	Very Low Usage

4.3 Objective No. 3: To assess the extent of mobile device usage for learning among degree college students in Mizoram.

The objective of this study was to determine the extent to which degree college students in Mizoram make use of mobile devices for learning. A mobile device use for learning scale that was developed by the investigator was given to 500 degree college students in Mizoram in order to collect data.

The result of the assessment of the level of usage of mobile devices for learning by degree college students of Mizoram is shown table 4.39 and figure 4.33 provides a visual representation of the data.

Table 4.39

Assessment of the level of usage of mobile devices for learning by degree college students of Mizoram

	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Level of Usage	16 (3.2%)	124 (24.8%)	263 (52.6%)	90 (18%)	7 (1.4%)

The findings from table 4.39 reveal that majority of degree college students in Mizoram fall into the average usage category with 263 (52.6%) students reporting this level. This shows that while mobile devices are widely used for learning their integration into academic activities remains moderate rather than intensive. The average usage may indicate that students rely on mobile devices to a certain extent for tasks such as accessing online materials, communicating with peers and teachers and participating in mobile-based learning platforms but they may not yet be fully maximizing the advanced educational possibilities offered by mobile learning.

A considerable proportion of students i.e. 124 numbers (24.8%) report a high usage level, reflecting a positive trend toward mobile learning adoption. These students likely engage in more consistent and diverse use of mobile devices for academic purposes, including research, virtual collaboration and accessing e-learning

platforms. Their higher usage may also be influenced by greater digital literacy, stronger motivation or better access to internet facilities.

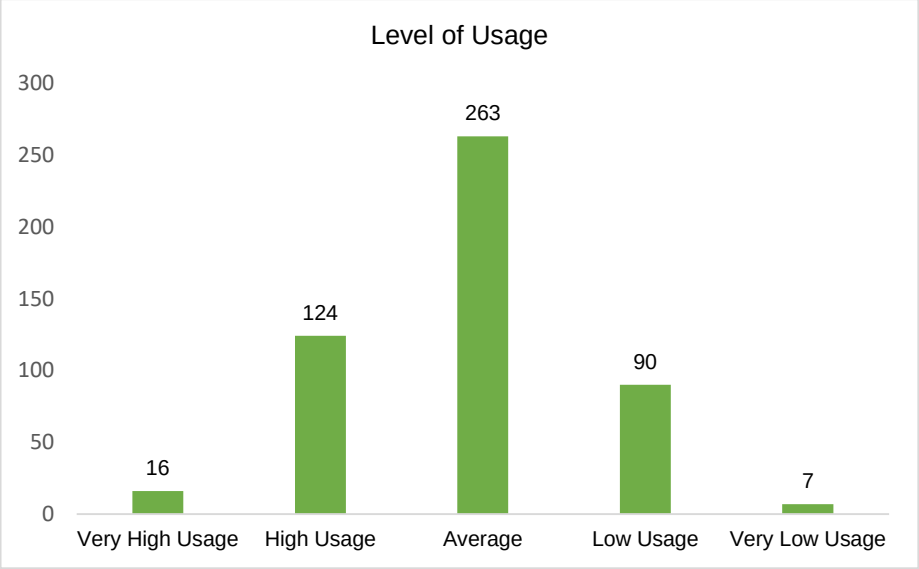
On the other hand, only 16 students (3.2%) fall into the very high usage category indicating that intensive integration of mobile technology into daily learning practices is still rare among college students. This can be due to infrastructural challenges, affordability issues or the absence of institutional encouragement for full-scale mobile-based learning.

At the lower end, 90 students (18%) report low usage and 7 students (1.4%) indicate very low usage. These figures highlight a segment of students who are either reluctant or unable to adopt mobile devices as effective tools for learning. Possible reasons can include lack of skills, preference for traditional learning methods, economic constraints or limited internet connectivity in their locality.

Overall, the result shows that mobile learning in Mizoram's degree colleges is at a transitional stage: it is neither underutilized nor fully embedded in the educational framework. The trend indicates potential for growth if infrastructural, pedagogical and motivational factors are strengthened.

Figure 4.33

Assessment of the level of usage of mobile devices for learning by degree college students of Mizoram



The bar graph in Figure 4.33 provides a visual representation of the distribution of degree college students of Mizoram across different levels of usage of mobile devices for learning. The data presented in the bar graph shows the Level of Usage among respondents. The horizontal axis represents five categories of usage Very High Usage, High Usage, Average, Low Usage, and Very Low Usage while the vertical axis indicates the number of respondents in each category.

The graph shows that the majority of respondents fall under the Average Usage category with 263 students, suggesting that most students engage at a moderate level. The High Usage category records 124 respondents, reflecting a considerable portion of active users. In contrast, 90 respondents report Low Usage, indicating limited engagement. Only 16 respondents show Very High Usage and 7 respondents show Very Low Usage, representing the smallest groups.

4.4 Objective No. 4: To compare the use of mobile devices for learning by degree college students of Mizoram in relation to gender, academic streams, locale, family income and father's educational background

An analysis was conducted to compare the utilization of mobile devices for learning among degree college students in Mizoram, taking into consideration factors such as gender, academic streams, locale, family income and father's education.

4.4.1 A comparison of the use of mobile devices for learning between male and female degree college students of Mizoram.

In order to compare the levels of usage of mobile devices for learning between male and female degree college students of Mizoram, a comparison table (Table 4.40) was prepared showing the number of respondents from male and female at each level of usage. The comparison is also illustrated visually in a bar graph (Figure 4.34). To assess whether the two groups differed significantly, a t-test was performed.

Comparison based on the level of usage of mobile devices for learning

The result of the comparison of the level of usage of mobile devices for learning between male and female degree college students of Mizoram is shown in the following table 4.40.

Table 4.40

Comparison of the level of usage of mobile devices for learning between male and female degree college students of Mizoram

	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Male	11 (4.28%)	57 (22.18%)	145 (56.42%)	43 (16.73%)	1 (0.39%)
Female	5 (2.06%)	67 (27.57%)	118 (48.56%)	47 (19.34%)	6 (2.47%)

The comparison of mobile learning usage between male and female students highlights distinct patterns in their engagement levels. Among male students, the

largest share (56.42%) falls under the “Average” usage category, followed by “High” usage at 22.18%. A smaller portion reported “Low” usage (16.73%) while very few indicated “Very High” (4.28%) or “Very Low” (0.39%) usage levels. This trend indicates that most male students maintain a moderate level of engagement with mobile devices for academic purposes with relatively few at either extreme of the usage spectrum.

In contrast, female students show a somewhat wider distribution. The majority (48.56%) also fall in the “Average” category, but a greater proportion reported “High” usage (27.57%) compared to males. Additionally, 19.34% of females indicated “Low” usage while 2.47% and 2.06% reported “Very Low” and “Very High” usage respectively. This indicates that female students are more widely spread across different usage levels, some showing stronger engagement while others display lower involvement.

When comparing both groups, it becomes apparent that male students tend to cluster around the average usage level whereas female students demonstrate greater variability. The higher percentage of females in the “High” usage group (27.57% compared to 22.18% among males) shows that women are slightly more likely to use mobile devices actively for learning. At the same time, the higher proportion of females in the “Very Low” category (2.47% compared to 0.39% of males) may reflect barriers such as limited access, lack of confidence or lower interest in mobile-based learning.

The minimal percentage of students in the “Very High” category across both genders (4.28% for males and 2.06% for females) indicates that while mobile learning is commonly used, very intensive or exclusive dependence on mobile devices remains uncommon. This could be attributed to practical challenges like small screen size, typing difficulty or a preference for blended learning approaches combining traditional and digital methods.

Overall, the findings indicate that gender influences mobile learning behaviour with males showing more consistent, moderate use and females exhibiting a wider range of engagement levels. These differences may stem from varying

technological confidence, learning styles or socio-cultural factors shaping how students integrate mobile devices into their academic routines.

Figure 4.34

Comparison of the level of usage of mobile devices for learning between male and female degree college students of Mizoram

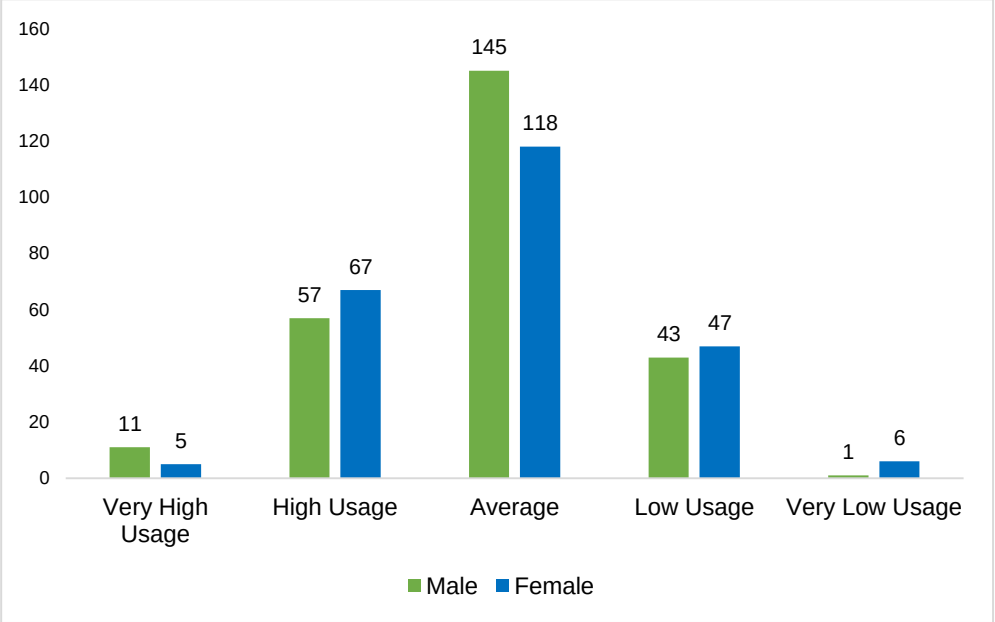


Figure 4.34 shows the comparison of mobile learning usage between male and female students where green bars represent males and blue bars represent females.

Most students fall under the "Average Usage" category with 145 males and 118 females indicating moderate engagement across genders. In the "High Usage" group, 57 males and 67 females are recorded showing slightly higher participation among females.

A small number of students reported "Very High" usage (11 males, 5 females) and "Very Low" usage (1 male, 6 females) indicating that males are more concentrated around average use while females show a wider spread across usage levels. Overall, males maintain moderate engagement whereas females display both higher and lower extremes of mobile learning usage.

Comparison by test of significance

To examine whether male and female degree college students in Mizoram differ in their use of mobile devices for learning, the hypothesis 'There is a significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram' was reformulated into a null hypothesis. The null hypothesis stated that 'There is no significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram.'"

In order to test the null hypothesis, the mean and standard deviation of the two groups were determined individually, a t-test was performed and comparison was made between mean scores of male and female students of Mizoram, the details are presented in the following table 4.41.

Table 4.41

Comparison of the use of mobile devices for learning between male and female degree college students of Mizoram by test of significance

Group	Number of Students	Mean	SD	SED	t-value	Significant Level
Male	257	75.09	9.89	0.93	1.14	Not Significant
Female	243	74.03	10.94			

The data presented in Table 4.41 shows that the obtained t-value of 4.24 exceeds the critical t-values of 1.97 at the 0.05 level and 2.59 at the 0.01 level for 498 degrees of freedom. The results indicate that the use of mobile devices for learning is comparable between male and female students, with no significant difference observed. Therefore, the null hypothesis "There is no significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram" cannot be rejected.

Thus, there is no significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram

4.4.2 A comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to academic stream.

In order to compare the levels of usage of mobile devices for learning among degree college students of Mizoram in relation to academic stream, a comparison table (Table 4.42) was prepared showing the number of respondents from each academic stream at each level of usage. The comparison is also illustrated visually in a bar graph (Figure 4.35). ANOVA was conducted to assess the significance of the difference between the groups.

Comparison based on the level of usage of mobile devices for learning

Table 4.42 shows the comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to academic stream.

Table 4.42

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to academic stream

	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Arts	15 (3.66%)	97 (23.66%)	223 (54.39%)	72 (17.56%)	3 (0.73%)
Science	0	19 (31.67%)	26 (43.33%)	13 (21.67%)	2 (3.33%)
Commerce	1 (3.33%)	8 (26.67%)	14 (46.67%)	5 (16.67%)	2 (3.33%)

The comparison of mobile learning usage across Arts, Science, and Commerce streams shows distinct patterns in student engagement.

Among Arts students, the majority 54.39% (223 students) reported average usage followed by 23.66% (97) with high usage. Only 3.66% (15) showed very high usage while 17.56% (72) reported low and 0.73% (3) very low usage. This indicates

that Arts students use mobile devices moderately, likely due to the reading and writing oriented nature of their coursework.

In the Science stream, most students reported average (43.33%) and high (31.67%) usage with no very high usage. About 21.67% indicated low and 3.33% very low usage. The absence of very high usage suggests that mobile devices are useful but limited for laboratory-based or experimental tasks.

For Commerce students, 46.67% reported average usage, 26.67% high and 3.33% very high. Meanwhile, 16.67% recorded low and 3.33% very low usage. Their moderate engagement may stem from reliance on tools like spreadsheets and software which are better suited to computers.

Overall, average usage dominates across all streams, Arts (54.39%), Science (43.33%) and Commerce (46.67%). Very high usage remains uncommon, while Science students show the greatest share of high usage, reflecting stronger integration of mobile learning into their academic activities.

Figure 4.35

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to academic stream

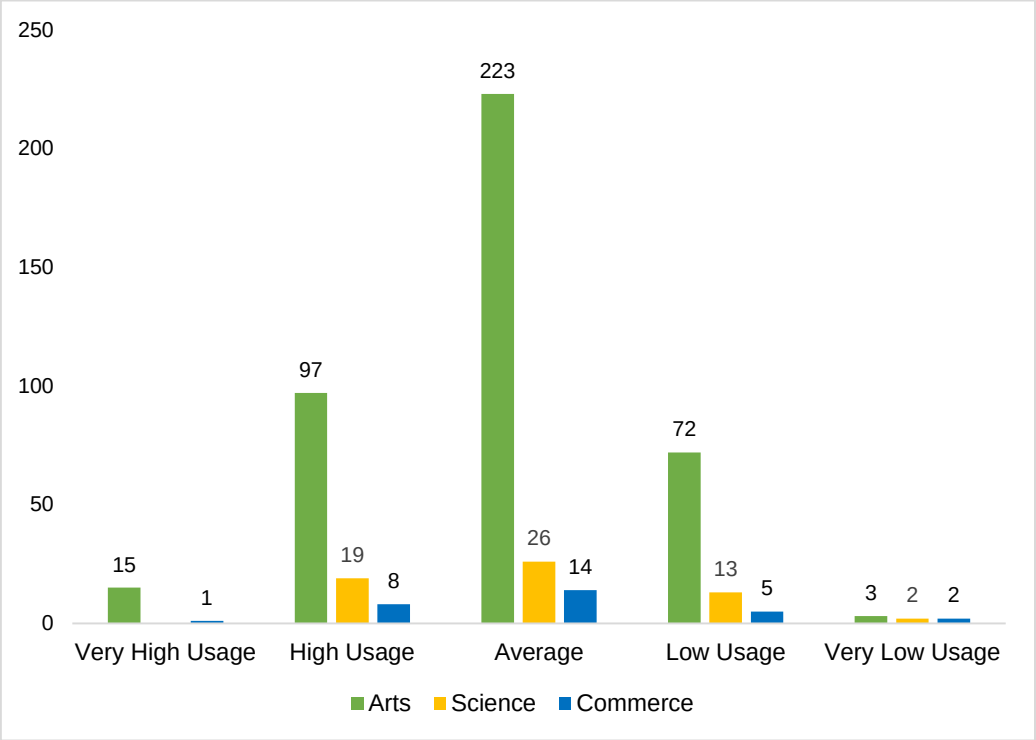


Figure 4.35 compares mobile learning usage among Arts (green), Science (grey), and Commerce (blue) students.

Most Arts students reported average usage (223) followed by high (97) and low (72) usage showing moderate engagement overall. Science students mainly fall under average (26) and high (19) usage with very few reporting very high (1) or very low (5) usage. Commerce students also show a similar trend with average (14) and high (8) usage being most common.

Across all streams, average usage dominates while very high usage remains rare indicating that students use mobile devices for learning moderately rather than intensively.

Comparison by test of significance

For comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams, the hypothesis which stated that 'There is significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams' was converted to a null hypothesis which stated that "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams."

To compare the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams, ANOVA was performed and the results are presented in the following table 4.43.

Table 4.43

Comparison of the use of mobile device for learning among degree college students of Mizoram in relation to academic stream by test of significance

Sources of variance	Degrees of freedom	Sum of the squares	Mean Square	F Ratio
Between Set	(s-1) = 3-1 =2	253.731	126.866	**1.17**
Within set	N-s=500-3=497	53882.531	108.416	

Table 4.43 shows that the computed F-ratio of 1.17 is lower than the critical value of 4.66 at the 0.01 level of significance. Hence, the null hypothesis "There is no significant difference the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams" cannot be rejected.

Hence, there is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams.

4.4.3 A comparison of the use of mobile devices for learning between urban and rural degree college students of Mizoram.

In order to compare the levels of usage of mobile devices for learning between urban and rural degree college students of Mizoram, a comparison table (Table 4.44) was prepared showing the number of respondents from rural and urban at each level of usage. The comparison is also illustrated visually in a bar graph (Figure 4.36). A *t*-test was performed to assess whether the difference between the two groups was statistically significant.

Comparison based on the level of usage of mobile devices for learning

The result of the comparison of the level of usage of mobile devices for learning between urban and rural degree college students of Mizoram is shown in the following table 4.44.

Table 4.44

Comparison of the level of usage of mobile devices for learning between urban and rural degree college students of Mizoram

	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Urban	5 (2.25%)	64 (28.83%)	110 (49.55%)	42 (18.92%)	1 (0.45%)
Rural	11 (3.96%)	60 (21.58%)	153 (55.04%)	48 (17.27%)	6 (2.16%)

The comparison of mobile learning usage between urban and rural students in Mizoram reveals both convergence and contrast shaped by contextual and infrastructural factors. A majority of students in both settings show average usage, 49.55% in urban and 55.04% in rural areas indicating that mobile learning is a common and moderately integrated part of students' study habits. The slightly higher rural percentage shows that usage may be oriented more toward basic academic functions than advanced engagement.

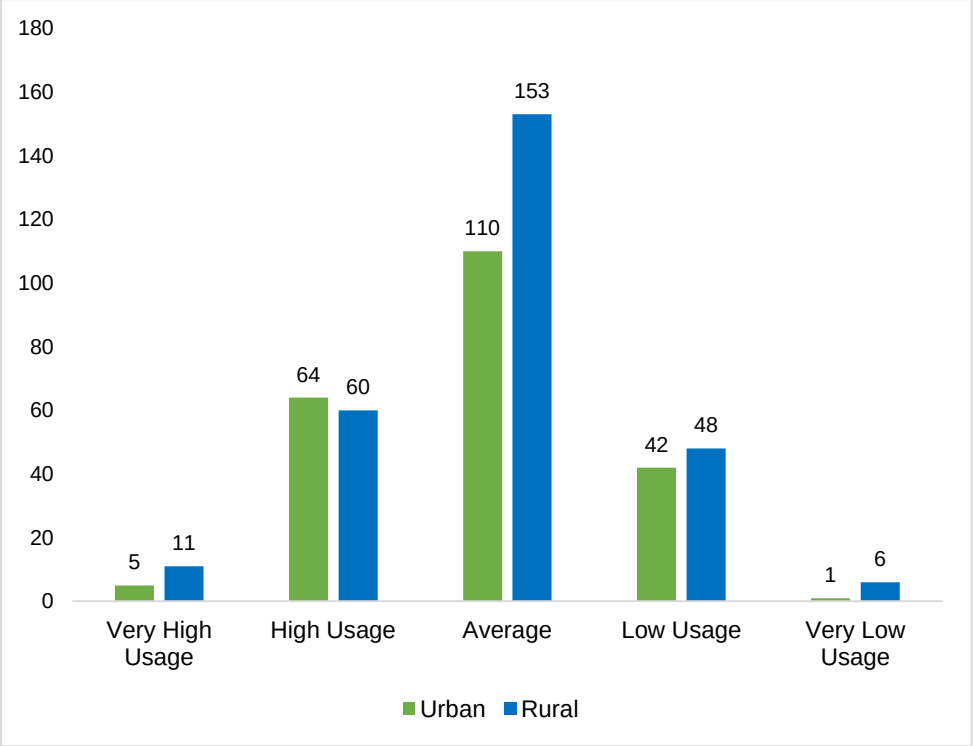
In the high usage category, 28.83% of urban students surpass 21.58% of rural students, which may reflect relatively better access to internet connectivity, modern devices and supportive digital environment in urban areas. Conversely, very high usage is slightly higher in rural areas (3.96%) than urban (2.25%) indicating that a small group of rural learners are making effective use of mobile resources despite certain infrastructural challenges.

Low usage remains similar (urban 18.92%, rural 17.27%), though very low usage is slightly higher in rural areas (2.16%), which may be linked to factors such as connectivity issues, affordability constraints or varying levels of digital familiarity.

Overall, the findings indicate that while mobile learning is widespread in both contexts, urban students engage more intensively whereas rural students show broader but moderate participation.

Figure 4.36

Comparison of the level of usage of mobile devices for learning between urban and rural degree college students of Mizoram



The bar chart from figure 4.36 illustrates the comparison of mobile device usage for learning among degree college students in Mizoram, distinguishing between students from urban and rural areas through colour coding. The green bars represent urban students while the blue bars represent rural students.

As shown in the bar graph, both groups have the largest proportion in the average usage category with 110 urban (green) and 153 rural (blue) students, indicating moderate engagement in mobile learning. In the high usage category, the green bar (64) is slightly taller than the blue bar (60), showing somewhat greater engagement among urban students. Conversely, the blue bar exceeds the green in the very high usage category (11 rural vs. 5 urban) showing a small group of highly active rural learners. For low and very low usage, both colours are close in height, though blue bars are slightly higher, indicating marginally lower engagement in rural areas overall.

Comparison by test of significance

To compare the use of mobile devices for learning between urban and rural degree college students in Mizoram, the hypothesis which stated that 'There is a significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram' was converted into a null hypothesis which stated that, 'There is no significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram.'

In order to test the null hypothesis, the mean and standard deviation of the two groups were determined individually, a t-test was performed and comparison was made between mean scores of rural and urban students of Mizoram, the details are presented in the following table, Table 4.45.

Table 4.45

Comparison of the use of mobile devices for learning between urban and rural degree college students of Mizoram by test of significance

Group	Number of students	Mean	SD	SED	t-value	Significant Level
Rural	278	74.03	10.55	0.29	4.24	0.05
Urban	222	75.26	10.22			

The data depicted in the above table 4.45 reveals that the calculated value of 't' i.e. 4.24 is more than the critical value of 't' with the degrees of freedom (df) 498 i.e. 1.97 at 0.05 and 2.59 at 0.01 level. When it comes to the use of mobile devices for learning, this shows that there is a significant difference between urban and rural degree college students. Therefore, the null hypothesis "There is no significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram." can be rejected.

Thus, there is a significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram.

4.4.4 A comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to family income.

In order to compare the levels of usage of mobile devices for learning among degree college students of Mizoram in relation to family income, a comparison table (Table 4.46) was prepared showing the number of respondents at each level of usage. The comparison is also illustrated visually in a bar graph (Figure 4.37). ANOVA was conducted to assess the significance of the difference between the groups.

Comparison based on the level of usage of mobile devices for learning

The result of the comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to family income is shown in the following table 4.46.

Table 4.46

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to family income

Level of Usage	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Below 1 Lakh	7 (3.8%)	42 (22.83%)	99 (53.8%)	34 (18.48%)	2 (1.09%)
Between 1 to 5 Lakhs	8 (3.32%)	64 (26.56%)	125 (51.87%)	40 (16.6%)	4 (1.66%)
Between 5 to 10 Lakhs	1 (1.64%)	12 (19.67%)	30 (49.18%)	17 (27.87%)	1 (1.64%)
Above 10 Lakhs	0	4 (7.14%)	9 (64.28%)	1 (7.14%)	0

Table 4.46 presents the relationship between family income levels and the extent of mobile device usage for learning among degree college students in Mizoram. The data show several notable patterns. A majority (53.8%) of students from families earning below ₹1 lakh annually report an average level of usage, indicating that while mobile access is common, financial limitations may influence

the extent of engagement. About 22.83% of this group show high usage, indicating that some students make active use of mobile devices despite economic constraints. Meanwhile, around 19.57% fall into low or very low usage, reflecting that affordability and digital access might still pose challenges for a smaller section.

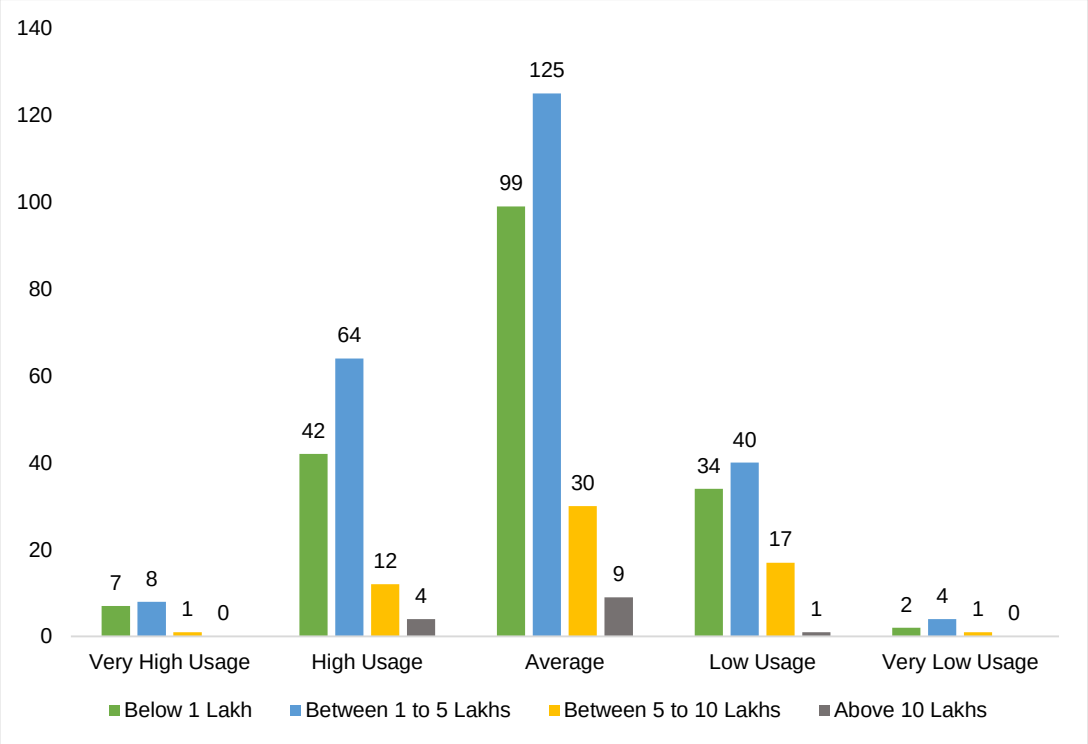
Among students from ₹1–5 lakh income families who form the largest segment of the sample, 51.87% report average usage, a trend similar to the lowest income group. A slightly higher share (26.56%) report high usage, indicating that moderate financial stability may support greater engagement. However, around 18.26% remain in the low and very low usage categories, showing that other factors such as motivation, digital competence or institutional context may also affect usage patterns.

For students from ₹5–10 lakh income families, about 49.18% report average usage, while 27.87% fall under low usage, which is higher than the lower income categories. This pattern shows that higher income does not necessarily lead to increased mobile-based learning. Some students in this group may have access to alternative learning resources, leading to a more balanced or diversified use of technology. The high usage proportion (19.67%) is slightly lower than the preceding group, aligning with this interpretation.

The group with above ₹10 lakh family income is the smallest in the sample. Most of these students (64.28%) report average usage, with small proportions (7.14% each) under high and low usage and no respondents in the very high usage category. This shows that for higher-income students, mobile devices may serve as supplementary rather than primary tools for learning, possibly due to access to more advanced digital technologies or learning environments.

Figure 4.37

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to family income



The bar chart from figure 4.37 depicts the relationship between family income levels and the extent of mobile device usage for learning among degree college students in Mizoram. The green bars represent students from families earning below ₹1 lakh, blue bars indicate ₹1–5 lakhs, yellow bars show ₹5–10 lakhs and grey bars represent above ₹10 lakhs. Most students across all income groups fall under the average usage category led by the blue (125) and green (99) bars. High usage is more frequent among the blue group (64) while very high usage remains minimal in all categories. Low and very low usage are relatively minor indicating that moderate mobile learning engagement is common across income levels.

Comparison by test of significance

For comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to family income, the hypothesis which stated that 'There is significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income' was converted to a null hypothesis which stated that "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income."

To compare the use of mobile devices for learning among degree college students of Mizoram in relation to family income, ANOVA was performed and the results are presented in the following table 4.47.

Table 4.47

Comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to family income by test of significance

Sources of variance	Degrees of freedom	Sum of the squares	Mean Square	F Ratio
Between Set	(S - 1) = 4 - 1 = 3	501.85	167.28	**1.55**
Within set	N – S = 500 – 4 = 496	53634.41	108.13	

Table 4.47 shows that the computed F-ratio of 1.55 falls below the critical value of 4.66 at the 0.01 level of significance. Hence, the null hypothesis "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income" cannot be rejected.

Hence, there is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income.

4.4.5 A comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

In order to compare the levels of usage of mobile devices for learning among degree college students of Mizoram in relation to father's educational background, a comparison table (Table 4.48) was prepared showing the number of respondents at each level of usage. The comparison is also illustrated visually in a bar graph (Figure 4.38). ANOVA was conducted to assess the significance of the difference between the groups.

Comparison based on the level of usage of mobile devices for learning

The result of the comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to father's educational background is shown in the following table 4.48.

Table 4.48

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to father's educational background

Level of Usage	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Below HSLC	6 (2.79%)	50 (23.26%)	111 (51.63%)	46 (21.4%)	2 (0.93%)
HSLC	3 (4%)	21 (28%)	39 (52%)	12 (16%)	0
HSSLC	5 (7.58%)	16 (24.24%)	35 (53.03%)	10 (15.15%)	0
Undergraduate	1 (1.03%)	24 (24.74%)	49 (50.52%)	18 (18.56%)	5 (5.15%)
Master Degree or Above	1 (2.13%)	13 (27.66%)	29 (61.7%)	4 (8.51%)	0

Table 4.48 presents the relationship between father's educational background levels and the extent of mobile device usage for learning among degree college students in Mizoram. The data reveal some patterns, though variations across educational levels are relatively modest.

Students whose fathers have education below HSLC mostly fall under the average usage category (51.63%) with smaller proportions in the very high (2.79%) and very low (0.93%) groups. This shows that while these students engage in mobile learning their usage remains largely moderate. The combined share of average and low users (73.03%) may relate to limited exposure or guidance in technology use at home.

Among students whose fathers have completed HSLC, average usage (52%) continues to dominate followed by a higher share in the high usage group (28%). The absence of very low users indicates a slight improvement in engagement, possibly linked to greater acceptance or understanding of technology among parents.

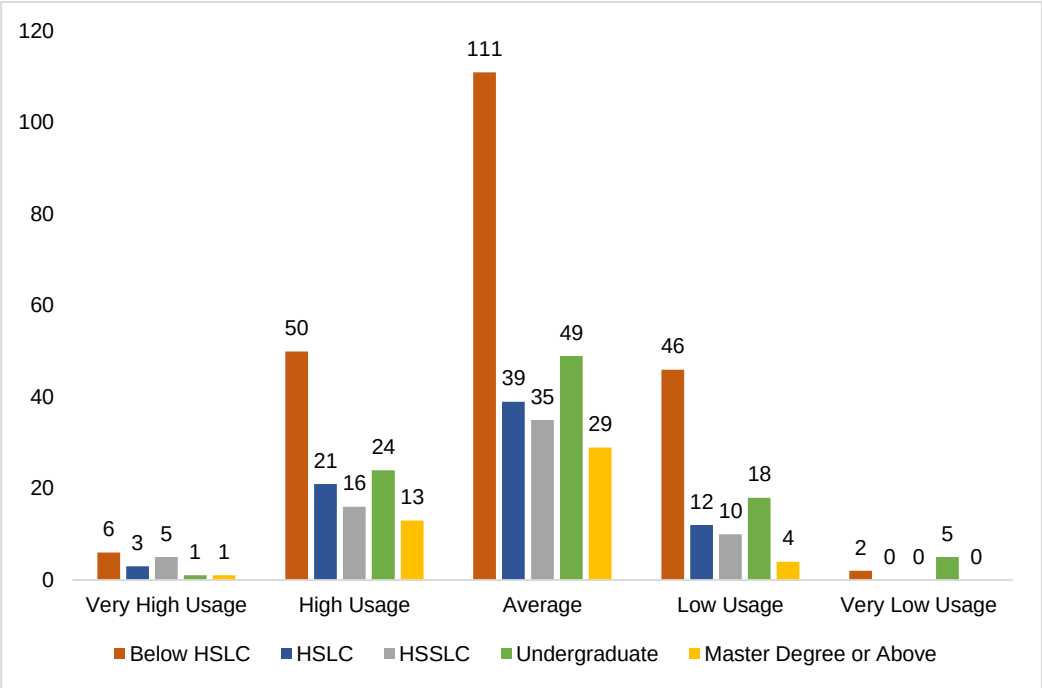
For students whose fathers have HSSLC education, average usage (53.03%) remains prevalent but this group also records the highest proportion of very high users (7.58%), indicating that higher parental education may support more intensive exploration of mobile-based learning.

In the graduate-level category, average usage (50.52%) remains central though there is a noticeable rise in low (18.56%) and very low usage (5.15%). This may reflect a diverse approach where some students depend less on mobile devices, possibly due to the availability of other learning resources at home.

Students whose fathers hold a Master's degree or higher show the highest average usage (61.7%) along with a substantial high usage proportion (27.66%) and very few in low usage (8.51%). This shows that higher parental education may correspond with more consistent and balanced engagement in mobile learning supported by better awareness and encouragement towards productive digital practices.

Figure 4.38

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to father's educational background



The bar chart illustrates the relationship between father's education leve and the extent of mobile device usage for learning among degree college students in Mizoram. The chart uses distinct colours for each category: orange for Below HSLC, blue for HSLC, grey for HSSLC, green for Undergraduate and yellow for Master's Degree or above.

The orange bars (Below HSLC) dominate the average usage category (111 students) indicating that most students from less-educated parental backgrounds use mobile devices moderately. High usage is more evident among students whose fathers completed HSLC (21) and HSSLC (24) while very high usage is minimal across all groups. Students with fathers holding a Master's degree or above (yellow) show higher shares in average and high usage indicating that higher parental education aligns with more consistent, purposeful mobile learning engagement.

Comparison by test of significance

For comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background, the hypothesis which stated that 'There is significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background' was converted to a null hypothesis which stated that "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background."

To compare the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background, ANOVA was performed and the results are presented in the following table 4.49.

Table 4.49

Comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background by test of significance

Sources of variance	Degrees of freedom	Sum of the squares	Mean Square	F Ratio
Between Set	(s-1) = 5-1 =4	1014.62	4	**2.36**
Within set	N-s=500-5=495	53121.64	495	

As reflected in Table 4.49, the obtained F-ratio (2.36) does not exceed the critical value of 4.66 at the 0.01 significance level. Hence, the null hypothesis "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background" cannot be rejected.

Hence, there is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

4.5 Objective No. 5: To find out the relationship between the use of mobile devices for learning and the academic achievement of degree college students of Mizoram.

In order to determine the relationship between students' academic achievement and their level of usage of mobile devices for learning, a Pearson product–moment correlation analysis was performed. Academic achievement was operationalized through the students' semester examination marks while the level of usage of mobile devices for learning was measured using the researcher-developed usage scale. The results indicated a correlation coefficient of $r(498) = 0.064$ which represents a very weak positive relationship between the two variables. This suggests that in general, students who reported higher scores in mobile device use for learning tended to have slightly higher examination marks, however, the association was extremely small in magnitude.

The computed p-value was 0.153 which is greater than the conventional significance threshold of 0.05. This result indicates that the observed correlation is not statistically significant, meaning that the relationship could have arisen by chance within this sample. Consequently, there is insufficient statistical evidence to conclude that higher levels of usage of mobile devices for learning are systematically associated with better academic performance among degree college students in Mizoram.

Overall, the analysis shows that while a minimal positive trend exists, the relationship between the level of usage of mobile devices for learning and examination performance is negligible and other factors may be more influential in determining students' achievement.

4.6 To identify the types of mobile devices used and the extent of their usage among degree college students in Mizoram.

To determine the types and level of mobile device usage for learning among degree college students in Mizoram, a *mobile device use for learning scale* was administered to 500 students to collect data for the study. The results were shown in detailed manner as follows.

4.6.1 The types of mobile devices used for learning by degree college students of Mizoram.

To find out the types of mobile devices degree college students in Mizoram use for learning, students were asked to indicate which mobile devices they commonly used for academic learning purposes. The following table 4.50. shows the types of mobile devices used by degree college students for learning.

Table 4.50

Types of mobile devices used for learning by degree college students of Mizoram

Types of Mobile Devices Used	No. of Students
Smartphone	447 (89.4%)
Smartphone, Laptop	40 (8%)
Smartphone, Tablet/iPAD	7 (1.4%)
Smartphone, Tablet/iPAD, Laptop	4 (0.8%)
Smartphone, Tablet/iPAD, Laptop, PDA	2 (0.4%)

The above table reveals that the majority of students specifically 447 out of 500, used only smartphones for their learning purposes. This accounts for 89.4% of the total respondents, indicating that smartphones are the most commonly used mobile learning device among undergraduate students.

A smaller group of 40 students comprising 8% of the total sample reported using both smartphones and laptops. This shows a moderate level of diversity in device usage among some learners. Additionally, 7 students (1.4%) used smartphones

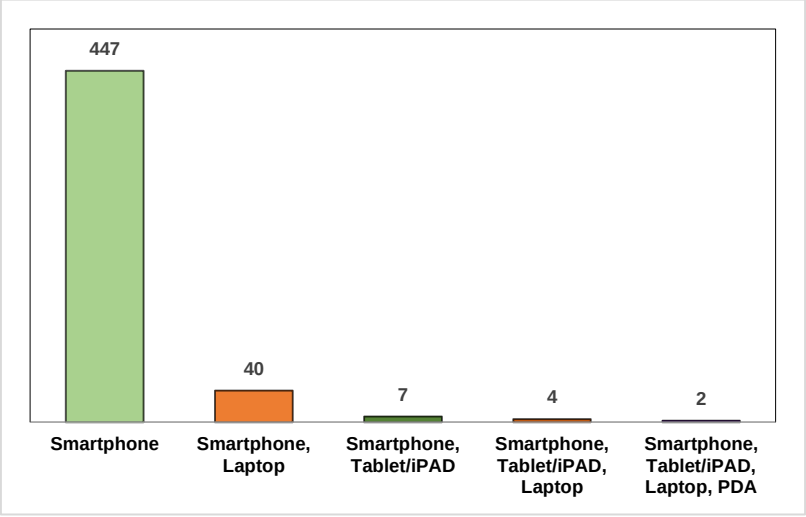
along with tablets or iPads while 4 students (0.8%) indicate the use of smartphone, tablet/iPad and laptop together for learning activities.

Only 2 students making up a mere 0.4% of the total reported using all four devices smartphone, tablet/iPad, laptop and PDA. This indicates that PDAs are nearly obsolete in the context of current mobile learning practices among undergraduate students.

Overall, the findings show that smartphones are the predominant device used for learning with relatively few students using a combination of other mobile devices.

Figure 4.39

Types of mobile devices used for learning by degree college students of Mizoram



The bar chart from figure 4.49 presents the types of mobile devices used for learning among degree college students in Mizoram. The light green bar represents students using smartphones only, which forms the overwhelming majority with 447 students. The orange bar, representing those who use both smartphones and laptops follows distantly with 40 students. Smaller groups combine multiple devices: smartphone and tablet/iPad (7), smartphone, tablet/iPad, and laptop (4), and a very small number using smartphone, tablet/iPad, laptop, and PDA (2).

Overall, the figure clearly shows that smartphones are the primary learning tool for most students while the use of multiple digital devices remains limited, possibly reflecting accessibility and affordability factors in the student population.

4.6.2 The extent of use of mobile devices for learning by degree college students of Mizoram.

To assess the daily engagement with mobile learning, students reported the number of hours they typically spend on academic learning using mobile devices on a daily basis. The findings are presented in the table below.

Table 4.51

Extent of use of mobile devices for learning by degree college students of Mizoram on a daily basis.

Extent of use of Mobile Devices for Learning	No. of Students
1 Hour	140 (28%)
1 to 2 Hours	171 (34.2%)
2 to 3 Hours	104 (20.8%)
3 to 4 Hours	54 (10.8%)
4 to 5 Hours	16 (3.2%)
More than 5 Hours	15 (3%)

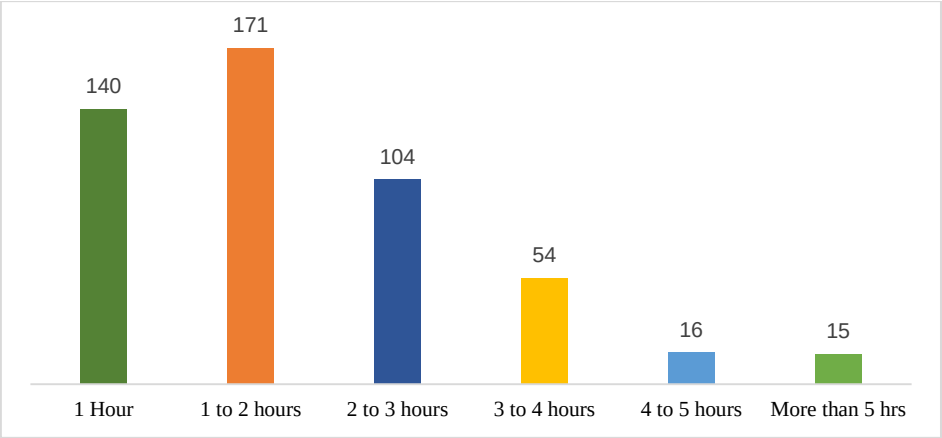
Out of the 500 respondents, 140 students (28%) report using mobile devices for learning for about one hour daily. The largest group, comprising 171 students (34.2%), use them for one to two hours per day making this the most common duration among respondents. Additionally, 104 students (20.8%) spend two to three hours while 54 students (10.8%) use mobile devices for three to four hours each day.

A smaller number, 16 students (3.2%) use them for four to five hours and only 15 students (3%) report more than five hours of daily use.

Overall, the findings show that most students (63%) engage with mobile devices for one to two hours daily indicating a moderate level of usage while extended use beyond four hours remains relatively uncommon

Figure 4.40

Extent of use of mobile devices for learning by degree college students of Mizoram on a daily basis.



The bar chart from figure 4.40 illustrates the daily duration of mobile device usage for learning among degree college students in Mizoram. The green bar represents students who use mobile devices for 1 hour (140 students), while the orange bar shows the largest group, 171 students who spend 1 to 2 hours daily making it the most common duration. The blue bar indicates 104 students using devices for 2 to 3 hours and the yellow bar shows 54 students for 3 to 4 hours. Smaller groups include 16 students (light blue bar) using them for 4 to 5 hours and 15 students (light green bar) for more than 5 hours. Overall, the chart indicates that most students spend between 1 to 2 hours daily on mobile learning reflecting moderate usage patterns.

4.7 Objective No. 7: To investigate the factors contributing to disparities in mobile device usage for learning among degree college students in Mizoram.

To investigate the causes for the disparities in the use of mobile devices for learning of degree college students of Mizoram an interview was conducted with thirty-six (36) students from different colleges. This investigates the factors contributing to disparities in the use of mobile devices for learning among degree college students. The findings are presented below.

4.7.1 Device and Internet Access

All students owned mobile devices, but disparities in and storage capacity limited some students' ability to access or store learning resources. Paid content restrictions also reduced access to certain educational materials.

While some students reported good connectivity, others expressed difficulties. Student 1 noted, *""The quality of connectivity in our area remains unsatisfactory, affecting overall access and usage,"* and another student stated, *"The internet connectivity in my locality is unreliable and remains a major constraint."* These responses highlight regional disparities in internet quality, which can result in unequal learning opportunities. Students in urban centers like Aizawl experienced fewer connectivity issues, while those in smaller towns or villages reported challenges in maintaining stable access.

4.7.2 Skills and Confidence

In terms of digital skills, most students expressed confidence in using mobile devices for academic purposes. They reported using them for reading, watching videos and assignments with ease. However, a few students mentioned barriers related to skills and technical handling. One student admitted, *"Except for some limitations in technical skills, I do not encounter any other issues."*

This suggests that while the majority are digitally competent, there remains a minority of learners who require digital literacy support. Without addressing this gap, some students may not fully benefit from mobile-based curriculum delivery.

4.7.3 Learning Context

Students reported using mobile devices both inside and outside classroom contexts, with strong emphasis on supplementary learning, assignments, and exam preparation. For instance, students reported using mobile learning to summarize lengthy answers, which enhanced their retention of information. In addition, they indicated that mobile learning was highly beneficial during their studies, particularly in completing assignments.

Mobile learning provided flexibility, enabling students to study at their own pace and revisit difficult concepts. However, many highlighted that mobile learning cannot entirely replace traditional face-to-face methods. As one Student remarked, *"Mobile learning is not necessarily more effective than traditional learning, but it provides significant support in my studies"*. This reflects a blended-learning preference, where students value mobile learning as a support mechanism rather than the primary mode of instruction.

4.7.4 Usage and Challenges

A strong theme across responses was the positive contribution of mobile learning to language development, particularly English. Students frequently mentioned its role in vocabulary building, translation, and supplementary reading. For example, one student shared, *"It assisted me in completing assignments, searching for translations and for conducting supplementary reading."*

However, not all students found mobile learning equally beneficial for language. One student admitted, *"I find it hard to concentrate due to small screen size,"* and another student reported, *"No, It does not help me"* when asked if it helped in language development. These exceptions indicate that while mobile learning generally enhances language learning access, screen size, content quality and individual learning styles influence outcomes.

4.7.5 Language and Content Accessibility

Many students improved their language skills through mobile learning, using translation tools and supplementary reading. However, comprehension issues and paywalled resources limited access for some.

Many students found that mobile learning improved their language skills, particularly when using videos, translation tools and supplementary reading materials. Few students specifically used mobile devices to access translations and improve understanding of content. However, content accessibility was not equal for all. Some students had trouble fully understanding some materials without help from other sources. For example, one of the students said they had trouble getting to resources since they couldn't pay for them, which limited their access to useful information. While the majority benefited linguistically from mobile learning, a minority experienced barriers that reduced the inclusivity of the available content.

4.7.6 Perceptions and Inclusivity

Overall, students perceived mobile learning as flexible, supportive, and effective in complementing traditional education. As one student noted, *"As for me I find it useful for doing my assignment."* Similarly, another student emphasized, *"I used to make some notes and watch videos for some complex concepts."*

Nevertheless, inclusivity issues arise when considering distractions and unequal access. Distractions were widely reported, with students rating them between 3/10 to 7.5/10. For instance, one student shared, *""I get distracted by social media and I would rate the distraction at 7.5 on a 10-point scale."* while another student noted, *""I experience a distraction level of 7/10, primarily due to gaming and online shopping."* This indicates that while most students can adapt others may struggle to balance learning with entertainment, leading to uneven outcomes.

Inclusivity is further challenged by infrastructural issues. Students from rural or semi-urban areas face greater connectivity and device storage challenges, which can put them at a disadvantage compared to peers in urban areas. Despite this, the

majority acknowledged the value of mobile learning, suggesting that with infrastructural support, it has strong potential to make education more inclusive.

4.8 Objective No.8: To examine the suitability of Mizoram University Curriculum for supporting mobile learning.

The suitability of the Mizoram University curriculum for mobile learning was examined exclusively through faculty interviews. Faculty members were selected as respondents because they possess in-depth knowledge of the curriculum structure, course content and teaching practices within their respective disciplines. Given the limited time available for the study, expert interviews offered an efficient and focused means of identifying curriculum components that could be effectively adapted to mobile learning. This approach provided direct, experience-based insights while avoiding the more time-intensive process of conducting a full document analysis.

An interview schedule was conducted with twenty-six (26) faculty members from various colleges affiliated to Mizoram University. Faculty members represented the Arts, Science and Commerce streams providing diverse perspectives on subject-specific applicability, available resources and pedagogical practices. Their responses reveal varying degrees of suitability, shaped by the nature of the subject, the type of learning outcomes and the availability of relevant digital resources.

This study assesses how well the existing curriculum supports mobile learning, identifies subject-specific potentials and challenges and explores the feasibility of mobile-based assessment and instruction. The findings are presented below:

4.8.1 Overall Curriculum Suitability for Mobile Learning

1) Across all disciplines, teachers acknowledged that a significant portion of learning objectives can be achieved via mobile platforms.

2) While mobile learning can deliver a substantial amount of the curriculum content, teachers emphasized its role as a supplementary rather than a complete replacement for face-to-face instruction.

3) A recurring theme was reliance on printed books as the primary learning source, particularly in disciplines with limited digital resources.

4.8.2 Subject-wise Analysis

1) *Arts Stream*

- Subjects like Political Science, History, Sociology, Education, Public Administration and English can integrate interactive tools such as -discussion forums for debates, virtual tours for History, interactive policy simulations for Public Administration and e-reading and annotation tools for English.
- Mizo language faces severe digital content scarcity; only about 10% of its curriculum can be supported by mobile learning. Teachers often have to create and distribute their own PDF resources.
- In most Arts subjects, 60–80% of assignments (short essays, quizzes, source analyses) can be completed on mobile devices. Long research papers and extensive field-based work still require traditional methods.

2) Science Stream

- Science subjects like Zoology, Botany, Biotechnology, Physics, Chemistry, Biochemistry, Mathematics, Home Science benefit from virtual labs for practical experiments, simulation apps for visualizing molecular, physical and biological processes and data analysis tools for statistical and experimental work.
- Hands-on experiments, specimen handling and field measurements cannot be fully replicated on mobile devices.
- Approximately 70–85% of theoretical and analytical tasks can be managed through mobile devices.

3) Commerce Stream

- Commerce courses can effectively use simulation-based accounting software, case study apps for legal and management analysis, collaborative platforms for group projects and tax calculation tools for applied exercises.
- Most assignments like problem-solving, financial analysis, report writing and presentations can be completed via mobile devices except for certain high-complexity tasks needing extended in-person collaboration.

4.8.3 Pedagogical Benefits

From the teachers' perspectives, the Mizoram University curriculum can harness mobile learning in several ways:

1) Almost all subjects encourage independent study components, which align well with mobile access to e-books, videos and tutorials.
2) Multimedia content like videos, quizzes and simulations can make abstract concepts more tangible.
3) Messaging apps, discussion boards and cloud-based tools allow for seamless peer-to-peer and teacher-student interaction.
4) Mobile learning opens access to global knowledge repositories and specialized apps for subject-specific learning.

4.8.4 Challenges and Limitations

1) Especially acute in Mizo language and other region-specific subjects with limited online material.
2) Science and vocational courses cannot replicate all lab or field experiences virtually.
3) While quizzes and short assignments are feasible, longer research tasks are cumbersome to produce on mobile.

4.8.5 Assessment Feasibility

Table 4.52

Stream-wise Feasibility of Mobile Learning in Mizoram University Curriculum

Stream	Estimated Mobile Feasibility	Examples of Feasible Tasks	Examples of Non-Feasible Tasks
Arts	60 – 80%	Quizzes, essays, document analysis, short research	Extensive fieldwork, long papers requiring multiple citations
Science	70 – 85%	Virtual labs, simulations, data analysis	Physical experiments, specimen handling
Commerce	75 – 90 %	Simulations, case studies, accounting exercises, reports	Large-scale collaborative audits or in-person presentations

The analysis indicates that the Mizoram University curriculum has a moderately high compatibility with mobile learning. Most subjects, particularly in Commerce and parts of Science can deliver the majority of their learning objectives through mobile platforms. Arts subjects also show strong potential with the exception of resource-limited disciplines like Mizo language.

Mobile learning can significantly enhance flexibility, accessibility and interactivity, making it especially valuable in geographically challenging regions like Mizoram. However, full-scale adoption requires bridging digital resource gaps and maintaining hybrid models for practical work.

CHAPTER V

MAJOR FINDINGS AND DISCUSSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER STUDIES

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CHAPTER V

MAJOR FINDINGS AND DISCUSSIONS, RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER STUDIES

The present chapter deals with the major findings of the study and the discussions in relation with the findings. This chapter also includes recommendations based on the findings and suggest areas for further research.

5.1 MAJOR FINDINGS AND DISCUSSION

The major findings of the present study are as follows:

5.1.1 Objective No.1: To investigate the opinion of degree college students in Mizoram regarding mobile learning

1) *Findings on opinion of degree college students on distraction and concentration during mobile learning activities*: A little over half of the respondents 276 (55.2%) agreed that mobile learning affects their ability to concentrate. Among rural students, 161 (57.91%) students reported slightly higher distraction levels than urban students (51.80%). Commerce students were the least likely (46.67%) to perceive distraction whereas Arts students were the most affected (56.59%).

2) A large majority of the respondents (74.80%) believed that mobile learning enhances their theoretical understanding with minimal differences between gender, locality and various academic streams. Among which, commerce students exhibited the highest level of agreement (76.67%).

3) Slightly more than half of the respondents (53%) agreed that mobile learning decreases the value of classroom instruction with stronger agreement among Arts students (54.39%) and urban students (55.41%). Commerce students were least likely to agree (40%).

4) 70% of students reported that mobile learning increases their academic success rate. Commerce students showed exceptionally high agreement (93.33%) followed by Science (71.67%) and Arts (68.54%).

5) Most students in different streams (78.40%) believed mobile learning usage will grow in the near future with Commerce students showing the highest optimism (86.67%).

6) Among the students, around 58.8% agreed that mobile learning is as effective as traditional learning. Science students (70%) were the most supportive suggesting compatibility between mobile learning and practical/scientific resources.

7) Among the students, 69.4% of respondents found mobile learning motivating with female students (71.19%) and Science students (73.33%) reporting higher motivational impact.

8) Despite positive perceptions overall, a majority (62.8%) opposed teachers integrating mobile learning directly into classroom sessions, indicating preference for its use outside formal lectures.

Discussion with respect to the opinion of degree college students in Mizoram on mobile learning:

The findings indicated that mobile learning is widely acknowledged by students as a beneficial educational tool particularly for enhancing theoretical learning, improving academic performance and motivating learners. These results align with the views of Kukulska-Hulme et al. (2009), who highlighted that mobile devices provide flexibility, enabling learning "anytime, anywhere" and fostering deeper engagement with content.

However, the perceived distraction (55.2%) echoes Wood et al. (2012), who found that while mobile devices expand learning opportunities, they also pose risks of cognitive overload and task-switching which may impair concentration. Rural students' slightly higher distraction rates may stem from less structured learning environments or network instability causing disruptions (Ally & Prieto-Blázquez, 2014).

The strong agreement (74.80%) on mobile learning enhancing theoretical understanding supports Traxler's (2009) argument that mobile technology promotes access to diverse learning resources catering to different cognitive preferences. High acceptance among Commerce students showed that fields with data-heavy, text-based content may integrate more easily with mobile platforms compared to lab-intensive disciplines like Science.

Interestingly, while most students valued mobile learning, over half (53%) believed it diminishes classroom instruction value. This reflects earlier findings by Thomas et al. (2014), who argued that technology should complement rather than replace face-to-face pedagogy. Students' resistance to integrating mobile learning into classroom time (62.8% opposed) further supports the notion that they prefer traditional lecture structures while using mobile learning for supplementary purposes.

The study revealed that mobile learning boosts academic success (70.4%) aligns with studies done by Sung, Chang & Liu (2016) which reported improved performance through mobile-assisted learning interventions. The overwhelming optimism (78.4%) about future growth of mobile learning reflects the global trend toward blended and online education as documented by UNESCO (2020).

However, the moderate agreement (58.8%) on mobile learning being as effective as traditional learning indicates that many students still see limitations, possibly due to device constraints, lack of face-to-face interaction or inconsistent digital literacy (Gikas & Grant, 2013).

Overall, the results indicated that mobile learning is not only an accepted educational approach in Mizoram but also a growing complement to traditional education. Yet, challenges such as distraction, skepticism about classroom integration and ensuring equitable access remain critical areas for policy and practice.

5.1.2 Objective No.2: To construct and standardize a mobile device use for learning scale.

The objective of this phase of the study was to construct and standardize a Mobile Device Use for Learning Scale considering the socio-cultural, educational and regional aspects of degree college students in Mizoram. The process followed systematic scale construction procedures:

1) Item Development and Validation:
    a. An initial item pool of 40 statements was created from literature review and expert consultations.
    b. After expert validation, 19 items were removed and 21 items were retained for the first trial.
2) First and Second Try-outs:
    a. The first try-out with 20 undergraduate students ensured clarity and comprehension.
    b. The second try-out with 130 students allowed for item discrimination using the upper 27% – lower 27% method and t-tests. All 21 items showed t-values above 2.64, significant at the 0.01 level confirming strong discriminatory power.
3) Reliability Testing:
    a. Test-retest reliability with a two-week interval yielded a correlation coefficient of 0.756 ($p < .01$).
    b. Split-half reliability produced a coefficient of 0.764 ($p < .01$). Both results indicated a high degree of consistency.
4) Scoring & Norms:
    a. The final scale, a five-point Likert format, assigned higher scores to more positive usage patterns.
    b. The maximum score is 105 and the minimum score is 21.
    c. Based on administration to 500 students ($M = 74.574$, $SD = 10.416$), z-score norms and raw score ranges were developed, categorizing usage into five levels: Very High, High, Average, , Low and Very Low Usage.

5) Standardization Outcome:

The scale is both reliable and valid for assessing the extent and nature of mobile device use for learning among degree college students.

5.1.3 Objective No. 3: To assess the extent of mobile device usage for learning among degree college students in Mizoram

The study on the level of usage of mobile devices for learning among degree college students of Mizoram reveals a clear pattern.

1) The majority of students, 263 (52.6%) reported an average level of usage indicating that mobile devices are moderately integrated into their academic activities.
2) A substantial proportion of 124 (24.8%) indicated a high level of usage.
3) A small segment of 16 (3.2%) fell into the very high usage category.
4) 90 (18%) students reported a low level of usage.
5) 7 (1.4%) students showed very low usage.

These findings showed that while mobile learning is gaining ground among students, its integration is still uneven with most learners engaging at a moderate rather than intensive level.

***Discussion with respect to the level of mobile device usage for learning among degree college students in Mizoram*:**

The predominance of average usage levels indicated that while students are aware of the usefulness of mobile devices they may not be maximizing their potential for academic purposes. One possible reason could be that many students use mobile devices primarily for basic functions such as note-taking, communication or accessing study materials but not for advanced academic tasks. This aligns with Kukulska-Hulme et al. (2009) who argued that mobile technologies are often underutilized for deeper learning due to lack of guidance and limited integration into teaching practices.

The presence of nearly one-fourth of students reporting high usage showed that mobile learning is gradually gaining acceptance. Possible reasons may

include increased availability of affordable smartphones, better internet connectivity in urban areas and rising familiarity with online educational platforms. This is supported by Sharples et al. (2014) who observed that mobile devices expand opportunities for learning beyond the classroom especially when students are motivated and supported with resources.

On the other hand, the very small number of students i.e., 16 (3.2%) with very high usage highlighted that only a minority of students are highly dependent on mobile learning. This could be due to individual interest, greater digital skills or access to high-speed internet and advanced apps. However, for the majority, structural barriers such as unstable internet connectivity, high data costs or lack of institutional encouragement limit their full engagement, as emphasized by Gikas and Grant (2013) in their study on mobile learning challenges.

The findings that 90 (18%) students reported low usage and 7 (1.4%) students very low usage can be explained by several factors. Students from rural and remote areas of Mizoram often face poor network connectivity making mobile learning less practical. Additionally, some learners may still prefer traditional methods of studying or may lack confidence and skills to use mobile applications for academic purposes. Park (2011) noted that contextual barriers such as infrastructure and institutional support strongly influence the uptake of mobile learning which could explain the disparities observed here.

Overall, the findings indicated that mobile learning among Mizoram's degree college students is still in a transitional stage; widely recognized but not fully embraced. To move beyond average usage levels, students would need better digital infrastructure, institutional training programs and awareness about effective academic uses of mobile devices as also recommended in prior studies (Traxler, 2010; Gikas & Grant, 2013).

5.1.4 Objective No. 4: To compare the use of mobile devices for learning by degree college students of Mizoram in relation to gender, academic streams, locale, family income and father's educational background

1) There is no significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram.

2) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams.

3) There exists a significant difference in the use of mobile devices for learning between rural and urban degree college students.

4) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income.

5) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

Discussion with respect to comparison of the use of mobile devices for learning by degree college students of Mizoram in relation to gender, academic streams, locale, family income and father's educational background:

The findings highlighted that demographic factors such as gender, academic stream, family income and father's educational background do not significantly affect the use of mobile devices for learning. This showed that mobile learning has become an accessible and normalized practice across different groups of students in Mizoram.

The absence of gender differences aligns with previous studies (Alrasheedi & Capretz, 2015) which indicated that mobile learning has become gender-neutral as both male and female students have equal access to digital technologies. This could be due to the widespread use of smartphones and the internet among youth irrespective of gender.

Similarly, the lack of difference across academic streams indicated that mobile devices serve as versatile tools for all fields of study. Park (2011) noted that mobile learning can be applied across disciplines and in Mizoram, students from Arts, Science and Commerce may equally depend on devices for accessing notes, e-books and online materials.

The only significant factor was locale where students from urban settings were found to use mobile devices for learning more than students from rural settings. This finding supports the argument of Kukulska-Hulme et al. (2021) that students from rural area face a digital divide due to poor connectivity and limited access to ICT infrastructure. In Mizoram, urban areas have better internet penetration and affordability enabling students to engage more actively in mobile-based learning.

Regarding family income, the results revealed no significant difference which may be attributed to the affordability of smartphones and cheaper internet data plans in India. Traxler (2018) also highlighted that the declining cost of mobile devices has reduced the economic gap in digital access. This showed that mobile learning is no longer restricted to higher-income groups.

Lastly, father's educational background did not have a significant influence on mobile learning practices. This is consistent with Thomas et al. (2013) who noted that parental background plays a lesser role compared to peer influence, institutional support and individual motivation in adopting digital learning. The finding showed that students' engagement with mobile learning is driven more by personal and social factors than parental educational status.

Overall, the results pointed towards the growing democratization of mobile learning with locale (rural–urban differences) being the only remaining barrier. This echoed the observations of Valk, Rashid and Elder (2010) who argued that mobile learning is a powerful equalizer in education but infrastructural challenges in rural areas continue to limit its full potential.

5.1.5 Objective No.5: To find out the relationship between the use of mobile devices for learning and the academic achievement of degree college students of Mizoram.

The study sought to explore the relationship between the level of usage of mobile devices for learning and the academic achievement of degree college students in Mizoram. The statistical analysis using Pearson's product–moment correlation revealed a correlation coefficient of $r(498) = 0.064$, indicating a very weak positive relationship between the two variables. This means that students who reported higher scores in mobile device usage for learning tended to have slightly higher examination marks. However, the association was extremely small in magnitude and lacked practical significance. The p-value of 0.153 exceeded the conventional significance threshold of 0.05, confirming that the correlation was not statistically significant. Therefore, there is insufficient evidence to assert that higher usage of mobile devices for learning is systematically linked to improve academic performance in this context. This indicated that other factors beyond mobile device usage are likely to play a more prominent role in determining students' academic achievement.

Discussion with respect to the relationship between the use of mobile devices for learning and the academic achievement of degree college students of Mizoram:

The minimal and statistically insignificant correlation between mobile device usage and academic achievement found in this study echoed the inconclusive results reported in previous research. While some studies highlighted that mobile learning can enhance academic outcomes by increasing flexibility, accessibility and learner autonomy (Kukulska-Hulme, 2020; Al-Emran, Mezhuyev, & Kamaludin, 2018) others have cautioned that the benefits are not guaranteed without proper pedagogical integration (Traxler, 2016). The current results aligned more closely with findings from Junco (2012) and Lepp, Barkley & Karpinski (2015) which revealed that high mobile device use does not necessarily translate into higher academic achievement particularly when a substantial portion of usage is devoted to non-academic activities.

A key consideration is that mobile device usage in itself is a broad measure that does not differentiate between purposeful educational use and recreational or social use. Crompton and Burke (2018) emphasised that the positive learning potential of mobile devices is realised only when they are used in ways that support active, collaborative and inquiry-based learning. In the absence of structured learning strategies and curriculum alignment, students may use mobile devices in ways that fragment attention, leading to reduced academic focus.

In the context of Mizoram, additional factors may further dilute the potential academic benefits of mobile learning. Internet infrastructure in parts of the state is still developing which can limit seamless access to educational resources (Lalthlamuana, 2021). Furthermore, disparities in digital literacy, as noted by UNESCO (2020) can affect how effectively students are able to harness mobile technologies for learning purposes. Students who lack training in identifying credible online resources or in managing digital distractions may experience little academic gain from increased device usage.

Another possible explanation for the weak relationship is that academic achievement is influenced by a range of socio-cultural, institutional and personal factors such as teaching quality, learning resources, parental support and students' study habits (Ortiz-de-Villate et al., 2021; Javornik and Glavak-Tkalic, 2023). In such settings, mobile learning acts more as a supplementary tool than a primary driver of academic performance. This aligned with the Technology Acceptance Model (TAM) framework which suggests that perceived usefulness and ease of use must translate into behavioural intention and actual productive usage for tangible outcomes to occur (Davis, 1989; Teo, 2011).

The findings implied that to harness the benefits of mobile learning in Mizoram, interventions should focus not merely on encouraging mobile device usage but on fostering pedagogically guided, curriculum-aligned and digitally literate usage patterns. Teacher training programs, curriculum design that incorporates mobile-

based tasks and student workshops on effective mobile learning strategies may help convert device usage into measurable academic gains.

5.1.6 Objective No.6: To identify the types of mobile devices used and the extent of their usage among degree college students in Mizoram

The study found that smartphones are by far the most dominant mobile learning device among degree college students in Mizoram with 447 out of 500 respondents (89.4%) reporting exclusive use of smartphones for academic purposes. A smaller segment of students (8%) reported using smartphones alongside laptops and only a handful incorporated tablets/iPads into their learning toolkit. The combination of smartphone, tablet/iPad, laptop and PDA use was reported by just 0.4% of the students, underscoring the near obsolescence of PDAs in contemporary academic contexts.

In terms of daily usage, 34.2% of students reported spending between 1–2 hours on mobile learning followed by 28% who dedicated just 1 hour. Around 20.8% used mobile devices for 2–3 hours while longer durations 3 – 4 hours (10.8%), 4 – 5 hours (3.2%) and more than 5 hours (3%) were relatively uncommon. The data indicated a moderate engagement level with the majority (63%) using mobile devices for learning for less than two hours daily.

Discussion with respect to identifying the types of mobile devices used and the extent of their usage among degree college students in Mizoram:

The overwhelming reliance on smartphones mirrors findings from other parts of India and globally where smartphones are recognized as the most accessible and versatile device for learning (Kukulska-Hulme, 2012; UNESCO, 2023). In the Indian context, the widespread penetration of affordable Android smartphones coupled with competitive data pricing has made them the primary medium for digital access (Telecom Regulatory Authority of India [TRAI], 2023; Medianama, 2023). Studies have reported similar patterns in Indian higher education where students favor smartphones over laptops and tablets due to affordability and ease of use (Yadav, 2019; Nayak et al., 2022; Basu et al., 2020; Kumar & Pande, 2023).

The negligible use of PDAs and low adoption of tablets reflects both market shifts and user preferences. While tablets offer larger screen space for reading and educational content, their relatively high cost has been identified as a barrier to adoption in low-income contexts (Raihan, 2025). Empirical studies in the Indian education system suggest that affordability is a key element: low-cost tablets (LCTs) like the Aakash were adopted partly because they were designed specifically to be inexpensive, but even then, cost remains a major concern when compared to more ubiquitous devices. Furthermore, in resource-limited contexts such as Mizoram, economic constraints are particularly significant. According to the Mizoram Economic Survey, the per capita income for 2021–22 was ₹ 1,75,896 (Mizoram Planning Department, 2023) .Given this relatively low income level, the financial burden of purchasing tablets especially when laptops or smartphones might provide more value per rupee is likely a strong factor when it comes to device choice. Beyond hardware costs, recurring cost considerations (e.g., maintenance, replacements) further limit adoption in such settings (Education Commission, 2021).

The moderate usage duration (mostly under 2 hours per day) showed that while mobile devices are integrated into students' academic routines, they may not yet be used to their full pedagogical potential. This aligns with Mtebe and Raisamo's (2014) findings that adoption of digital resources (such as OER) in higher education in is constrained suggesting that mobile-enabled learning often remains marginal rather than central.

Several factors may explain the limited duration:

1) Infrastructure constraints – Limited internet speed, unstable connectivity and affordability barriers remain significant in parts of Mizoram, reflecting infrastructural and topographical challenges in the Northeast (Guha, 2025).

2) Curricular integration gaps – Many Indian higher education curricula, despite the National Education Policy 2020's emphasis on digital and blended learning, continue to rely heavily on face-to-face instruction and traditional printed materials, while mobile and online technologies are more often used for supplemental communication or light content access rather than as a fully

structured core of teaching (Ministry of Education, 2020; Kasinathan, 2022; Mondal et al., 2023).

3) Device limitations. The physical constraints of smartphones, particularly their small screen size, pose challenges for sustained academic engagement. As Traxler (2016) observes, such limitations can impede students' ability to undertake extended reading or manage cognitively demanding tasks. This suggests that while smartphones are convenient for quick access to information, their design may reduce the depth and quality of learning activities in higher education contexts that require detailed analysis and prolonged study.

The findings have direct relevance to the National Education Policy (NEP) 2020 which emphasizes leveraging technology to promote inclusive and flexible learning environments. NEP 2020 advocates for the integration of digital platforms, mobile learning and open educational resources (OERs) to enhance access and equity in higher education (Ministry of Education, 2020). In the context of Mizoram where higher education institutions are geographically dispersed and rural regions continue to experience connectivity gaps, smartphones have the potential to function as a key equalizing tool. This, however, is contingent upon adequate investment in digital infrastructure and capacity-building initiatives for teachers (Kasinathan, 2022).

Studies from the Northeast region also highlight a dual digital divide: not only infrastructural deficits, but also a significant gap in digital literacy among students (CSDD, 2023; Bajwa, 2023) is evident. Hence, effective integration of smartphone-based learning must go beyond providing devices, and include comprehensive skill-building programs for both students and faculty.

5.1.7 Objective No.7: To investigate the factors contributing to disparities in mobile device usage for learning among degree college students in Mizoram

The study found that while mobile device ownership among degree college students in Mizoram is universal, significant disparities exist in how these devices are used for learning. Differences in internet connectivity and device capacity

emerged as key barriers with some students experiencing unstable networks or insufficient storage space that limit their ability to download and store learning materials for offline use. In some cases, access to educational resources was further restricted by paid content requirements, reducing opportunities for equitable learning.

Although most students demonstrated confidence in using mobile devices for academic purposes, variations in digital skills were evident. While many could competently perform basic functions such as reading, video viewing and assignment submission, others struggled with platform navigation or required assistance in understanding online materials. This variation suggests that higher-order digital literacy is not evenly distributed affecting students' ability to engage independently with mobile learning resources.

The learning environment played a substantial role in shaping the effectiveness of mobile learning. Digital distractions particularly from social media, gaming and online shopping were widespread and often rated as moderately to highly disruptive. These distractions affected learners across different contexts indicating that even when technical access was strong, self-regulation remained a challenge.

Mobile learning was used for a range of academic tasks from exam preparation to supplementary reading and many students valued its flexibility in allowing them to learn at their own pace. However, technical barriers, personal concentration issues and comprehension difficulties reduced its potential for some learners. While many students also reported that mobile learning improved their language skills through access to translations, videos and diverse reading materials, the benefits were not uniform due to accessibility and comprehension challenges.

Overall, perceptions of mobile learning were strongly positive with most students recognising it as a valuable complement to traditional learning. Yet, inclusivity was uneven. Students with reliable connectivity, capable devices, stronger digital skills and effective self-management strategies benefitted far more than those lacking these conditions revealing that technical, skill-based and behavioral disparities collectively shape the mobile learning experience.

Discussion with respect to investigate the factors contributing to disparities in mobile device usage for learning among degree college students in Mizoram:

Although all students owned mobile devices, inequalities in the quality of access created significant differences in learning opportunities. Poor or unstable internet connectivity was a common issue, particularly for students in rural and semi-urban areas. Others faced low device storage capacity which limited their ability to save materials for offline use; an important function in low-connectivity settings. Some reported being unable to access certain educational content because it required paid subscriptions. These challenges are consistent with GSMA (2021) and Ally and Prieto-Blázquez (2014), who note that mobile learning effectiveness depends not only on ownership but also on reliable connectivity, adequate device specifications and affordable content access.

Most students demonstrated confidence in performing basic academic tasks on their mobile devices, such as reading materials, viewing instructional videos and completing simple assignments. However, a notable proportion struggled with more advanced digital skills, including navigating complex platforms, evaluating online content or independently interpreting digital learning materials. This pattern reflects the distinction highlighted in the digital literacy literature which include basic operational skills such as opening files or using apps that is qualitatively different from higher-order digital competencies involving critical interpretation, information evaluation and strategic use of digital resources. Van Deursen and Van Dijk (2014) emphasize that operational skills alone are insufficient for effective academic engagement as higher-order skills (e.g., information and strategic literacy) determine whether learners can meaningfully apply digital content in educational settings. Similarly, Eshet-Alkalai (2004) argues that true digital literacy extends beyond technical proficiency to include cognitive skills such as critical thinking and content analysis. The variation in students' digital competencies therefore indicates that while many learners can manage routine mobile tasks, others require additional support and structured digital literacy training to participate effectively in more complex learning activities.

When considering environmental influences, digital distractions were the most widely reported barrier. Social media use was the most common form of distraction, followed by gaming and online shopping. Distraction ratings ranged from low to high, indicating variability in self-regulation among learners. This is consistent with Junco (2012) who found that non-academic social media use negatively correlates with academic performance and Chen & Yan (2016) who observed that multitasking on mobile devices reduces attention span and learning efficiency. While most students had physically stable study environments, the multifunctional nature of mobile devices meant that distractions were readily available and often irresistible.

Mobile devices were used for a range of academic purposes, including reading, completing assignments, watching instructional videos, preparing for examinations and accessing supplementary learning materials. Many students appreciated the flexibility of mobile learning, as it enabled them to learn at their own pace and revisit challenging concepts as needed. However, technical challenges such as unstable internet connectivity and limited device storage capacity, coupled with personal difficulties such as maintaining concentration or comprehending complex content, reduced learning effectiveness for some learners. These patterns mirror the findings of Crompton and Burke (2018), who noted that while mobile learning provides substantial flexibility and accessibility, it also places greater demands on learners' self-regulation, time management and efficient use of digital resources.

Many learners reported improvements in language skills through mobile learning, often using translation tools, supplementary readings and videos to strengthen comprehension. This supports Kukulska-Hulme's (2012) argument that mobile learning can enhance linguistic proficiency by providing flexible access to varied content formats. However, comprehension difficulties and restrictions caused by paid content access limited the benefits of some learners. This highlights the importance of ensuring that digital resources are both linguistically appropriate and financially accessible to all students.

Overall, students perceived mobile learning as a valuable complement to traditional education, appreciating its flexibility, accessibility and variety of learning formats. Nevertheless, inclusivity was uneven. Those with reliable connectivity, sufficient storage, advanced digital skills and strong self-regulation were able to maximise its benefits, while others faced significant limitations. This reflects findings by Okai-Ugbaje et al. (2022), who emphasize that equitable mobile-learning outcomes rely not just on infrastructure, but also on contextual understanding of learners' conditions and capabilities.

5.1.8 Objective No.8: To examine the suitability of Mizoram University Curriculum for supporting mobile learning.

The analysis of interviews with twenty-six (26) teachers from Arts, Science and Commerce streams revealed that the Mizoram University curriculum demonstrates a high level of compatibility with mobile learning, although the degree of suitability varies across disciplines. Commerce subjects such as Financial Accounting, Business Law, Marketing and Taxation showed the highest potential, 75–90% of the course objectives and assessments are achievable through mobile platforms. Science subjects including Zoology, Botany, Biotechnology, Physics, Chemistry and Mathematics also demonstrated strong compatibility with an estimated 70–85% of theoretical and analytical tasks that are suitable for mobile learning via simulations, virtual labs and interactive data tools. Arts subjects reflected moderate compatibility (60–80%) with subjects like Political Science, History and Sociology integrating mobile-friendly tools such as virtual tours, discussion forums and policy simulations. However, the Mizo language emerged as a significant outlier with only around 10% of the curriculum adaptable to mobile learning due to the scarcity of digital resources.

A consistent pattern across all streams was the perception of mobile learning as a supplementary tool rather than a complete replacement for traditional classroom teaching. Teachers emphasized that printed textbooks remain the primary source of knowledge and certain components such as extensive fieldwork, laboratory experiments and in-person presentations cannot be replicated effectively on mobile

devices. Nevertheless, the flexibility and self-paced learning opportunities offered by mobile platforms were widely appreciated especially for independent reading, project work and reflective assignments. Most respondents agreed that short essays, quizzes, data analysis and group discussions could be effectively managed on mobile devices, with an overall feasibility rate of 70–85% for mobile-based assessments.

Another notable finding was the uneven distribution of digital resources across subjects. While Science and Commerce benefit from a wealth of specialized mobile applications and online tools, region-specific subjects such as the Mizo language rely heavily on teacher-created PDFs and scanned documents. Faculty adoption of mobile learning is already well underway with many using platforms like WhatsApp, Google Forms, Google Classroom and subject-specific apps to share materials, conduct quizzes and facilitate discussions. Teachers reported increased student engagement and faster communication through mobile learning, although they also cautioned against over-reliance without adequate in-person interaction.

Discussion with respect to examining the suitability of Mizoram University curriculum for supporting mobile learning:

The findings of this study indicate that the Mizoram University curriculum is largely compatible with mobile learning particularly in the Commerce and Science streams where a substantial proportion of instructional content and assessments can be delivered through mobile platforms. This aligns with Kukulska-Hulme and Shield (2008) who argued that mobile learning is particularly effective in domains that involve problem-solving, simulations and quick access to digital resources. In the case of Mizoram University, subjects such as Financial Accounting, Business Law, Zoology and Physics lend themselves well to mobile integration due to the availability of interactive applications, virtual labs and specialized software that support theoretical and analytical tasks.

In the Arts stream, while subjects like Political Science, History and Sociology demonstrated good adaptability to mobile platforms through tools such as virtual tours, discussion forums and collaborative projects, the Mizo language curriculum highlights a challenge widely noted in the literature: mobile learning

adoption is constrained by the limited availability of culturally and linguistically relevant digital content. As UNESCO (2018) observes, multilingual regions often face significant disparities in digital resource development which restricts meaningful integration of technology into language-based subjects. With only around 10% of the Mizo curriculum supported by online materials, teachers rely heavily on self-developed resources, reflecting the persistent digital divide in less-represented languages.

A consistent finding across all streams was the preference for mobile learning as a supplementary tool rather than a complete replacement for traditional instruction. This aligns with Crompton and Burke's (2018) systematic review which emphasizes that mobile learning is most impactful when embedded within blended learning environments that integrate both digital and face-to-face components. The continued dependence on printed textbooks, along with the irreplaceability of practical, laboratory and fieldwork activities, indicates that Mizoram University's curriculum is best suited for a hybrid learning approach that leverages the strengths of mobile technology while maintaining essential in-person academic experiences.

The study also reinforces findings from Hartley et al. (2020) that mobile devices can strongly support self-regulated learning, improving students' planning, monitoring and reflective practices. However, as Sha et al. (2012) also highlight mobile learning demands a high degree of learner responsibility and digital literacy which can be challenging for some students.

An important insight from the interviews is that faculty adoption of mobile learning is already underway with teachers making extensive use of tools such as WhatsApp, Google Classroom and subject-specific apps. This aligns with Crompton & Burke (2018) who observed that the ease of adoption of mobile learning in higher education is strongly linked to the accessibility of low-cost, widely available apps and platforms. Nonetheless, the current study suggests that while such tools improve communication and engagement, they may not fully address deeper pedagogical needs unless complemented by structured, curriculum-aligned digital content.

Overall, the findings reveal that mobile learning is a highly viable enhancement to the Mizoram University curriculum, particularly for theoretical, analytical and collaborative tasks. However, its success will depend on the development of subject-specific digital resources, investment in faculty training and the integration of mobile learning into a broader blended learning strategy that retains the strengths of traditional pedagogical methods.

5.2 RECOMMENDATIONS:

Taking into consideration the findings of the present study, the investigator recommends the following:

1) Integrate mobile learning with traditional classroom instruction to combine the advantages of both approaches while preserving the value of face-to-face interaction. Gikas and Grant (2013) assert that mobile devices facilitate collaborative, context-driven learning that enhances teacher-led instruction. Consequently, the integration of mobile learning with traditional pedagogy enables learners to access resources, engage asynchronously and obtain immediate feedback while maintaining classroom discourse and peer interaction.

2) Fill up resource gaps in subjects like Mizo language and science practicals by developing authentic online materials that correspond with the syllabus and handling difficulties with accuracy. The study conducted by Hsu and Ching (2015) underlines the significance of curated, syllabus-aligned digital resources for ensuring academic integrity and curricular consistency. In the context of Mizoram where disciplines such as the Mizo language and scientific practicals exhibit inadequate digital representation, the curation of reliable online materials can address content deficiencies and enhance learning accessibility. Institutional control and content validation ensure academic integrity while fostering fair learning opportunities.

3) Provide professional development programs for teachers to strengthen skills in mobile pedagogy, content evaluation and effective integration of mobile learning into lessons. In their chapter “Teacher Training and Professional

Development in Mobile Pedagogy for English Language Teaching", Norris and Kukulska-Hulme (2017) document how a customized CPD (continuing professional development) programme in Europe helped teachers develop confidence in designing mobile-assisted tasks, assessing digital content and incorporating pedagogical frameworks that link technology and pedagogy. They particularly emphasize teacher wisdom, the idea that professional learning must empower teachers to make thoughtful decisions about when and how to use mobile devices and align them with their curricular goals.

4) Promote purposeful and academically focused mobile device use rather than simply increasing the amount of time spent on devices. Although mobile learning provides flexibility, Selwyn (2016) warns against technology-centric methods that prioritize screen time over the quality of learning. Promoting purposeful and academically focused utilization of mobile devices guarantees technology enhances learning rather than distracts learning. Educational institutions ought to prioritize focused on a goal activity including digital note-taking, quiz-based learning and academic communication using educational applications.

5) Adopt blended approaches for practical and hands-on subjects, combining physical activities with virtual simulations or demonstrations. The ability of mobile learning to simulate real-world experiences through virtual laboratories and demonstrations corresponds with Hrastinski's (2019) observations regarding the efficacy of blended learning. In subjects requiring practical engagement such as science, fine arts and commerce integrating physical activities with virtual simulations facilitates the continuity of experience learning while reducing infrastructural constraints.

6) Invest in the creation of localized and culturally relevant educational resources. The UNESCO (2013) recommendations on ICT in education emphasize the necessity for contextually pertinent materials that embrace local languages and cultures. Investing in localized and culturally pertinent educational tools fosters inclusivity and enables learners to engage with information on a personal and

communal level. This is especially vital in areas such as Mizoram where internet resources in indigenous languages are limited.

7) Establish partnerships with local publishers and Mizoram University can help digitize and update textbooks, journals and other learning materials in subjects that are underrepresented. The OECD (2023) emphasizes that collaboration between institutions and other stakeholders is key to ensuring the sustainability and quality of digital education initiatives. Such partnerships can make educational resources more widely available, provide equal access across different streams and maintain continuity across multiple disciplines.

8) Encourage the use of interactive tools such as online debates, mind-mapping apps and virtual case studies in Arts and Commerce. Pinto & Leal (2022) found that mobile learning strategies like concept mapping and peer interaction significantly boost students' reasoning, judgment and higher-order thinking. In the Arts and Commerce disciplines such involvement fosters practical learning and innovative exploration.

9) Develop subject-specific digital content repositories validated by faculty to address reliability concerns reported by teachers across all streams. Establish subject-specific digital content repositories validated by faculty to improve resource reliability. Heine & Konig (2022) argue that well-defined and educator-approved digital resources are central to teachers' professional digital competence. In the Mizoram context, such faculty-curated repositories can reduce dependence on unverified online content while fostering scholarly collaboration and curricular continuity. In the Mizoram context, such faculty-curated repositories can reduce dependence on unverified online content while fostering scholarly collaboration and curricular continuity.

5.3 SUGGESTIONS FOR FURTHER RESEARCH:

In the light of the present study, the investigator suggests the following areas for further investigation:

1) To investigate the long-term effects of mobile learning on academic performance, skill development and learner autonomy in Mizoram.

2) A comparative study of assessing the effectiveness of traditional, fully mobile and blended learning models in Mizoram.

3) An evaluative study of mobile learning impact and learning outcomes in theory-heavy and practical-heavy disciplines in Mizoram.

4) To examine the impact of mobile learning on student engagement, motivation and collaboration in North East India.

5) A study on the Technology Acceptance Model (TAM) to identify factors affecting adoption and sustained use of mobile learning in Mizoram.

6) A critical analysis of mobile learning applications for subjects with limited existing digital resources in Mizoram.

7) Investigate strategies to improve students' digital literacy and ability for the credibility and accuracy of online information in Mizoram.

8) Effectiveness of mobile-based virtual laboratory simulations for science students in developing practical competencies in Mizoram.

9) Explore the relationship between mobile learning usage patterns (e.g., time spent, type of resources accessed) and specific cognitive skills like critical thinking, creativity and problem-solving in Mizoram.

10) A study of socio-economic factors such as family income, influence device ownership, internet access and mobile learning effectiveness in Mizoram.

5.4 CONCLUSION

The present study examined the opinions, patterns of use and curriculum suitability of mobile learning among degree college students in Mizoram and explored the relationship between mobile learning usage and academic achievement. The findings reveal that mobile learning is now firmly embedded in students' academic routines with a majority recognising its value in enhancing theoretical understanding, increasing access to information and motivating more active engagement with studies. In particular, Commerce students expressed high confidence in its contribution to academic success and most respondents expect mobile learning to play an even greater role in the future. The findings reveal that mobile devices are increasingly regarded as legitimate tools for academic advancement rather than solely as sources of entertainment.

Despite this generally positive outlook, the study also identified important concerns. More than half of the students reported that mobile learning can be a source of distraction and over 60% opposed its direct integration into classroom lectures, indicating a preference for it to remain a supplementary resource. This highlights the importance of thoughtful and deliberate integration, ensuring that mobile learning complements rather than replaces the benefits of traditional face-to-face teaching.

In terms of usage patterns, most students fall within the moderate category with some variation across demographic groups. Female students demonstrated slightly higher engagement than their male counterparts while urban students reported greater high-level usage than rural students. Nevertheless, rural students also showed substantial adoption despite infrastructural challenges. Socio-economic background and parents education levels exerted minimal influence on mobile learning engagement, although students from lower-income households were more likely to depend on mobile devices as their primary means of accessing learning resources. Statistical analysis revealed only a very weak and non-significant correlation between mobile learning usage and academic achievement ($r = 0.064$, $p >$

0.05) indicating that the quality and purpose of usage are far more important than frequency alone.

From the curriculum perspective, mobile learning is considered highly suitable for theory-based subjects across Arts, Science and Commerce, but less effective for practical components and in fields with limited quality digital resources particularly the Mizo language. Teachers emphasised the need for credible, syllabus-aligned materials to prevent reliance on unverified sources and ensure alignment with academic objectives.

Based on these findings, several recommendations can be made. Institutions should adopt a balanced approach that blends mobile learning with traditional teaching, ensuring that the strengths of both are retained. High-quality, syllabus-aligned digital resources should be developed for all subjects, giving priority to subjects currently lacking adequate online content such as Mizo language and science practicals. Students should be encouraged to diversify their use of devices beyond smartphones to include laptops and tablets for more complex academic tasks. Teachers should be provided with targeted training in mobile pedagogy, digital content evaluation and the integration of interactive tools such as simulations, virtual labs and GIS mapping software for practical-heavy disciplines. The development of locally relevant educational resources in the Mizo language and other regional contexts should also be prioritised to ensure inclusivity and cultural relevance.

The study also highlights several areas for further investigation. Longitudinal studies could assess the long-term impact of mobile learning on academic performance, skill development and learner autonomy. Comparative research into traditional, fully mobile and blended learning models would help identify the most effective higher education system in Mizoram. Subject-specific studies could examine how mobile learning influences outcomes differently in theory-heavy and practical-heavy disciplines, while qualitative research could provide deeper insights into its effects on motivation, collaboration and time management. The application of theoretical models such as the Technology Acceptance Model (TAM) could shed light on the factors influencing adoption and sustained use. Additionally, pilot

projects could be undertaken to design and test locally developed mobile learning applications especially for underrepresented subjects and to evaluate interventions aimed at improving digital literacy and the ability to critically assess online information.

In conclusion, mobile learning in Mizoram holds significant promise as a complementary educational tool. Its full potential can only be realised through strategic integration, robust resource development, infrastructure enhancement and capacity building for both educators and learners. By implementing these recommendations and pursuing the proposed research avenues, mobile learning can evolve from a supplementary resource into an equitable, effective and integral part of higher education in the state.

SUMMARY

INTRODUCTION

The rapid advancement of digital technologies and the widespread availability of mobile devices have transformed contemporary education. Mobile learning (m-learning), which allows learners to access educational resources anytime and anywhere, has emerged as a flexible, accessible, and learner-centered approach. This paper explores the concept, evolution and significance of learning in general and situates mobile learning within broader pedagogical, technological and policy frameworks. It traces the historical development of electronic learning tools—from radio and television to computers, the internet and smartphones—while highlighting the transformative impact of mobile devices on teaching and learning. Different learning theories, styles, and modern approaches such as blended learning, flipped classrooms, gamification and adaptive learning are examined in relation to mobile education. Special attention is given to the National Education Policy (NEP) 2020, which emphasizes technology integration, inclusivity and the use of mobile platforms in education. While mobile learning enhances accessibility, engagement, personalization and collaborative opportunities, it also poses challenges such as digital inequality, distractions and infrastructural constraints. The study concludes that mobile learning holds significant promise for democratizing education, especially in resource-constrained contexts like Mizoram, provided that stakeholders address challenges through effective policies, teacher training and equitable access to technology.

NEED AND IMPORTANCE OF THE STUDY:

The diversity of learning styles and approaches among students highlights the need for flexible, inclusive and adaptive educational strategies. Mobile learning (m-learning), which utilizes portable devices such as smartphones, tablets, and laptops, offers unique opportunities to support personalized and multimodal learning experiences. This study focuses on degree college students in Mizoram, where geographic and infrastructural constraints often limit traditional educational access. It examines how mobile learning platforms cater to different learning styles—visual,

auditory, verbal, kinesthetic, logical, social and solitary—and learning types including cognitive, behavioral, observational, experiential, and social learning. While the National Education Policy (NEP) 2020 emphasizes the integration of technology to foster holistic, experiential and learner-centered education, there remains a lack of research on its ground-level effectiveness in Mizoram. This study addresses that gap by investigating whether mobile tools are inclusive, pedagogically responsive, and aligned with diverse learner needs. The findings aim to inform educators in designing mobile-compatible curricula, guide policymakers in ensuring equitable digital education initiatives, and assist EdTech developers in creating adaptive tools. By analyzing the extent to which mobile learning supports differentiated instruction, this research contributes to bridging the divide between technological adoption and effective pedagogy, thereby fostering a learner-centered digital education system in Mizoram.

Besides the aforesaid rationale of the study, the investigator is also interested in answering the following research questions:

1) What are the opinions of degree college students regarding mobile learning?

2) To what extent do degree college students in Mizoram make use of mobile learning?

3) What are the effects of gender, academic stream, locale, family income and father's educational background on the use of mobile devices for learning among degree college students in Mizoram?

4) Does mobile learning usage have an impact on the academic performance of degree college students in Mizoram?

5) What types of mobile learning devices are used by degree college students and to what extent are they utilized?

6) What are the factors contributing to disparities in mobile learning usage among degree college students in Mizoram?

7) Is the Mizoram University Curriculum suitable for mobile learning?

STATEMENT OF THE PROBLEM

In light of the research questions that required immediate responses, the current study has been stated as: “Mobile Learning among Degree College Students of Mizoram: An Analytical Study”.

OBJECTIVES OF THE STUDY

The objectives of the study are as follows:

1) To investigate the opinion of degree college students in Mizoram regarding mobile learning.

2) To construct and standardize a mobile device use for learning scale.

3) To assess the extent of mobile device usage for learning among degree college students in Mizoram.

4) To compare the use of mobile devices for learning by degree college students of Mizoram in relation to gender, academic streams, locale, family income and father’s educational background.

5) To find out the relationship between the use of mobile devices for learning and the academic achievement of degree college students of Mizoram.

6) To identify the types of mobile devices used and the extent of their usage among degree college students in Mizoram.

7) To investigate the factors contributing to disparities in mobile device usage for learning among degree college students in Mizoram.

8) To examine the suitability of the Mizoram University curriculum for supporting mobile learning.

NULL HYPOTHESES OF THE STUDY

The following null hypotheses are formulated for statistical analysis:

1) There is no significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram.

2) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams.

3) There is no significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram.

4) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income.

5) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

OPERATIONAL DEFINITIONS OF THE TERMS USED

The key terms used in the title of the study are operationally defined as follows:

Mobile learning : Mobile learning is learning that takes place through mobile technologies using handheld devices such as smartphones, tablets, portable notebooks, e-book readers, iPads, etc.

Mobile learning devices: Mobile learning devices are handheld devices and may be classified as cell phones (mobile phones), laptop computers, tablets, Kindles, personal digital assistants (PDAs), etc.

Degree College Students: Students who are studying in an institution in Mizoram that offers undergraduate degrees and grants a degree in the field of arts, science and commerce.

DELIMITATIONS OF THE STUDY

The present study will be delimited to undergraduate degree students of Mizoram and will not include students from professional and vocational courses.

METHOD OF THE STUDY

This study adopted a sequential explanatory mixed-methods design which involves two distinct phases: a quantitative phase and a qualitative phase. This design is selected not only to quantify the mobile learning usage among degree college students of Mizoram but also to explore deeper insights into students' experiences, perceptions and contextual factors influencing mobile learning.

The quantitative research design comprised a descriptive survey method in which a mobile device use for learning scale was developed to analyse the mobile learning usage among degree college students of Mizoram. It also measured the types and extent of usage of mobile device for learning, relationship and comparisons based on demographic and academic variables and the correlation between the usage of mobile device for learning and academic achievement.

The qualitative part of the research design looked deeper into students' opinions toward mobile learning, causes of disparity of using mobile devices for learning and the suitability of Mizoram University curriculum for mobile learning.

POPULATION AND SAMPLE

Population

In the present study, the population comprised of all degree college students enrolled in institutions affiliated with Mizoram University. Based on data from the Higher and Technical Education Department, Government of Mizoram, a total of 30 colleges are affiliated with Mizoram University, comprising an overall student population of 18,530. The details of the population are presented in the following tables.

District-wise statistics of degree college students in Mizoram

District	Male	Female	Total
Aizawl	6622	5980	12602
Lunglei	886	816	1702
Kolasib	408	330	738
Champhai	445	391	836
Serchhip	232	270	502
Lawngtlai	547	257	804
Siaha	272	269	541
Mamit	121	128	249
Hnahthial	102	76	178
Khawzawl	53	52	105
Saitual	112	161	273
TOTAL			**18530**

Source: Higher & Technical Education Department, Government of Mizoram 2023-24.

Sample

For the quantitative part of the study, multistage random sampling was utilised. Five (5) Districts - Aizawl, Kolasib, Mamit, Lunglei and Champhai were randomly selected, each representing a distinct geographical region namely Central, North, West, South and East. From each selected district, respondents were randomly chosen for a total sample of 500. For the qualitative part of the study, purposive

sampling was used to select a smaller group comprising 33 students and 26 teachers. The following table presents the details of the samples selected.

Details of sample selected for quantitative study (N= 500)

Name of District	Male			Female			Total		
	Arts	**Science**	**Commerce**	**Arts**	**Science**	**Commerce**	**Arts**	**Science**	**Commerce**
Central	108	72	38	98	65	34	206	137	72
South	18	Nil	Nil	8	Nil	Nil	26	Nil	Nil
West	3	Nil	Nil	5	Nil	Nil	8	Nil	Nil
East	7	7	Nil	7	6	Nil	14	13	Nil
North	7	6	Nil	6	5	Nil	13	11	Nil
							267	**161**	**72**
Total							**500**		

Details of sample selected for students for interview (N=33)

Name of District	Total
Central	9
South	9
West	3
East	6
North	6
TOTAL	**33**

Details of sample selected for teachers for interview (N=26)

Name of Stream	Number of Teachers
Arts	11
Science	8
Commerce	7
Total	26

TOOLS USED

The following tools developed by the researcher were employed for the current study:

1. Opinionnaire for Degree College students on mobile learning.
2. Mobile device use for learning scale.
3. Interview schedule for Degree College students.
4. Interview schedule for College teachers on the suitability of Mizoram University Curriculum.

1. Opinionnaire for degree college students on mobile learning:

The investigator developed opinionnaire to study the opinion of degree college students on mobile learning. The opinionnaire consists of 8 questions and each question has 2 options for the respondents.

Degree college students are the primary users and beneficiaries of mobile learning technologies in academic settings. Their experiences, preferences and challenges provide valuable insights into the effectiveness and usability of mobile learning tools. Keeping this in mind, the investigator developed opinionnaire for degree college students.

2. Mobile Device use for Learning Scale developed by the researcher:

To assess the level of usage of mobile device for learning among degree college students in Mizoram, the investigator developed and standardized a mobile device use for learning scale. The usage scale comprised of 21 items. The scale is designed according to Likert's five-point scale, with a maximum score of 105 and a minimum score of 21. The reliability of the test was 0.76 (split-half) and 0.76 (test-retest). The specifics of the attitude scale's creation are outlined in the analysis and interpretation chapter (Chapter IV).

3. Interview Schedule for Degree College Students.

To study the disparities in the use of mobile devices for learning of degree college students of Mizoram, the investigator developed an interview schedule for degree college students. This interview schedule consists of eight (8) questions and was divided into six components as follows:

1) Device and Internet Access
2) Skills and Confidence
3) Learning context
4) Usage and challenges
5) Language and Content Accessibility
6) Perceptions and inclusivity

4. Interview Schedule for College Teachers on the suitability of Mizoram University curriculum

To study the suitability of Mizoram University curriculum, the investigator developed an interview schedule for college teacher. There are six (6) questions in this interview schedule.

COLLECTION OF DATA

For the purpose of collecting quantitative data, the investigator personally visited the selected colleges of Mizoram. After getting permission from the respective Principal, the investigator administered the mobile device use for learning scale and opinionnaire to the students and for qualitative data, the investigator conducted an interview schedule to the students and the teachers.

For the purpose of finding the relationship between the usage of mobile devices for learning and academic achievement, academic achievement scores of degree college students were obtained through the college administration with proper authorization. These data were recorded in their original form to ensure accuracy and validity.

TABULATION OF DATA

All the data collected were first scrutinized and classified. Scoring of each respondents on usage scale was done according to the scoring procedure. After the data were scrutinized, classified and scored, it was tabulated by entering into excel sheets for statistical treatment. Keeping in view the objectives of the study, the tabulated data were analysed using appropriate statistical techniques.

STATISTICAL TECHNIQUES USED

For the present study, the investigator employed descriptive statistical measures such as measures of central tendency and percentages to find out the nature of score distribution for describing frequencies and for classification of respondents in different categories.

The difference between the mean scores of the different groups based on gender, academic stream, locale, family income and father's educational qualification were tested for significance by applying the t-test and ANOVA. The Pearson Product Moment Correlation was employed for establishing validity and reliability of the constructed usage scale and relationship between the usage of mobile devices for learning and academic achievement of degree college students of Mizoram.

MAJOR FINDINGS

The major findings of the present study are as follows:

Objective 1: To investigate the opinion of degree college students in Mizoram regarding mobile learning.

1) Opinion of degree college students on distraction and concentration during mobile learning activities:

Q.1 Learning with mobile devices affect my concentration.		
Respondents	**Yes**	**No**
Overall (N=500)	276 (55.2%)	224 (44.8%)
Male (N=257)	142 (55.25%)	115 (44.75%)
Female (N=243)	134 (55.14%)	109 (44.86%)
Urban (N= 222)	115 (51.80%)	107 (42.20%)
Rural (N= 278)	161 (57.91%)	117 (42.09%)
Arts (N=410)	232 (56.59%)	178 (43.41%)
Science (N=60)	30 (50%)	30 (50%)
Commerce (N=30)	14 (46.67%)	16 (53.33%)

55.2% of students believed mobile learning affects their concentration, while 44.8% reported no such impact. The findings were consistent across male (55.25%) and female (55.14%) students, with slightly higher agreement among rural students (57.91%) compared to urban students (51.80%). Arts students (56.59%) were more likely to acknowledge distraction than those in science (50%) or commerce (46.67%). Overall, the results highlight that a majority of students perceive mobile learning as a factor influencing their ability to concentrate, suggesting a need to address potential distractions associated with mobile devices in educational contexts.

2) Opinion of degree college students on the enhancement of theoretical learning through mobile learning:

Q.2 Mobile Learning can enhance the theoretical part of the subject.		
Respondents	**Yes**	**No**
Overall (N=500)	374 (74.80%)	126 (25.20%)
Male (N=257)	195 (75.88%)	62 (24.12%)
Female (N=243)	179 (73.66%)	64 (26.34%)
Urban (N= 222)	165 (74.32%)	57 (25.68%)
Rural (N= 278)	209 (75.18%)	69 (24.82%)
Arts (N=410)	308 (75.12%)	102 (24.88%)
Science (N=60)	43 (71.67%)	17 (28.33%)
Commerce (N=30)	23 (76.67%)	7 (23.33%)

A substantial majority (74.8%) agreed that mobile learning enhances theoretical learning, while only 25.2% disagreed. Male (75.9%) and female (73.7%) students showed comparable levels of agreement, with minimal variation between urban (74.3%) and rural (75.2%) respondents. Stream-wise analysis indicated strong support across disciplines, with Commerce students showing the highest agreement (76.7%), followed by Arts (75.1%) and Science (71.7%). Overall, the results highlight widespread recognition of mobile learning as a valuable tool for strengthening theoretical knowledge among degree college students, irrespective of demographic or academic differences.

3) Opinion of degree college students on the influence of mobile learning on the value of classroom instruction:

Q.3 Mobile learning decreases the value or importance of classroom instruction.		
Respondents	**Yes**	**No**
Overall (N=500)	265 (53%)	235 (47%)
Male (N=257)	134 (52.14%)	123 (47.86%)
Female (N=243)	131 (53.91%)	112 (46.09%)
Urban (N= 222)	123 (55.41%)	99 (44.49%)
Rural (N= 278)	142 (51.08%)	136 (48.92%)
Arts (N=410)	223 (54.39%)	187 (45.61%)
Science (N=60)	30 (50%)	30 (50%)
Commerce (N=30)	12 (40%)	18 (60%)

A slight majority (53%) of respondents agreed that mobile learning decreases the importance of classroom instruction while 47% disagreed. Female students (53.91%) and urban students (55.41%) expressed stronger concern compared to their male and rural counterparts. Arts students (54.39%) also showed higher agreement while Commerce students (60%) largely disagreed indicating greater acceptance of mobile learning. Science students were evenly divided. The findings show that although mobile learning is perceived by many as diminishing traditional classroom value, significant variation exists across demographic and academic groups.

4) Opinion of degree college students regarding the potential of mobile learning to enhance their success rates:

Q.4 Using mobile devices for learning increases my success rate.		
Respondents	**Yes**	**No**
Overall (N=500)	352 (70.40%)	148 (29.60%)
Male (N=257)	184 (71.60%)	73 (28.40%)
Female (N=243)	168 (69.14%)	75 (30.86%)
Urban (N= 222)	156 (70.27%)	66 (29.73%)
Rural (N= 278)	196 (70.50%)	82 (29.50%)
Arts (N=410)	281 (68.54%)	129 (31.46%)
Science (N=60)	43 (71.67%)	17 (28.33%)
Commerce (N=30)	28 (93.33%)	2 (6.67%)

A substantial majority (70.40%) believed mobile learning positively contributes to their success while 29.60% disagreed. The results showed minimal variation across gender with 71.60% of male and 69.14% of female students supporting the statement. Similarly, perceptions were consistent across students from urban (70.27%) and rural (70.50%) indicating that residential location has little impact on students' views. Academic discipline, however, showed greater variation: 68.54% of arts students, 71.67% of science students, and a notably high 93.33% of commerce students agreed that mobile learning improved academic outcomes. Overall, the findings highlight a strong, positive perception of mobile learning among students, indicating its significance in fostering academic achievement.

5) Opinion of degree college students with respect to the future of mobile learning:

Q.5 Use of mobile learning will increase in the near future.		
Respondents	**Yes**	**No**
Overall (N=500)	392 (78.40%)	108 (21.60%)
Male (N=257)	207 (80.54%)	50 (19.46%)
Female (N=243)	185 (76.13%)	58 (23.87%)
Urban (N= 222)	173 (77.93%)	49 (22.07%)
Rural (N= 278)	219 (78.78%)	59 (21.22%)
Arts (N=410)	322 (78.54%)	88 (21.46%)
Science (N=60)	44 (73.33%)	16 (26.67%)
Commerce (N=30)	26 (86.67%)	4 (13.33%)

78.4% students believe mobile learning will increase in the near future. Male students (80.54%) expressed slightly higher optimism compared to female students (76.13%). Rural students (78.78%) were marginally more positive than urban students (77.93%) indicating that mobile learning is viewed as an opportunity to bridge educational gaps. Among academic streams, Commerce students (86.67%) were most optimistic followed by Arts (78.54%) and Science (73.33%) students indicating disciplinary differences in adaptability toward mobile learning. Overall, the findings highlight a strong positive outlook among students toward mobile learning as an emerging mode of education, with implications for policy and practice in higher education.

6) Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning:

Q.6 Mobile learning is as effective as traditional learning.		
Respondents	**Yes**	**No**
Overall (N=500)	294 (58.80%)	206 (41.20%)
Male (N=257)	147 (57.20%)	110 (42.80%)
Female (N=243)	147 (60.49%)	96 (39.51%)
Urban (N= 222)	126 (56.76%)	96 (43.24%)
Rural (N= 278)	168 (60.43%)	110 (39.57%
Arts (N=410)	232 (56.59%)	178 (43.31%)
Science (N=60)	42 (70%)	18 (30%)
Commerce (N=30)	20 (66.67%)	10 (33.33%)

58.80% of respondents believe mobile learning is as effective as traditional classroom instruction, while 41.20% disagreed. Female (60.49%) and rural (60.43%) students showed slightly higher acceptance compared to male (57.20%) and urban (56.76%) students. Discipline-wise, science students (70%) demonstrated the strongest agreement, followed by commerce (66.67%) and arts students (56.59%). These results suggest that overall, students hold a favorable view of mobile learning, with particularly strong acceptance among science stream learners who may be more adaptable to technology-based education. The study underscores the growing relevance of mobile learning as a viable alternative to traditional teaching methods, particularly in fostering accessibility and technological engagement among students.

7) Opinion of degree college students on motivation when employing mobile learning for educational purposes:

Q.7 Using mobile devices for educational purposes motivates me.		
Respondents	**Yes**	**No**
Overall (N=500)	347 (69.40%)	153 (30.60%)
Male (N=257)	174 (67.70%)	83 (32.30%)
Female (N=243)	173 (71.19%)	70 (28.81%)
Urban (N= 222)	155 (69.82%)	67 (30.18%)
Rural (N= 278)	192 (69.06%)	86 (30.94%)
Arts (N=410)	284 (69.27%)	126 (30.73%)
Science (N=60)	44 (73.33%)	16 (26.67%)
Commerce (N=30)	19 (63.33%)	11 (36.67%)

69.40% of respondents agreed that mobile devices motivate them in their studies while 30.60% disagreed. Female students (71.19%) reported slightly higher motivation compared to male students (67.70%). Similarly, urban (69.82%) and rural (69.06%) students showed nearly identical levels of agreement showing that location does not significantly influence motivation. Across academic streams, Science students (73.33%) expressed the highest motivation followed by Arts (69.27%) while Commerce students (63.33%) reported the lowest. These findings highlight that mobile learning serves as a motivational tool for most degree college students with variations observed across academic disciplines.

8) Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom:

Q.8 Do you want your teachers to integrate mobile learning in the classroom?		
Respondents	**Yes**	**No**
Overall (N=500)	186 (37.20%)	314 (62.80%)
Male (N=257)	97 (37.74%)	160 (62.26%)
Female (N=243)	89 (36.63%)	154 (63.37%)
Urban (N= 222)	83 (37.39%)	139 (62.61%)
Rural (N= 278)	103 (37.05%)	175 (62.95%)
Arts (N=410)	149 (36.34%)	261 (63.66%)
Science (N=60)	24 (40%)	36 (60%)
Commerce (N=30)	13 (43.33%)	17 (56.67%)

Only 37.20% of students were in favor of integrating mobile learning while a majority of 62.80% opposed it. Gender-based analysis indicated similar attitudes among males (37.74%) and females (36.63%). Residential background showed minimal variation with 37.39% of urban students and 37.05% of rural students supporting mobile learning. Stream-wise, Commerce students expressed the highest support (43.33%) followed by Science (40%) and Arts (36.34%). Overall, the results highlight a prevailing resistance among students toward the incorporation of mobile learning in classrooms, irrespective of demographic or academic differences.

Objective 2: To construct and standardize mobile device use for learning scale.

The objective of this phase of the study was to construct and standardize a Mobile Device Use for Learning Scale considering the socio-cultural, educational and regional aspects of degree college students in Mizoram. The process followed systematic scale construction procedures:

1) *Item Development & Validation:*
    a. An initial item pool of 40 statements was created from literature review and expert consultations.
    b. After expert validation, 19 items were removed, and 21 items were retained for the first trial.
2) *First & Second Try-outs:*
    a. The first try-out with 20 undergraduate students ensured clarity and comprehension.
    b. The second try-out with 130 students allowed for item discrimination using the upper 27% – lower 27% method and t-tests. All 21 items showed t-values above 2.64, significant at the 0.01 level, confirming strong discriminatory power.
3) *Reliability Testing:*
    a. Test-retest reliability with a two-week interval yielded a correlation coefficient of 0.756 ($p < .01$).
    b. Split-half reliability produced a coefficient of 0.764 ($p < .01$). Both results indicate a high degree of consistency.
4) *Scoring & Norms:*
    a. The final scale, a five-point Likert format, assigns higher scores to more positive usage patterns.
    b. The maximum score is 105 and the minimum is 21.

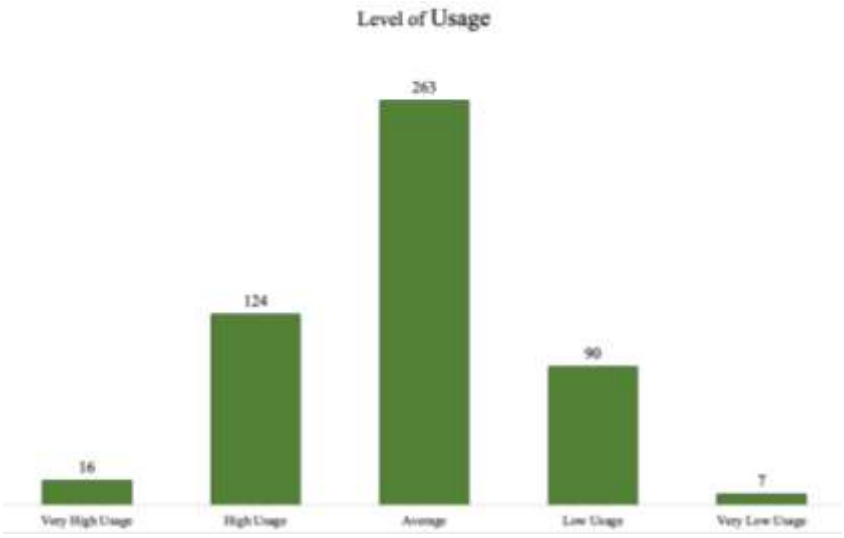
c. Based on administration to 500 students (M = 74.574, SD = 10.416), z-score norms and raw score ranges were developed, categorizing usage into five levels: Very High, High, Average, , Low and Very Low Usage.

5) Standardization Outcome:

The scale is both reliable and valid for assessing the extent and nature of mobile device use for learning among degree college students.

Objective 3: To assess the extent of mobile device usage for learning among degree college students in Mizoram.

	Very High Usage	**High Usage**	**Average**	**Low Usage**	**Very Low Usage**
Level of Usage	16 (3.2%)	124 (24.8%)	263 (52.6%)	90 (18%)	7 (1.4%)



The majority of students 263 (52.6%) reported an average level of usage indicating that mobile devices are moderately integrated into their academic activities. A substantial proportion 124 (24.8%) indicated a high level of usage while only a small segment 16 (3.2%) fell into the very high usage category. On the other hand, 90 (18%) students reported a low level of usage and just 7 (1.4%) students showed very low usage. These findings show that while mobile learning is gaining

ground among students, its integration is still uneven with most learners engaging at a moderate rather than intensive level

Objective 4: To compare the use of mobile devices for learning by degree college students of Mizoram in relation to gender, academic streams, locale, family income and father's educational qualification.

1. A comparison of the use of mobile devices for learning between male and female degree college students of Mizoram.

Comparison of the level of usage of mobile devices for learning between male and female degree college students of Mizoram

A mobile device use for learning scale that was developed by the investigator was given to 500 degree college students in Mizoram in order to collect data.

	Very High Usage	**High Usage**	**Average**	**Low Usage**	**Very Low Usage**
Male	11 (4.28%)	57 (22.18%)	145 (56.42%)	43 (16.73%)	1 (0.39%)
Female	5 (2.06%)	67 (27.57%)	118 (48.56%)	47 (19.34%)	6 (2.47%)

The comparison of mobile learning usage between male and female students reveals notable variations across the different levels of usage. Among male students, the majority (56.42%) fall under the "Average" usage category, followed by "High" usage (22.18%). Only a small percentage of males reported "Very High" usage (4.28%) or "Very Low" usage (0.39%) while 16.73% indicated "Low" usage. This distribution shows that male students predominantly maintain a moderate engagement with mobile devices for learning with fewer students at the extreme ends of usage.

In contrast, female students show a slightly different pattern. The largest proportion (48.56%) also falls under "Average" usage, but a higher percentage compared to males reported "High" usage (27.57%) and "Very Low" usage (2.47%). Meanwhile, 19.34% of female students indicated "Low" usage, and only 2.06%

reported "Very High" usage. This indicates that although the majority of female students also use mobile devices at an average level, a relatively greater share of them fall into both the higher and lower extremes compared to their male counterparts.

Comparison of the use of mobile devices for learning between male and female degree college students of Mizoram by test of significance

To examine whether male and female degree college students in Mizoram differ in their use of mobile devices for learning, the hypothesis "There is a significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram" was reformulated into a null hypothesis. The null hypothesis stated that "There is no significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram."

In order to test the null hypothesis, the mean and standard deviation of the two groups were determined individually, a t-test was performed and comparison was made between mean scores of male and female students of Mizoram.

Group	***N***	***Mean***	***SD***	***SED***	***t-value***	***Sig. Level***
Male	***257***	***75.09***	***9.89***	***0.93***	***1.14***	***Not Significant***
Female	***243***	***74.03***	***10.94***			

The data depicted in the above table reveals that the calculated value of 't' is less than the critical value of 't' with the degrees of freedom (df) 498 i.e. 1.97 at 0.05 and 2.59 at 0.01 level. When it comes to the use of mobile devices for learning, this suggests that there is no significant difference between males and female students. Therefore, the null hypothesis "There is no significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram" cannot be rejected.

2. A comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to academic stream.

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to academic stream

	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Arts	15 (3.66%)	97 (23.66%)	223 (54.39%)	72 (17.56%)	3 (0.73%)
Science	0	19 (31.67%)	26 (43.33%)	13 (21.67%)	2 (3.33%)
Commerce	1 (3.33%)	8 (26.67%)	14 (46.67%)	5 (16.67%)	2 (3.33%)

The comparison of mobile device usage across Arts, Science, and Commerce streams reflects important variations in students' engagement with mobile learning. A majority of Arts students (54.39%) reported an average level of usage with 23.66% at a high level. Only 3.66% showed very high usage while 17.56% were at a low level and 0.73% at very low. This distribution suggests that while Arts students rely on mobile devices, their usage is moderate rather than intensive. It may indicate that Arts subjects involve more reading, essay writing and conceptual analysis ; tasks that are somewhat compatible with mobile learning but may also require broader resources beyond mobile devices. The relatively balanced spread between average and high usage highlights that mobile learning is adopted but not deeply embedded in this stream.

The Science stream shows a distinctly different pattern. No students reported very high usage while the majority clustered around average (43.33%) and high (31.67%) usage levels. About 21.67% indicated low usage and 3.33% reported very low usage. This indicates that although mobile devices are used considerably in Science education, the lack of very high usage might be linked to the limitations of mobile devices in handling complex laboratory work, simulations and experiments.

The Commerce stream demonstrates the highest proportion of average usage (46.67%) with 26.67% reporting high usage and only 3.33% in the very high category. At the same time, 16.67% reported low usage and 3.33% very low. The data reveals that Commerce students use mobile devices regularly but similar to the Arts stream, their usage remains at a moderate level. This could be attributed to their academic tasks which can be supported by mobile devices but often benefit from larger screens, spreadsheets or specialized software available on computers.

Comparison of the use of mobile device for learning among degree college students of Mizoram in relation to academic stream by test of significance

For comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams, the hypothesis which stated that "There is significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams" was converted to a null hypothesis which stated that "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams."

To compare the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams, ANOVA was performed and the results are presented in the following table.

Sources of variance	**Degrees of freedom**	**Sum of the squares**	**Mean Square**	**F Ratio**
Between Set	(s-1) = 3-1 =2	253.731	126.866	1.17
Within set	N-s=500-3=497	53882.531	108.416	

Table shows that the calculated F-ratio was 1.17, which is lower than the critical value of 4.66 at 0.01. Hence, the null hypothesis "There is no significant difference the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams" cannot be rejected. Hence, there is no

significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams.

3. A comparison of the use of mobile devices for learning between urban and degree college students of Mizoram.

Comparison of the level of usage of mobile devices for learning between urban and rural degree college students of Mizoram

	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Urban	5 (2.25%)	64 (28.83%)	110 (49.55%)	42 (18.92%)	1 (0.45%)
Rural	11 (3.96%)	60 (21.58%)	153 (55.04%)	48 (17.27%)	6 (2.16%)

The comparison of mobile device usage for learning among urban and rural degree college students of Mizoram reveals both similarities and differences in usage patterns indicating how geographical and contextual factors shape learning practices.

From the data, the majority of students in both urban and rural areas fall under the average usage category with 49.55% of urban students and 55.04% of rural students reporting this level. This shows that mobile learning has become an accepted and moderately practiced tool for education across both contexts showing its integration into students' academic routines. However, the slightly higher percentage in rural areas may indicate that while students are making use of mobile devices, the level of engagement remains limited to essential or functional tasks rather than advanced or intensive usage.

When examining high usage, 28.83% of urban students fall into this category compared to 21.58% of rural students. This disparity reflects a gap in the intensity of mobile learning between urban and rural learners. Urban students may have better access to stable internet connections, modern devices and supportive digital environments, enabling them to explore advanced learning resources, conduct research and participate in interactive academic activities. Conversely, rural students

may face infrastructural barriers that restrict them to more basic forms of mobile usage.

At the very high usage level, urban students (2.25%) are outnumbered by rural students (3.96%). This finding is interesting as it challenges the assumption that only urban learners engage in very intensive mobile learning. A possible interpretation is that while most rural learners remain at average levels, a small section of highly motivated rural students maximizes mobile resources to overcome limitations in conventional learning facilities. This may represent a group of digital enthusiasts or those highly adaptive to mobile learning opportunities despite infrastructural challenges.

On the other hand, the low and very low usage categories show minor differences. 18.92% of urban and 17.27% of rural students fall under low usage, indicating that in both contexts, nearly one-fifth of learners still rely less on mobile devices for learning. Very low usage, however, is slightly higher among rural students (2.16%) compared to urban students (0.45%) which can be attributed to technological divides such as weak network coverage, affordability issues or lack of digital literacy among some rural learners.

Comparison of the use of mobile devices for learning between urban and rural degree college students of Mizoram by test of significance

To compare the use of mobile devices for learning between urban and rural degree college students in Mizoram, the hypothesis which stated that "There is a significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram" was converted into a null hypothesis which stated that, "There is no significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram."

In order to test the null hypothesis, the mean and standard deviation of the two groups were determined individually, a t-test was performed and comparison was made between mean scores of rural and urban students of Mizoram, the details are presented in the following table.

Group	N	Mean	SD	SED	t-value	Sig. Level
Rural	278	74.03	10.55	0.29	4.24	0.05
Urban	222	75.26	10.22			

The data depicted in the above table revealed that the calculated value of 't' is more than the critical value of 't' with the degrees of freedom (df) 498 i.e. 1.97 at 0.05 and 2.59 at 0.01 level. When it comes to the use of mobile devices for learning, this shows that there is a significant difference between rural and urban degree college students. Therefore, the null hypothesis "There is no significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram." can be rejected.

4. A comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to family income.

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to family income

Level of Usage	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Below 1 Lakh	7 (3.8%)	42 (22.83%)	99 (53.8%)	34 (18.48%)	2 (1.09%)
Between 1 to 5 Lakhs	8 (3.32%)	64 (26.56%)	125 (51.87%)	40 (16.6%)	4 (1.66%)
Between 5 to 10 Lakhs	1 (1.64%)	12 (19.67%)	30 (49.18%)	17 (27.87%)	1 (1.64%)
Above 10 Lakhs	0	4 (7.14%)	9 (64.28%)	1 (7.14%)	0

The result in the above table illustrates the relationship between family income levels and the extent of mobile device usage for learning among degree

college students in Mizoram. The analysis reveals several patterns. A large majority (53.8%) of students from families earning below ₹1 lakh annually reported an average level of usage. This shows that while access to mobile devices exists, limitations in affordability and digital resources may hinder very high usage. Around 22.83% reported high usage indicating that despite financial constraints, a notable group actively integrates mobile devices into their learning. However, 19.57% (low and very low) fall into the lower usage categories showing that financial barriers still restrict consistent digital engagement for a minority in this income group.

Students from 1 to 5 Lakhs income families forms the largest segment of the sample. More than half (51.87%) reported an average level of usage almost mirroring the below 1 lakh category. A higher proportion (26.56%) reported high usage compared to the lower income group indicating that moderate financial stability enhances students' ability to leverage mobile devices. Still, a considerable number (18.26%) fall under low and very low usage pointing to the possibility that factors other than income, such as personal interest, digital skills or institutional support also influence usage.

The result also shows that nearly half (49.18%) of students from 5–10 Lakhs income families stated average usage but the proportion of students with low usage (27.87%) is significantly higher compared to the lower-income categories. This indicates that higher income does not necessarily translate to higher engagement with mobile learning. It could be inferred that students from affluent families might have access to diverse learning resources beyond mobile devices leading to relatively lower dependency on mobile technology for educational purposes. High usage (19.67%) is slightly lower than in the previous group, further reinforcing this possibility.

Students from Above 10 Lakhs income families group is the smallest sample. Strikingly, the majority (64.28%) reported average usage while a few (7.14%) fall under high and low usage categories. No respondents reported very high usage. This shows that among wealthier students, mobile devices may not be the primary tool for

learning as they likely rely on desktop computers or other advanced technologies. Their dependence on mobile learning seems less significant compared to lower- and middle-income groups.

Comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to family income by test of significance

For comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to family income, the hypothesis which stated that "There is significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income" was converted to a null hypothesis which stated that "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income."

To compare the use of mobile devices for learning among degree college students of Mizoram in relation to family income, ANOVA was performed and the results are presented in the following table.

Sources of variance	**Degrees of freedom**	**Sum of the squares**	**Mean Square**	**F Ratio**
Between Set	(S - 1) = 4 - 1 = 3	501.85	167.28	**1.55**
Within set	N – S = 500 – 4 = 496	53634.41	108.13	

Table shows that the calculated F-ratio was 1.55, which is lower than the critical value of 4.66 at 0.01. Hence, the null hypothesis "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income" cannot be rejected. Hence, there is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income.

5. A comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

Level of Usage	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Below HSLC	6 (2.79%)	50 (23.26%)	111 (51.63%)	46 (21.4%)	2 (0.93%)
HSLC	3 (4%)	21 (28%)	39 (52%)	12 (16%)	0
HSSLC	5 (7.58%)	16 (24.24%)	35 (53.03%)	10 (15.15%)	0
Undergraduate	1 (1.03%)	24 (24.74%)	49 (50.52%)	18 (18.56%)	5 (5.15%)
Master Degree or Above	1 (2.13%)	13 (27.66%)	29 (61.7%)	4 (8.51%)	0

The findings presented in the above table highlights the relationship between father's educational background and the extent of mobile device usage for learning among degree college students in Mizoram. A distinct pattern emerges, though the variations are minimal between educational categories. Students whose fathers have education below HSLC show a strong tendency towards average usage (51.63%) with only a small proportion in the "very high" (2.79%) and "very low" (0.93%) categories. This shows that while students from such backgrounds do engage in mobile-based learning, they are less likely to fall into extremes of usage. The high percentage of "average" and "low" users (73.03% combined) may reflect limited parental encouragement or exposure to digital learning, possibly due to lower digital literacy among parents.

In the category of students whose fathers have HSLC level of education, average usage is again dominant (52%) with a noticeable share in the

“high usage” category (28%). Interestingly, there are no respondents in the “very low usage” group. This indicates a slightly positive shift compared to those below HSLC, showing that even modest improvements in parental education can contribute to greater support or acceptance of technology-based learning.

Students whose fathers completed HSSLC also show high concentration in the average usage group (53.03%). However, this group also has the highest percentage of “very high users” (7.58%) compared to lower education categories. This may suggest that with higher parental education, students are more likely to explore and adopt mobile devices intensively for learning.

In the category of students whose fathers have graduate level of education, average usage remains dominant (50.52%) but what stands out is the relatively higher proportion in both “low usage” (18.56%) and “very low usage” (5.15%). This could imply a mixed impact: while many students still rely on mobile devices, a section may feel less dependent on them, possibly because of alternative resources (e.g., books, desktop computers) available in relatively more educated households.

Among students whose fathers hold a Master’s degree or higher, average usage is highest (61.7%), coupled with a strong share in the “high usage” category (27.66%). Only a small fraction fall into “low usage” (8.51%) and none are in “very low.” This indicates a positive correlation between higher parental education and a balanced yet consistent reliance on mobile devices for learning. Higher-educated parents may encourage diversified and purposeful usage of digital tools, leading to more consistent engagement without extremes.

Comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background

For comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background, the hypothesis which stated that "There is significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background" was converted to a null hypothesis which stated that "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

To compare the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background, ANOVA was performed and the results are presented in the following table

Sources of variance	**Degrees of freedom**	**Sum of the squares**	**Mean Square**	**F Ratio**
Between Set	(s-1) = 5-1 =4	1014.62	4	**2.36**
Within set	N-s=500-5=495	53121.64	495	

Table shows that the calculated F-ratio was 2.36, which is lower than the critical value of 4.66 at 0.01. Hence, the null hypothesis "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background" cannot be rejected. Hence, there is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

Objective 5: To find out the relationship between the level of usage of mobile devices for learning and academic achievement of degree college students of Mizoram.

The statistical analysis using Pearson's product–moment correlation revealed a correlation coefficient of $r(498) = 0.064$, indicating a very weak positive relationship between the two variables. This means that students who reported higher scores in mobile device usage for learning tended to have slightly higher examination marks. However, the association was extremely small in magnitude and lacked practical significance. The p-value of 0.153 exceeded the conventional significance threshold of 0.05 confirming that the correlation was not statistically significant. Therefore, there is insufficient evidence to assert that higher usage of mobile devices for learning is systematically linked to improved academic performance in this context.

Objective 6: To identify the types of mobile devices used and the extent of their usage among degree college students in Mizoram.

Types of mobile devices used for learning by degree college students of Mizoram

Types of Mobile Devices Used	No. of Students
Smartphone	447 (89.4%)
Smartphone, Laptop	40 (8%)
Smartphone, Tablet/iPAD	7 (1.4%)
Smartphone, Tablet/iPAD, Laptop	4 (0.8%)
Smartphone, Tablet/iPAD, Laptop, PDA	2 (0.4%)

The study found that smartphones are by far the most dominant mobile learning device among degree college students in Mizoram, with 447 out of 500 respondents (89.4%) reporting exclusive use of smartphones for academic purposes. A smaller segment of students (8%) reported using smartphones alongside laptops and only a handful incorporated tablets/iPads into their learning toolkit. The combination of smartphone, tablet/iPad, laptop and PDA use was reported by just

0.4% of the students, underscoring the near obsolescence of PDAs in contemporary academic contexts.

Extent of use of mobile devices for learning by degree college students of Mizoram on a daily basis.

Extent of use of Mobile Devices for Learning	No. of Students
1 Hour	140 (28%)
1 to 2 Hours	171 (34.2%)
2 to 3 Hours	104 (20.8%)
3 to 4 Hours	54 (10.8%)
4 to 5 Hours	16 (3.2%)
More than 5 Hours	15 (3%)

In terms of daily usage, 34.2% of students reported spending between 1–2 hours on mobile learning, followed by 28% who dedicated just 1 hour. Around 20.8% used mobile devices for 2–3 hours, while longer durations 3–4 hours (10.8%), 4–5 hours (3.2%) and more than 5 hours (3%) were relatively uncommon. The data indicates a moderate engagement level with the majority (63%) using mobile devices for learning for less than two hours daily.

***Objective No.7: To investigate the factors contributing to disparities in mobile device usage for learning among degree college students in Mizoram*:**

To investigate the causes for the disparities in the use of mobile devices for learning of degree college students of Mizoram an interview was conducted with thirty-six (36) students from different colleges. This study investigates the factors contributing to disparities in the use of mobile devices for learning among degree college students. The findings are presented below.

1. **Device and Internet Access:** All students owned mobile devices, but disparities in and storage capacity limited some students' ability to access or

store learning resources. Paid content restrictions also reduced access to certain educational materials. While some students reported good connectivity, others expressed difficulties. Students in urban centers like Aizawl experienced fewer connectivity issues, while those in smaller towns or villages reported challenges in maintaining stable access.

2. **Skills and Confidence:** In terms of digital skills, most students expressed confidence in using mobile devices for academic purposes. They reported using them for reading, watching videos and assignments with ease. However, a few students mentioned barriers related to skills and technical handling. This shows that while the majority are digitally competent, there remains a minority of learners who require digital literacy support. -based curriculum delivery.

3. **Learning Context:** Students reported using mobile devices both inside and outside classroom contexts with strong emphasis on supplementary learning, assignments and exam preparation. For instance, students reported using mobile learning to summarize lengthy answers which enhanced their retention of information. In addition, they indicated that mobile learning was highly beneficial during their studies particularly in completing assignments.

4. **Usage and Challenges:** A strong theme across responses was the positive contribution of mobile learning to language development, particularly English. Students frequently mentioned its role in vocabulary building, translation, and supplementary reading. However, not all students found mobile learning equally beneficial for language. These exceptions indicate that while mobile learning generally enhances language access, screen size, content quality and individual learning styles influence outcomes.

5. **Language and Content Accessibility:** Many students improved their language skills through mobile learning, using translation tools and

supplementary reading. However, comprehension issues and paywalled resources limited access for some. Many students found that mobile learning improved their language skills, particularly when using videos, translation tools and supplementary reading materials. Few students specifically used mobile devices to access translations and improve understanding of content. However, content accessibility was not equal for all. Some students had trouble fully understanding some materials without help from other sources. While the majority benefited linguistically from mobile learning, a minority experienced barriers that reduced the inclusivity of the available content.

6. **Perceptions and Inclusivity:** Overall, students perceived mobile learning as flexible, supportive and effective in complementing traditional education. However, inclusivity issues arise when considering distractions and unequal access. Distractions were widely reported, with students rating them between 3/10 to 7.5/10. The finding shows that while most students can adapt others may struggle to balance learning with entertainment, leading to uneven outcomes.

Objective 8: To examine the suitability of Mizoram University Curriculum for supporting mobile learning.

1. Overall Curriculum Suitability for Mobile Learning

1) Across all disciplines, teachers acknowledged that a significant portion of learning objectives can be achieved via mobile platforms.

2) While mobile learning can deliver a substantial amount of the curriculum content, teachers emphasized its role as a supplementary rather than a complete replacement for face-to-face instruction.

3) A recurring theme was reliance on printed books as the primary learning source, particularly in disciplines with limited digital resources.

2. Subject-wise Analysis

i) *Arts Stream*

- Subjects like Political Science, History, Sociology, Education, Public Administration and English can integrate interactive tools such as -discussion forums for debates, virtual tours for History, interactive policy simulations for Public Administration and e-reading and annotation tools for English.
- Mizo language faces severe digital content scarcity; only about 10% of its curriculum can be supported by mobile learning. Teachers often have to create and distribute their own PDF resources.
- In most Arts subjects, 60–80% of assignments (short essays, quizzes, source analyses) can be completed on mobile devices. Long research papers and extensive field-based work still require traditional methods.

ii) Science Stream

- Science subjects like Zoology, Botany, Biotechnology, Physics, Chemistry, Biochemistry, Mathematics, Home Science benefit from virtual labs for practical experiments, simulation apps for visualizing molecular, physical and biological processes and data analysis tools for statistical and experimental work.
- Hands-on experiments, specimen handling and field measurements cannot be fully replicated on mobile devices.
- Approximately 70–85% of theoretical and analytical tasks can be managed through mobile devices.

iii)Commerce Stream

- Commerce courses can effectively use simulation-based accounting software, case study apps for legal and management analysis, collaborative platforms for group projects and tax calculation tools for applied exercises.

- Most assignments like problem-solving, financial analysis, report writing and presentations can be completed via mobile devices except for certain high-complexity tasks needing extended in-person collaboration.

3. Pedagogical Benefits

From the teachers' perspectives, the Mizoram University curriculum can harness mobile learning in several ways:

1) Almost all subjects encourage independent study components, which align well with mobile access to e-books, videos and tutorials.
2) Multimedia content like videos, quizzes and simulations can make abstract concepts more tangible.
3) Messaging apps, discussion boards and cloud-based tools allow for seamless peer-to-peer and teacher-student interaction.
4) Mobile learning opens access to global knowledge repositories and specialized apps for subject-specific learning.

4. Challenges and Limitations

1) Especially acute in Mizo language and other region-specific subjects with limited online material.
2) Science and vocational courses cannot replicate all lab or field experiences virtually.
3) While quizzes and short assignments are feasible, longer research tasks are cumbersome to produce on mobile.

5. Assessment Feasibility

Stream-wise Feasibility of Mobile Learning in Mizoram University Curriculum

Stream	Estimated Mobile Feasibility	Examples of Feasible Tasks	Examples of Non-Feasible Tasks
Arts	60 – 80%	Quizzes, essays, document analysis, short research	Extensive fieldwork, long papers requiring multiple citations
Science	70 – 85%	Virtual labs, simulations, data analysis	Physical experiments, specimen handling
Commerce	75 – 90 %	Simulations, case studies, accounting exercises, reports	Large-scale collaborative audits or in-person presentations

The analysis indicates that the Mizoram University curriculum has a moderately high compatibility with mobile learning. Most subjects, particularly in Commerce and parts of Science can deliver the majority of their learning objectives through mobile platforms. Arts subjects also show strong potential with the exception of resource-limited disciplines like Mizo language.

Mobile learning can significantly enhance flexibility, accessibility and interactivity, making it especially valuable in geographically challenging regions like Mizoram. However, full-scale adoption requires bridging digital resource gaps and maintaining hybrid models for practical work.

Recommendations:

Taking into consideration the findings of the present study, the investigator recommends the following:

1) Integrate mobile learning with traditional classroom instruction to combine the advantages of both approaches while preserving the value of face-to-face interaction. Gikas and Grant (2013) assert that mobile devices facilitate collaborative, context-driven learning that enhances teacher-led instruction. Consequently, the integration of mobile learning with traditional pedagogy enables learners to access resources, engage asynchronously and obtain immediate feedback while maintaining classroom discourse and peer interaction.

2) Fill up resource gaps in subjects like Mizo language and science practicals by developing authentic online materials that correspond with the syllabus and handle accuracy difficulties. The study conducted by Hsu and Ching (2015) underlines the significance of curated, syllabus-aligned digital resources for ensuring academic integrity and curricular consistency. In the context of Mizoram where disciplines such as the Mizo language and scientific practicals exhibit inadequate digital representation, the curation of reliable online materials can address content deficiencies and enhance learning accessibility. Institutional control and content validation ensure academic integrity while fostering fair learning opportunities.

3) Provide professional development programs for teachers to strengthen skills in mobile pedagogy, content evaluation and effective integration of mobile learning into lessons. In their chapter “Teacher Training and Professional Development in Mobile Pedagogy for English Language Teaching”, Norris and Kukulska-Hulme (2017) document how a customized CPD (continuing professional development) programme in Europe helped teachers develop confidence in designing mobile-assisted tasks, assessing digital content and incorporating pedagogical frameworks that link technology and pedagogy. They particularly emphasize teacher wisdom, the idea that professional

learning must empower teachers to make thoughtful decisions about when and how to use mobile devices and align them with their curricular goals.

4) Promote purposeful and academically focused mobile device use rather than simply increasing the amount of time spent on devices. Although mobile learning provides flexibility, Selwyn (2016) warns against technology-centric methods that prioritize screen time over the quality of learning. Promoting purposeful and academically focused utilization of mobile devices guarantees that technology enhances rather than distracts from education. Educational institutions ought to prioritize focused on a goal activity including digital note-taking, quiz-based learning and academic communication using educational applications.

5) Adopt blended approaches for practical and hands-on subjects, combining physical activities with virtual simulations or demonstrations. The ability of mobile learning to simulate real-world experiences through virtual laboratories and demonstrations corresponds with Hrastinski's (2019) observations regarding the efficacy of blended learning. In subjects requiring practical engagement such as science, fine arts and commerce integrating physical activities with virtual simulations facilitates the continuity of experience learning while reducing infrastructural constraints.

6) Invest in the creation of localized and culturally relevant educational resources. The UNESCO (2013) recommendations on ICT in education emphasize the necessity for contextually pertinent materials that embrace local languages and cultures. Investing in localized and culturally pertinent educational tools fosters inclusivity and enables learners to engage with information on a personal and communal level. This is especially vital in areas such as Mizoram where internet resources in indigenous languages are limited.

7) Establish partnerships with local publishers and Mizoram University can help digitize and update textbooks, journals and other learning materials in subjects that are underrepresented. The OECD (2023) emphasizes that

collaboration between institutions and other stakeholders is key to ensuring the sustainability and quality of digital education initiatives. Such partnerships can make educational resources more widely available, provide equal access across different streams and maintain continuity across multiple disciplines.

8) Encourage the use of interactive tools such as online debates, mind-mapping apps and virtual case studies in Arts and Commerce. Pinto & Leal (2022) found that mobile learning strategies like concept mapping and peer interaction significantly boost students' reasoning, judgment and higher-order thinking. In the Arts and Commerce disciplines such involvement fosters practical learning and innovative exploration.

9) Develop subject-specific digital content repositories validated by faculty to address reliability concerns reported by teachers across all streams. Establish subject-specific digital content repositories validated by faculty to improve resource reliability. Heine & Konig (2022) argue that well-defined and educator-approved digital resources are central to teachers' professional digital competence. In the Mizoram context, such faculty-curated repositories can reduce dependence on unverified online content while fostering scholarly collaboration and curricular continuity. In the Mizoram context, such faculty-curated repositories can reduce dependence on unverified online content while fostering scholarly collaboration and curricular continuity.

Suggestions for further research:

In the light of the present study, the investigator suggests the following areas for further investigation:

1) To investigate the long-term effects of mobile learning on academic performance, skill development and learner autonomy in Mizoram.
2) A comparative study of assessing the effectiveness of traditional, fully mobile and blended learning models in Mizoram.

3) An evaluative study of mobile learning influences and learning outcomes in theory-heavy and practical-heavy disciplines in Mizoram.
4) To examine the impact of mobile learning on student engagement, motivation and collaboration in North East India.
5) A study on the Technology Acceptance Model (TAM) to identify factors affecting adoption and sustained use of mobile learning in Mizoram.
6) A critical analysis of mobile learning applications for subjects with limited existing digital resources in Mizoram.
7) Investigate strategies to improve students' digital literacy and ability for the credibility and accuracy of online information in Mizoram.
8) Effectiveness of mobile-based virtual laboratory simulations for science students in developing practical competencies in Mizoram.
9) Explore the relationship between mobile learning usage patterns (e.g., time spent, type of resources accessed) and specific cognitive skills like critical thinking, creativity and problem-solving in Mizoram.
10) A study of socio-economic factors such as family income, influence device ownership, internet access and mobile learning effectiveness in Mizoram.

Appendix 1

Students opinionnaire on mobile learning

The following questions are intended to understand the opinion of degree college students on mobile learning and there is no wrong or right answer to your response. Put a tick mark (√) in the box next to the statement that you find most appropriate.

Name _____ **Age _____**

Gender _____ **Locale: Rural/ Urban**

Stream _____

Sl. No.	Questions	Yes	No
1	Learning with Mobile Devices affect my concentration.		
2	Mobile Learning can enhance the theoretical part of the subject.		
3	Mobile learning decreases the value or importance of classroom instruction.		
4	Using mobile devices for learning increases my success rate.		
5	Use of mobile learning will increase in the near future.		
6	Mobile learning is as effective as traditional learning.		
7	Using mobile devices for educational purposes motivates me.		
8	Do you want your teachers to integrate mobile learning in the classroom?		

Appendix 2

Mobile device use for learning scale for students

Instruction: Please read the following questions carefully and provide your answer by putting a tick mark in the options given. Options are provided for each question and there is no right or wrong answer. *(Note: For those students residing in the District Capital for at least 5 years may choose Urban in the locale section)*

Name: _____ Stream: Arts/Science/Commerce

Sex: Male: _____ Female: _____ Age: _____

Locale: Urban: ____Rural: _____ Date: _____

Section A: *Student's information:*

1. Yearly family income
   - Below 1 Lakh
   - Between 1 Lakh to 5 Lakh
   - Between 5 Lakh to 10 Lakh
   - Above 10 Lakh

2. Father's Educational Background
   - Below HSLC
   - HSLC
   - HSSLC
   - Undergraduate
   - Master Degree or above

3. Mother's Educational Background
   - Below HSLC
   - HSLC
   - HSSLC
   - Undergraduate
   - Master Degree or above

4. Father's Occupation
   - Service
   - Business

- Self-employed - Unemployed

5. Mother's Occupation
   - Service - Business
   - Self-employed - Unemployed

6. What type of mobile devices do you own? (Tick all the devices you own)
   -Smartphone -Tablet/iPAD -Laptop -PDA

7. Do you use mobile devices for learning? -Yes -No

8. How many hours do you spend on mobile devices in general? (This includes the time you spend on social media).
   - 1 to 2 Hours - 2 to 3 Hours
   - 3 to 4 Hours - 4 to 5 Hours
   - More than 5 Hours

9. How many hours do you spend on mobile devices for learning?
   - 1 to 2 Hours - 2 to 3 Hours
   - 3 to 4 Hours - 4 to 5 Hours
   - More than 5 Hours
   - Yes - No

10. Which smartphone device do you believe is most crucial to your success rate?
    - Smartphone -Tablet/iPAD -Laptop -PDA

Section B: Mobile device use for learning scale.

1. I use mobile devices to complete my assignments.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

2. I use mobile devices to work on my college projects.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

3. I do not use mobile devices for academic group discussion.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

4. I use mobile devices to communicate with my friends for preparation of examnations.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

5. I use mobile devices for downloading learning materials.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

6. I do not use mobile devices for taking a screenshots of class lecture notes.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

7. I use mobile devices to record class lectures.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

8. I connect with other experts from different institutions using mobile devices.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

9. I do not use mobile devices for playing educational games.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

10. I use mobile devices to communicate with my friends.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

11. I use mobile devices to communicate with my teachers.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

12. Using a mobile devices does not helped me develop my soft skills. Eg. Communication and interpersonal skills, Problem Solving Skills, Time management and organisation etc.
   - Always
   - Frequently
   - Sometimes
   - Rarely
   - Never

13. I use mobile devices to learn about different cultures by watching movies/documentaries.
    - Always
    - Frequently
    - Sometimes
    - Rarely
    - Never

14. I do not use mobile devices to watch/listen to motivational speeches/videos.
    - Always
    - Frequently
    - Sometimes
    - Rarely
    - Never

15. I use mobile devices to get relief from social stress.
    - Always
    - Frequently
    - Sometimes
    - Rarely
    - Never

16. I use mobile devices for getting jobs related information.
    - Always
    - Frequently
    - Sometimes
    - Rarely
    - Never

17. I use mobile learning to get information regarding current social events.
    - Always
    - Frequently
    - Sometimes
    - Rarely
    - Never

18. I learn about the latest update about my studies using mobile devices.
    - Always
    - Frequently
    - Sometimes
    - Rarely
    - Never

19. I use mobile devices to read e-contents like e-journals, e-book, e-newspapers etc.

- Always
- Frequently
- Sometimes
- Rarely
- Never

20. I use mobile devices to access educational tools such as Online Applications/Software.

- Always
- Frequently
- Sometimes
- Rarely
- Never

21. I do not use online dictionary to help me with my language issues.

- Always
- Frequently
- Sometimes
- Rarely
- Never

Appendix 3

Interview Schedule for degree college students to investigate the causes for the disparities in the use of mobile devices for learning of degree college students of Mizoram.

Name: _____ Sex : _____

Name of College: _____ Locale: _____

Stream : _____

Sl No.	Questions
1	Do you own mobile device?
2	Do you have good internet connectivity?
3	Do you use mobile device for mobile learning?
4	Does it help you in language development?
5	Do you find mobile learning effective?
7	Do you face any difficulties when using these tools?
8	What are the biggest challenges you face in using mobile devices for learning?
9	Are there any distractions or challenges in your study environment?

Appendix 4

Interview Schedule for college teachers for examining the suitability of Mizoram University Curriculum for mobile learning.

Name: _____ Sex : _____

Name of College: _____ Stream : _____

Subject Teach: _____

Sl No.	Questions
1	Do you think the learning objectives of your courses can be achieved using mobile learning platforms? Why or why not?
2	Are there specific curriculum areas that would benefit from interactive mobile features?
3	Does the curriculum encourage self-paced or flexible learning that mobile technology could support?
4	In your opinion, what teaching methods in your subject are best supported by mobile learning?
5	To what extent can the assignments or assessments in your subject be completed via mobile devices?
6	Have you or your colleagues already used mobile learning for parts of your curriculum?

BIBLIOGRAPHY

Alawi, A. A. A. G., Shwal, M., & Nasreen, N. (2015). Interaction Triangle of Mobile Learning & ELearning and Computer Tools (CUAELML) in the Basic Class: Attitudes & opinions of pre-service teachers. *Multimedia Technology (MT)*, 4. https://issuu.com/sep2011--now/docs/mt9599_4_0_1_11

Al-Adwan A. S., Al-Adwan A. & Berger, H. (2018, January). Solving the mystery of mobile learning adoption in higher education. *International Journal of Mobile Communications* *16*(1), 24-49. http://dx.doi.org/10.1504/IJMC.2018.088271

Al-Emran, M., Elsherif, H. M., & Shaalan, K. (2016). Investigating attitudes towards mobile learning in higher education. *Computers in Human Behavior, 56*, 93–102. https://doi.org/10.1016/j.chb.2015.11.033

Ali, K. (2019). Role of digital pedagogy in enhancing learner engagement at primary level in India with reference to Assam. *International Journal of Innovative Research in Technology* (IJIRT), *6*(2), 357–361. https://ijirt.org/publishedpaper/IJIRT182036_PAPER.pdf?utm_

Ally, M., & Prieto-Blázquez, J. (2014). What is the future of mobile learning in education? *RUSC: Universities and Knowledge Society Journal, 11*(1), 142–151. https://doi.org/10.7238/rusc.v11i1.2033

Alqahtani, M. & Mohammad, H. (2015, October). Mobile Applications' Impact on Student Performance and Satisfaction. *The Turkish Online Journal of Educational Technology, 14*(4), 102-112. https://files.eric.ed.gov/fulltext/EJ1077662.pdf

Alrasheedi, M., & Capretz, L. F. (2015). Mobile learning adoption model: A critical review and future research. *Journal of Computer Science*, *11*(7), 1187-1199.

Al-Rahmi, A., M., Al-Rahmi, W., M., Alturki, U., Aldraiweesh, A., Almutairy, S., & Al-Adwan, A., S. (2021). Exploring the Factors Affecting Mobile Learning for Sustainability in Higher Education. *Sustainability, 13*(14), 2-22. https://www.mdpi.com/2071-1050/13/14/7893

Ansari, M. S. & Tripathi, A. (2017). An Investigation of Effectiveness of Mobile Learning Apps in Higher Education in India. *International Journal of Information Studies & Libraries, 2*(1), 33-41. https://bit.ly/3HYAKW5

Aslan, S., & Reigeluth, C. M. (2011). A trip to the past and future of educational computing: Understanding its evolution. *Contemporary Educational Technology, 2*(1), 1–17. https://doi.org/10.30935/cedtech/6040

Bajwa, S. S. (2023). Need and necessity of digital media literacy in North-East India. *International Journal of Scientific Development and Research, 8*(7), 456–463. https://ijsdr.org/papers/IJSDR2307066.pdf

Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.

Baran, E. (2014, October). A Review of Research on Mobile Learning in Teacher Education. *Educational Technology & Society, 17* (4), 17–32.

Banerjee, J., & Bose, I. (2011). Higher education through mobile learning: an analysis of students from Kolkata. *Indian Journal of Commerce & Management Studies, 2*(1). https://ideas.repec.org/a/aii/ijcmss/v2y2011i1p123-134.html

Bansal, T., & Joshi, D. (2014). A study of students' experiences of mobile learning. *Global Journal of HUMAN-SOCIAL SCIENCE: H Interdisciplinary, 14*(4), 27-33. https://shorturl.at/LWaNG

Bergmann, J., & Sams, A. (2012). *Flip your classroom: Reach every student in every class every day*. International Society for Technology in Education (ISTE).

Booth, A., Sutton, A., & Papaioannou, D. (2016). *Systematic approaches to a successful literature review* (2nd ed.). SAGE Publications.

Boro, B., Laltlanzova, R., & Chanchinmawia, F. (2024). Examining digital literacy skills among Gen Z students of Mizoram University: The impact of the Internet in the academic environment. *DESIDOC Journal of Library & Information Technology, 44*(1), 32–36. https://doi.org/10.14429/djlit.44.1.19291

Boyinbode, O., & Fasunon, D. (2015). Deploying an interactive mobile learning system in the classroom. *International Journal of u- and e-Service, Science and Technology, 8*(4), *321–330.*

https://doi.org/10.14257/ijunesst.2015.8.4.29

Camilleri & Camilleri. (2019). *Mobile Learning via Educational Apps: An Interpretative Study*. https://bit.ly/3YMDwnS

Cepeda, N. J., Pashler, H., Vul, E., Wixted, J. T., & Rohrer, D. (2006). Distributed practice in verbal recall tasks: A review and quantitative synthesis. *Psychological Bulletin, 132*(3), 354–380. https://doi.org/10.1037/0033-2909.132.3.354

Chandran, S. (2010). Sustainable distance education through mobile learning: A case study in multicultural context. *OIDA International Journal of Sustainable Development, 2*(4), 35-40. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1715281

Chatterjee, S., Majumdar, D., Misra, S., & Damasevicius, R. (2020). Adoption of mobile applications for teaching-learning process in rural girls' schools in India: An empirical study. *Education and Information Technologies, 25*, 4057–4076. https://doi.org/10.1007/s10639-020-10168-6.

Choudhury, S., & Senapati, C. (2021). *Digital education and Assam: A case study of KKHSOU. NSOU-OPEN Journal, 4*(1), 53–57. https://shorturl.at/Fklfs

Chuchu, T., & Ndoro, T. (2019). An Examination of the Determinants of the Adoption of Mobile Applications as Learning Tools for Higher Education Students. *International Journal of Interactive Mobile Technologies*, *13*(3), 53–67.

Creswell, J. W., & Creswell, J. D. (2018). *Research design: Qualitative, quantitative, and mixed methods approaches* (5th ed.). SAGE Publications.

Crompton, H. (2013). *A historical overview of mobile learning: Toward learner-centered education*. In Z. L. Berge & L. Y. Muilenburg (Eds.), *Handbook of mobile learning* (pp. 3–14). Routledge.

Crompton, H., & Burke, D. (2018). The use of mobile learning in higher education: A systematic review. *Computers & Education*, 123, 53–64. https://doi.org/10.1016/j.compedu.2018.04.007

Cuban, L. (1986). *Teachers and machines: The classroom use of technology since 1920*. Teachers College Press.

Darmendrail, L., Gasparini, A., & Müller, A. (2023). Mobile devices as experimental tools in physics education: Some historical and educational background. *arXiv*. https://doi.org/10.48550/arXiv.2303.07294

Demir, K. & Akpinar, E. (2018). The effect of mobile learning applications on students' academic achievement and attitudes toward mobile learning. *Malaysian Online Journal of Educational Technology, 6*(2), 48-59. https://files.eric.ed.gov/fulltext/EJ1174817.pdf

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: Defining "gamification." In *Proceedings of the 15th International Academic MindTrek Conference* (pp. 9–15). ACM. https://doi.org/10.1145/2181037.2181040

Dhara, T., & Bandyopadhyay, S. (2021). Mobile learning: It's factors and challenges: A literature review. *International Journal of Advanced Academic Studies, 3*(1), 210-213. https://www.allstudyjournal.com/article/489/3-1-36-748.pdf.

Eshet-Alkalai, Y. (2004). Digital literacy: A conceptual framework for survival skills in the digital era. *Journal of Educational Multimedia and Hypermedia, 13*(1), 93–106. https://www.learntechlib.org/primary/p/4793/

Fahad. (2009). Students' Attitudes and Perceptions towards the effectiveness of Mobile Learning in King Saud University, Saudi Arabia. *The Turkish Online Journal of Educational Technology*, *8*(2). https://files.eric.ed.gov/fulltext/ED505940.pdf

Foti, K. M., & Mendez, J. (2014). Mobile Learning: How Students Use Mobile Devices to Support Learning. *Journal of Literacy and Technology*, *15*(3). https://shorturl.at/10FEU

Fouzdar, K., & Behera, S., K. (2017). Attitude of Post Graduate Students towards Mobile Learning. EDUCARE: *International Journal for Educational Studies*, *9*(2), 111-120. https://mindamas-journals.com/educare/article/view/803

Garrison, D. R., & Vaughan, N. D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. Jossey-Bass.

Gikas, J., & Grant, M. M. (2013). Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones and social media. *The Internet and Higher Education, 19*, 18–26. https://doi.org/10.1016/j.iheduc.2013.06.002

Grove, S. K., Gray, J. R., & Burns, N. (2015). *Understanding nursing research: Building an evidence-based practice* (6th ed.). Elsevier.

Government of India. (2009). *The Right of Children to Free and Compulsory Education Act, 2009*. Ministry of Law and Justice. https://legislative.gov.in

Government of India. (2020). *National Education Policy 2020*. Ministry of Education. https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf

Gupta, S. P. (2011). *Statistical methods*. Sultan Chand & Sons.

Halder, I., Halder, S., & Guha, A. (2015). Undergraduate students' use of mobile phones: Exploring use of advanced technological aids for educational purpose. *Media and Communication Studies, 7*(4), 81-87. https://doi.org/10.5897/JMCS2014.0418

Hart, C. (2018). *Doing a literature review: Releasing the research imagination* (2nd ed.). SAGE Publications.

Hartley, K., Bendixen, L. D., Gianoutsos, D., & Shreve, E. (2020). The smartphone in self-regulated learning and student success: Clarifying relationships and testing an intervention. *International Journal of Educational Technology in Higher Education, 17*(1). https://doi.org/10.1186/s41239-020-00230-1

Hauminlun, & Singh, Ch., I. (2022). *Impact of Smartphone Among Postgraduate Students of Manipur University: A Study*. INFLIBNET Centre.https://shorturl.at/DHIgi

Hemabala, J., & Suresh. E., S., M. (2013). Mobile learning for undergraduate engineering students. *International Journal of Computer and Information Technology, 2*(6), 1175-1180. https://www.researchgate.net/publication/273452198

Hrastinski, S. (2019). What do we mean by blended learning? *TechTrends, 63*(5), 564–569. https://doi.org/10.1007/s11528-019-00375-5

Hug, T. (2005). Micro learning and narration: Exploring possibilities of utilization of narrations and storytelling for the designing of “micro units” and didactical micro-learning arrangements. In C. Montgomerie & J. Seale (Eds.), *Proceedings of World Conference on Educational Multimedia, Hypermedia and Telecommunications 2005* (pp. 1–8). AACE.

Husain, N. (2016). *Learning and teaching: A constructivist approach*. Shipra Publications.

Husain, S. (2016). Learning styles and academic achievement. *Journal of Education and Practice*, *7*(33), 101–107.

Illeris, K. (2018). *Contemporary theories of learning: Learning theorists in their own words*. Routledge.

Illeris, K. (2018). *Theories of learning* (3rd ed.). Routledge.

Jagadeeswari, M. (2017). Attitude towards mobile learning among undergraduate college students in Chennai City. *International Education and Research Journal (IERJ), 3*(7). http://ierj.in/journal/index.php/ierj/article/view/1259

Kadel, R., Guruge, D. B., Aziz, S. & Karagiannidis, V. (2021, September). Mobile Learning Approaches and Its Impact on Student’s Edcuation- A Survey. *International Journal of Information and Education Technology, 11*(9), 429-435.

Knowles, M. S., Holton, E. F., & Swanson, R. A. (2015). *The adult learner: The definitive classic in adult education and human resource development* (8th ed.). Routledge.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall.

Kopackova, H. (2014). "Preparedness for mobile learning at higher education," *The 10th International Conference on Digital Technologies 2014*, Zilina, Slovakia, 146-151. https://doi.org/10.1109/DT.2014.6868706

Koole, M. L. (2009). A model for framing mobile learning. In *Mobile learning: Transforming the delivery of education and training* (pp. 25–47). Athabasca University Press.

Krull, G., & Duart, J. M. (2017). Research Trends in Mobile Learning in Higher Education: A Systematic Review of Articles (2011 – 2015). *The International Review of Research in Open and Distributed Learning*, *18*(7). https://doi.org/10.19173/irrodl.v18i7.2893

Kukulska-Hulme, A., & Shield, L. (2008). An overview of mobile assisted language learning: From content delivery to supported collaboration and interaction. *ReCALL*, *20*(3), 271–289. https://doi.org/10.1017/S0958344008000335

Kukulska-Hulme, A., Pettit, J., Bradley, L., Carvalho, A. A., Herrington, A., Kennedy, D. M., & Walker, A. (2009). An international survey of mature students' uses of mobile devices in life and learning. *Journal of Computer Assisted Learning*, *25*(6), 520–532. https://doi.org/10.1111/j.1365-2729.2009.00392.x

Kukulska-Hulme, A. (2021). Mobile-assisted language learning [Revisited and updated]. In C. A. Chapelle (Ed.), *The concise encyclopedia of applied linguistics*, 713–718. Wiley-Blackwell. https://doi.org/10.1002/9781405198431.wbeal0767.pub2

Kumar, R. (2019). *Research methodology: A step-by-step guide for beginners* (5th ed.). SAGE Publications.

Kumar, R., & Madhu, S. (2018). Perceptions of higher education students towards the effectiveness of mobile learning in West Bengal. *International Journal of Research and Analytical Reviews (IJRAR)*, *5*(3), 830–838. https://doi.org/10.1729/Journal.23371

Lalduhawma, L. P., Thangmawia, L., & Hussain, J. (2022). Effectiveness of online learning during the COVID-19 pandemic in Mizoram. *Journal of Education and E-Learning Research, 9*(3), 175–183. https://doi.org/10.20448/jeelr.v9i3.4162

Lalthlamuana, C. (2017). Mobile communication and society in Mizoram. *Mizoram University Journal of Humanities & Social Sciences*, *3*(1), 45–53.

Ligi, B., & Raja, W. D. (2017). Mobile Learning in Higher Education. *International Journal of Research -Granthaalayah*, *5*(4), 1-6. https://doi.org/10.5281/zenodo.569363

Lynnette, C., & Cabanban, G. (2013). Development of mobile learning using android platform. *International Journal of Information Technology & Computer Science (IJITCS)*, *9*(1). https://shorturl.at/Ri1iH

Mac Callum, K., & Jeffrey, L. (2013). The influence of students' ICT skills and their adoption of mobile learning. *Australasian Journal of Educational Technology, 29*(3), 303-314. https://doi.org/10.14742/ajet.298

Martin, F., & Ertzberger, J. (2013). Here and now mobile learning: An experimental study on the use of mobile technology. *Computers & Education 68*, 76–85. https://doi.org/10.1016/j.compedu.2013.04.021

Mandal, B. (2018). A Study on Attitude of College Students Towards Mobile Learning. *Review of Research, 7*(11), 1-8. http://oldror.lbp.world/UploadedData/5744.pdf

Matimbwa, R. & Anney, V. N. (2016, April). *Teachers' and students' perceptions of self-driven acceptance of mobile phone use as an ICT teaching tool.* https://hdl.handle.net/10520/EJC190056

Mcconatha, D., & Praul. M. (2008). Mobile learning in higher education: An empirical assessment of a new educational tool. *The Turkish Online Journal of Educational Technology –TOJET, 7*(3),15-21. https://files.eric.ed.gov/fulltext/EJ1102943.pdf

Mergany, N.N, Dafalla, A.E & Awooda, E. (2021, February). *Effect of mobile learning on academic achievement and attitude of Sudanese dental students: a preliminary study*. BMC Medical Education. https://bit.ly/40IKDzN

Microelectronics Education Programme. (n.d.). Retrieved October 5, 2025, from https://en.wikipedia.org/wiki/Microelectronics_Education_Programme

Ministry of Electronics and Information Technology (MeitY). (2015). *Digital India Programme*. Government of India. https://www.digitalindia.gov.in

Ministry of Education. (2018). *Samagra Shiksha Abhiyan Framework*. Government of India. https://www.education.gov.in

Ministry of Education. (2020). *National Education Policy 2020*. Government of India.https://www.education.gov.in/sites/upload_files/mhrd/files/NEP_Final_English_0.pdf

Mohammadi, M., Sarvestani, M.S. & Nouroozi, S. (2020, February). Mobile Phone Use in Education and Learning by Faculty Members of Technical-

Engineering Groups: Concurrent Mixed Methods Design. *Frontier in Education, 5.* https://doi.org/10.3389/feduc.2020.00016

Mondal, N. (2021). Attitude of Postgraduate students towards using mobile. *International Journal of Research Publication and Reviews, 2*(1), 141-146. https://www.ijrpr.com/uploads/V2ISSUE1/IJRPR135.pdf

Narayanasamy, F. S., & Mohamed, B.K.J. (2013). Adaptation of mobile learning in higher educational institutions of Saudi Arabia. *International Journal of Computer Applications, 69*(6), 34-38. https://shorturl.at/1wK8P

Naskar, A., & Naskar, P. (2021). A Study on the Usefulness of Mobile Learning in the Higher Education System in the Present Scenario in West Bengal. *Journal of Emerging Technologies and Innovative Research, 8*(5), e671-e682. https://www.jetir.org/papers/JETIR2105625.pdf

Naismith, L., Lonsdale, P., Vavoula, G., & Sharples, M. (2004). *Literature review in mobile technologies and learning*. University of Birmingham.

Octoproctor. (n.d.). *History of technology in education.* https://octoproctor.com/blog/history-of-technology-in-education

Okai-Ugbaje, S., Ardzejewska, K., & Imran, A. (2022). A mobile learning framework for higher education in resource constrained environments. *Education and Information Technologies, 27*(8), 11947–11969. https://doi.org/10.1007/s10639-022-11094-

Oberer, B., & Erkollar, A. (2013). Mobile learning in higher education: A marketing course design project in Austria. *Procedia - Social and Behavioral Sciences, 93*, 2125 – 2129. http://dx.doi.org/10.1016/j.sbspro.2013.10.177

Paliwal, S., & Sharma, K.K. (2009). Future Trend of Education – Mobile Learning Problems and Prospects. *ICAL – POSTER PAPERS*, 657-659. https://www.ijetajournal.org/volume-5/issue-1/IJETA-V5I1P1.pdf

Pande, J. (2018). Investigating The Attitude Towards the Use Of Mobile Learning In Open And Distance Learning: A case study of Uttarakhand Open

University. *The Online Journal of Distance Education and e-Learning, 6*(4), 40-47. https://uou.ac.in/sites/default/files/2021-10/Mobile-Learning.pdf.

Pane, J. F., Steiner, E. D., Baird, M. D., & Hamilton, L. S. (2015). *Continued progress: Promising evidence on personalized learning*. RAND Corporation.

Park, Y. (2011). A pedagogical framework for mobile learning: Categorizing educational applications of mobile technologies into four types. *The International Review of Research in Open and Distributed Learning, 12*(2), 78–102. https://doi.org/10.19173/irrodl.v12i2.791

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008). Learning styles: Concepts and evidence. *Psychological Science in the Public Interest, 9*(3), 105–119. https://doi.org/10.1111/j.1539-6053.2009.01038.x

Pinto, A. M., & Leal, A. (2022). Mobile learning and its effect on learning outcomes and critical thinking: A systematic review. *Applied Sciences, 14* (19), 9105. https://doi.org/10.3390/app14199105

Prasad, K. K., & Aithal, S. P. (2017). A Study on online education model using location based adaptive mobile learning. International Journal of Applied Engineering and Management Letters (IJAEML), 1(1). http://dx.doi.org/10.5281/zenodo.820457.

Raja, K., S & Shirley, M., C. (2019). Attitude towards mobile learning in relation to academic performance of pre-teachers. *International Journal of Multidisciplinary Research, 9*(3), 293-303. https://www.indianjournals.com/ijor.aspx?target=ijor:zijmr&volume=9&issue=3&article=029

Research-Methodology. (n.d.). *Conceptual and empirical literature*. Retrieved from Research-Methodology.net

Rueckert. D. Kim. J. D., & Seo. D. (2013). Students' perceptions and experiences of mobile learning. Language Learning & Technology, 17(3), 52–73. https://shorturl.at/M2zme

Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *American Psychologist, 55*(1), 68–78. https://doi.org/10.1037/0003-066X.55.1.68

Sao, S., Sutradhar, G., C., Chanda, P., & Gayen, R. (2018). Attitude of B.Ed. student-teachers' towards mobile learning. *International Journal of Research and Analytical Reviews*, *5*(3), 414y-420y.

Sarrab, M., Elgamel, L., & Aldabbas, H. (2012), Mobile Learning (M-Learning) and Educational Environments. *International Journal of Distributed and Parallel Systems (IJDPS)*, *3*(4), 31-38

Saxena, A., & Saxena, A. (2015). A viewpoint and attitudes of students' towards future of mobile learning in education industry of India. *International Journal of Management, MIT College of Management*, *3*(1), 18–22.

Schultz, W. (2015). Neuronal reward and decision signals: From theories to data. *Physiological Reviews*, *95*(3), 853–951. https://doi.org/10.1152/physrev.00023.2014

Senthilkumaran, M. (2017.) *A Study of Attitude Towards Mobile Learning Teaching Profession and Self Efficacy Among Prospective Teachers.* http://hdl.handle.net/10603/346931

Sha, L., Looi, C.-K., Chen, W., & Zhang, B. H. (2012). *Understanding mobile learning from the perspective of self-regulated learning*. Journal of Computer Assisted Learning, 28(4), 366–378. https://doi.org/10.1111/j.1365-2729.2011.00461.x

Sharples, M., Taylor, J., & Vavoula, G. (2014). A theory of learning for the mobile age. In R. Andrews & C. Haythornthwaite (Eds.), The SAGE handbook of e-learning research (2nd ed., pp. 63–81). SAGE Publications. https://shorturl.at/Zc8Nx

Siddiqui, A. T., & Masud, M. (2017). A system framework for smart class system to boost education and management. *arXiv*. https://doi.org/10.48550/arXiv.1707.02924

Singh, V., & Thurman, A. (2019). How many ways can we define online learning? *Online Learning*, *23*(2), 1–20.

Skinner, B. F. (1963). *Operant behavior*. New York: Appleton-Century-Crofts.

Sung, Y.-T., Chang, K.-E., & Liu, T.-C. (2016). The effects of integrating mobile devices with teaching and learning on students' learning performance: A

meta-analysis and research synthesis. *Computers & Education, 94*, 252–275. https://doi.org/10.1016/j.compedu.2015.11.008

Sunitha, R., & Elina, S. (2020, June). A Study on Mobile Applications in Education. *IITM Journal of Management and IT, 11*(1), 91-97. https://bit.ly/3jS6cgz

Tayebinik, M., & Puteh, M. (2012). Mobile Learning to Support Teaching English as a Second Language. *Journal of Education and Practice, 3*(7), 56-62. https://ssrn.com/abstract=2279326

Thaker, K., & Vaghela, S.P. (2021). Students' perceptions towards mobile learning during COVID-19. *International Journal of Library Information Network, 6*(2), 39-55. https://www.researchgate.net/publication/354901611_Students'_perceptions_towards_mobile_learning_during_COVID-19

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

Thomas, T., Singh, L., & Gaffar, K. (2013). The utility of the UTAUT model in explaining mobile learning adoption in higher education in Guyana. *International Journal of Education and Development using Information and Communication Technology, 9*(3), 71–85. https://www.learntechlib.org/p/130283/

Traxler, J. (2007). Defining, Discussing and Evaluating Mobile Learning: The moving finger writes and having writ. *The International Review of Research in Open and Distributed Learning, 8*(2). https://doi.org/10.19173/irrodl.v8i2.346

Traxler, J. (2009). Learning in a mobile age. *International Journal of Mobile and Blended Learning, 1*(1), 1–12. https://doi.org/10.4018/jmbl.2009010101

Traxler J. (2010). Students and mobile devices. *Research in Learning Technology*, *18*(2). https://journal.alt.ac.uk/index.php/rlt/article/view/883

Traxler, J. (2016). Inclusion in an age of mobility. *Research in Learning Technology, 24*, 1-18. https://doi.org/10.3402/rlt.v24.31372

Ulz, J. (2022). How to write review of related literature (RRL) in research. Researcher.Life BLog. http://ml6.in/yaPkj

UNESCO (2013). Information and Communication Technologies in Education: Analytical Survey. *UNESCO:Institute for Information Technologies in Education (IITE).* https://shorturl.at/Wa8Ef

UNESCO. (2020). *COVID-19:* Education response – Preparing the reopening of schools. *UNESCO*. https://unesdoc.unesco.org/ark:/48223/pf0000373271

Vaishnav, R. & Sinha, M. (2017). *Effectiveness Of Mobile-Learning Module For Teaching Environmental Education*. https://ideas.repec.org/p/vor/issues/2017-23-01.html

Valk, J.-H., Rashid, A. T., & Elder, L. (2010). Using mobile phones to improve educational outcomes: An analysis of evidence from Asia. *The International Review of Research in Open and Distributed Learning, 11*(1), 117-140. https://doi.org/10.19173/irrodl.v11i1.794

Van Deursen, A. J. A. M., & Van Dijk, J. A. G. M. (2014). Digital skills: Unlocking the information society. *Springer*. https://shorturl.at/2q8dl

Vanlalruati & Chuaungo, L. (2023). Practices of college students in Mizoram for integration of ICT in learning in terms of stream of studies. *International Journal of Research and Analytical Reviews, 10*(1), 369–379. https://ijrar.org/papers/IJRAR23D2440.pdf

Vyas, N., & Nirban,S. V.(2014). Students' Perception on the Effectiveness of Mobile Learning in an Institutional Context. *ELT Research Journal, 3*(1), 26-36. https://dergipark.org.tr/tr/download/article-file/63633

Walkington, C. (2013). Using adaptive learning technologies to personalize instruction to student interests: The impact of relevant contexts on performance and learning outcomes. *Journal of Educational Psychology, 105*(4), 932–945. https://doi.org/10.1037/a0031882

Wikipedia contributors. (2025, September 30). *Distance education*. In Wikipedia, The Free Encyclopedia. https://en.wikipedia.org/wiki/Distance_education

Wikipedia contributors. (2025, September 30). *Social media use in education*. In Wikipedia, The Free Encyclopedia. https://en.wikipedia.org/wiki/Social_media_use_in_education

Wood, E., Zivcakova, L., Gentile, P., Archer, K., De Pasquale, D., & Nosko, A. (2012). *Examining the impact of off-task multitasking with technology on real-time classroom learning*. Computers & Education, 58(1), 365– 374. https://doi.org/10.1016/j.compedu.2011.08.029

Yadav & Pankaj (2013, October). Organize the Knowledge of the Specific Area of the Research to Evolve an Additive of Knowledge Research Methodology. *International Journal of Physical Education and Sports Sciences, 6*(1), 1-2. http://ignited.in/p/2990

Zokhuma, L. (2021). Online education in Mizoram during COVID-19: Challenges and opportunities. *Journal of North East India Studies, 11*(2), 112–124.

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INTERNATIONAL SEMINAR ON ISSUES AND TRENDS IN EDUCATION

ORGANISED BY : IQAC, INSTITUTE OF ADVANCED STUDIES IN EDUCATION

CERTIFICATE

THIS IS TO CERTIFY THAT

LALRINZUALI FANAI

Research Scholar, IASE

presented a paper on the topic

'Exploring Mobile Learning Practices among Under-Graduate Students in Aizawl City'

on 12th June, 2024 held at the Seminar Hall of Institute of Advanced Studies in Education, Aizawl, Mizoram.

12/6/24 — (Dr. LALCHAWIMAWII NGENTE), Convener

12/06/24 — (Prof. LALLIANZUALI FANAI), Principal

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CERTIFICATE OF PARTICIPATION

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Exploring the Usage of Mobile Devices for Learning Among Degree College Students in Aizawl District

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Abstract
The present study aims to explore the usage of mobile devices for learning among degree college students in Aizawl District using a mixed research methodology. By employing self-administered questionnaire, the study seeks to achieve three primary objectives: (1) Identifying the types of mobile devices used by degree college students, (2) To assess the level of usage of mobile learning devices among degree college students and (3) To compare the mobile learning usage of degree college students of Mizoram in relation to their gender, family income and father's education. The data for the present study was analysed using percentage and t-test and ANOVA to find out any significant differences. The findings are expected to throw light on the current mobile learning landscape in Aizawl District of Mizoram.

Keywords: Mobile Learning, Degree College Students, Aizawl District, Mizoram.

1. INTRODUCTION

Mobile learning (m-learning) devices have totally transformed the way students gain and engage with education in the current technologically advanced and rapidly changing world These devices, among others being smartphones, tablets, e-readers, and laptops enable one to learn anywhere and anytime. They have become very important tools for designing flexible and dynamic learning environments, particularly for degree college students who tend to use technology to organize their academic, personal, and social lives.

The rapid growth of internet access and cheap mobile devices in India has given degree college students more ways to improve their education (Traxler, 2018). In Mizoram, especially in Aizawl City, where higher education is growing, mobile learning has benefits as well as drawbacks. Students are using their phones and tablets more and more for schoolwork but things like gender, parental education and work experience may affect how they use them. This study was performed to assess the mobile learning practices of degree college students in Aizawl District focusing on the types of devices they use, the degree of their mobile learning usage and disparities in usage across chosen demographic characteristics.

This study hopes to add to the growing body of knowledge about m-learning by highlighting these aspects and giving suggestions to schools, teachers, and policymakers on how to better integrate mobile learning devices into academic settings. Learning about the specific conditions in Aizawl District will also help you come up with plans that work in places with similar socioeconomic and technological conditions.

2. STUDY AREA

The study was carried out in Aizawl District, the capital and center of education of Mizoram. Aizawl, the state's most urbanized region, is situated at an elevation of approximately 1,132 meters and currently has an urban literacy rate of over 98% (Census of India, 2011). Mizoram University and over 20 government and private universities with undergraduate programs in the arts, sciences, commerce and professional studies are located in the district. Aizawl is an ideal location to study mobile learning practices because it has comparatively better internet and mobile connectivity than rural areas. The study population consisted of 18–23-year-old undergraduate students selected to represent a variety of genders, academic backgrounds and socioeconomic statuses.

3. LITERATURE REVIEW

According to Foti and Mendez (2014), the majority of graduate students were frequent and comfortable users of mobile devices for academic purposes. In line with the current objective of the study of analyzing the formal and informal ways in which Aizawl degree college students use mobile learning, this illustrates how mobile learning improves learning outside of the classroom. Similarly, Kopackova (2014) reported high ownership of notebooks and smartphones among university students and a strong readiness to use mobile applications for learning. In Aizawl, where smartphones are anticipated to predominate, this aligns with the first objective of determining the kinds of devices used by students. Ghosh and Chakraborty (2018), in their study with first-year medical undergraduates, found that most students had access to smartphones and acknowledged mobile devices as effective learning tools. Their findings are very similar to those of the Aizawl context, where undergraduates might exhibit comparable patterns. Finally, Traxler (2018) highlighted the role of mobile learning in democratizing education in developing countries by lowering socioeconomic barriers. This relates especially to Aizawl, where students from various socioeconomic and parental backgrounds might use mobile learning differently. This directly relates to the third objective, which compares usage by gender, parental education and parental occupation.

4. OBJECTIVES

The objectives of the study are:

1. To identify the types of mobile learning devices used by degree college students of Aizawl District.
2. To assess the level of usage of mobile devices for learning by degree college students of Aizawl District.
3. To compare the mobile learning usage of degree college students of Aizawl District in relation to gender, family income and father's education.

5. METHODOLOGY

The present study employed a descriptive survey design to investigate the mobile learning practices of degree college students in Aizawl District. The population consisted of all degree college students admitted in government and private institutions in Aizawl District affiliated with Mizoram University. A sample of 343 students was selected by stratified random sampling in order to ensure adequate representation across gender and academic disciplines (Arts, Science, and Commerce).

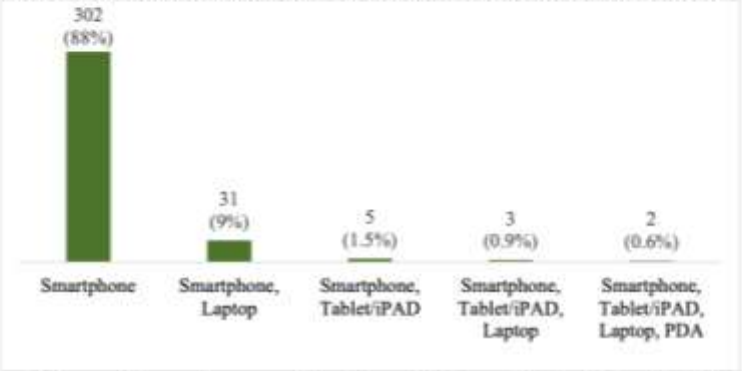
Data were collected using the Mobile device use for learning scale constructed and standardized by the researcher. The scale consisted of 21 items covering four dimensions of mobile learning- Information access, communication and collaboration, learning management and supplementary educational use.

The data were analyzed using both descriptive and inferential statistics- Frequencies and percentages were used to identify the types of devices students used. t-test was used to compare usage across gender and One-way ANOVA was used to examine differences in mobile learning usage based on family income and fathers education.

6. FINDINGS AND DISCUSSION

Objective No.1: To identify the types of mobile learning devices used by degree college students of Aizawl District.

Figure: 1: Types of mobile learning devices used by degree college students of Aizawl District.



The data shown in Figure 1 shows the ownership pattern of different devices. Out of a total of 343 students, the vast majority of 302 students (88%) reported owning smartphones as their primary device for learning. This finding highlights the central role of smartphones in students' academic lives, owing to their affordability, portability and easy access to internet services.

A smaller proportion, 31 students (9%) reported using both smartphones and laptops indicating that while laptops are beneficial for extended academic tasks such as assignments or research writing they are not as widely accessible as smartphones. Only a few students reported owning multiple devices such as smartphones, tablets/iPads and laptops. Specifically, 5 students (1.5%) used smartphones with tablets/iPads, 3 students (0.9%) combined smartphones, tablets/iPads and laptops, and only 2 students (0.6%) reported having all four types of devices including PDAs.

The findings show that in Aizawl District degree colleges, smartphones are the most available and used mobile learning device while laptop and tablet use is minimal. Due to affordability and user friendliness, smartphones are dominating in mobile learning. Low prevalence of laptop and tablet ownership may also be due to financial limitations and Mizoram's semi-urban, hill terrain in which smartphones are thought to be more advantageous in educational contexts.

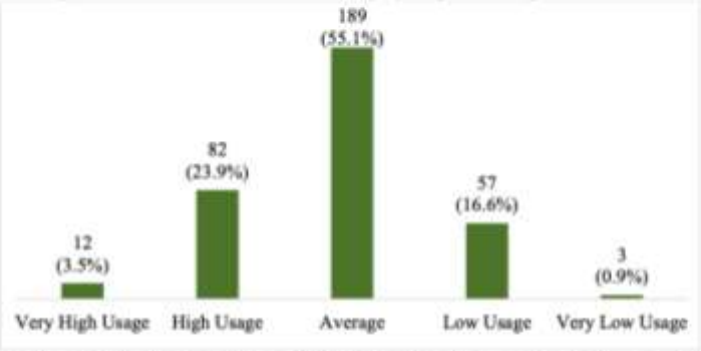
Objective No.2: To assess the level of usage of mobile devices for learning by degree college students of Aizawl District.

Table 1 Level of usage of mobile devices for learning by degree college students of Aizawl District

	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Overall	12	82	189	57	3

Level of Usage	(3.5%)	(23.9%)	(55.1%)	(16.6%)	(0.9%)

Fig. 2 Level of usage of mobile devices for learning by degree college students of Aizawl District



Result from the above table demonstrates a distinct trend in the way students use mobile devices for learning. The vast majority of students about 189 (55.1%) of the total fall into the "Average" usage category. This indicates that although mobile devices are being used for educational purposes, most students may not find them to be a primary or highly integrated tool. The "High Usage" category, which comprises 82 (23.9%) of the students is the next largest segment after the average usage group. This indicates a large proportion of students consistently utilize their mobile devices for learning.

Over 94 (27.4%) of the respondents depend considerably on their mobile devices for learning as indicated by the aggregate percentage of those with "High" and "Very High" usage (23.9% + 3.5%), reaching 27.4%. Only 3 students (0.9%) indicated "Very Low Usage," whereas 57 (16.6%) reported "Low Usage," placing it at the lower end of the spectrum. Despite their occasional use, mobile devices are often employed for learning as evidenced by the minimal percentage in the "Very Low Usage" category.

The results show that most students use mobile devices for learning at an average level, and fewer say they use them a lot or very much. This shows that students use mobile devices for educational purposes, but not to their full potential. Some students not using the facility as much could mean that they are lacking the skills or resources they need.

Objective No. 3: To compare the mobile learning usage of degree college students of Aizawl District in relation to gender, family income and father's education.

1. **A comparison of the use of mobile devices for learning between male and female degree college students of Aizawl District.**

In order to make a comparison between the use of mobile devices for learning of male and female degree college students of Aizawl District, the mean and standard deviation of the two groups were determined individually. To determine whether or not there is a significant difference between male and female degree college students, a t-test was performed and the results are presented in the following table. The table includes the mean scores, standard deviations and t-values calculated for each group.

Hypothesis no. 1. There is no significant difference in the use of mobile devices for learning between male and female degree college students of Aizawl District.

The following table 2 shows a comparison of the use of mobile devices for learning between male and

female degree college students of Aizawl District.

Table 2 Comparison of the use of mobile devices for learning between male and female degree college students of Aizawl District

Group	N	Mean	SD	SED	t-value	Sig. Level
Male	162	76.5	9.66	0.93	1.078	Not Significant
Female	181	73.88	10.29			

The above table shows that 162 male degree college students in the Aizawl District had a mean score of 75.5, which was a little higher than the mean score of 181 female students, which was 73.88 when it comes to using mobile devices for learning. This indicates that, on average, male students reported using mobile devices for learning slightly more than their female counterparts. When compared to the standard deviations, the mean score difference between the two groups is very small, at just 1.62. The standard error of difference (SED = 2.43) further shows that the difference is not statistically significant. Therefore, although male students appear to have scored slightly higher, both male and female students show almost the same level of engagement in the use of mobile devices for learning. This implies that gender does not have a meaningful influence on mobile device usage for learning among degree college students in Aizawl District. Therefore, the null hypothesis "There is no significant difference in the use of mobile devices for learning between male and female degree college students of Aizawl District" cannot be rejected.

The result shows that male students used mobile devices for learning slightly more than female students. However, the difference was small and statistically not significant. The computed t-value (1.08) did not surpass the critical table value, indicating that gender does not significantly influence mobile device usage for learning among degree college students in Aizawl District. This means that both male and female use mobile devices to learn at about the same level.

2. A comparison of the use of mobile devices for learning among degree college students of Aizawl District in relation to family income

In order to make a comparison between the use of mobile devices for learning among degree college students of Aizawl District in relation to family income, ANOVA was performed and the results are presented in the following table.

Hypothesis no.2. There is no significant difference in the use of mobile devices for learning among degree college students of Aizawl District in relation to family income.

The following table 3 shows a comparison of the use of mobile devices for learning among degree college students of Aizawl District in relation to family income.

Table 3 Comparison of the use of mobile devices for learning among degree college students of Aizawl District in relation to family income

Sources of variance	Degrees of freedom	Sum of the squares	Mean Square	F Ratio
Between Set	(S - 1) = 4 - 1 = 3	385.417	128.473	**1.270**
Within set	N – S = 343 – 4 = 339	34293.92	101.162	

The table 3 reveals the comparison of the use of mobile devices for learning among degree college students of Aizawl District in relation to their family income. The results indicate that the between-group variance

(Sum of Squares = 385.417, Mean Square = 128.473) is significantly smaller than the within-group variance (Sum of Squares = 34,293.92, Mean Square = 101.162) and the computed F-ratio is 1.270 which is comparatively low and has no statistical significance at acceptable levels. This indicates that differences in family income do not lead to a significant variation in the use of mobile devices for learning among students. Hence, the null hypothesis that there is no significant difference in the use of mobile devices for learning with respect to family income cannot be rejected. It can therefore be concluded that family income does not play a decisive role in determining the extent to which degree college students of Aizawl District use mobile devices for learning.

The result implies that people from all income levels are now able to use mobile devices for learning purposes. The easy access to cheap smartphones and data services may have made family income less important when it comes to mobile learning. Students from both lower and higher income backgrounds exhibit analogous patterns of mobile device utilization for academic purposes.

3. A comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to father's education

In order to make a comparison between the use of mobile devices for learning among degree college students of Aizawl District in relation to father's education, ANOVA was performed and the results are presented in the following table.

Hypothesis no. 3. There is no significant difference in the use of mobile devices for learning among degree college students of Aizawl District in relation to father's education.

The following table 4 shows a comparison of the use of mobile devices for learning among degree college students of Aizawl District in relation to father's education.

Table 4 Comparison of the use of mobile devices for learning among degree college students of Aizawl District in relation to father's education

Sources of variance	Degrees of freedom	Sum of the squares	Mean Square	F Ratio
Between Set	(s-1) = 5-1 =4	569.90	96.354	**0.95**
Within set	N-s=343-5=338	34109.44	101.461	

The results in Table 4 show the comparison of mobile device usage for learning among degree college students of Aizawl District in relation to father's education. The calculated F-ratio is 0.95 is lower than the critical F-value at the 0.05 level of significance. This shows that there is no significant difference in the use of mobile devices for learning based on the father's education level. Thus, the null hypothesis that "There is no significant difference in the use of mobile devices for learning among degree college students of Aizawl District in relation to father's education" cannot be rejected.

The findings show that a father's education level does not have a significant impact on degree college students in Aizawl District using mobile devices for learning. This indicates that the accessibility and utilization of mobile devices for learning purposes is prevalent among various socio-educational demographics, highlighting the increasing significance of technology in education regardless of father's level of education.

7. SUGGESTIONS

1. Teach students how to use their phones and tablets for learning in a way that works.
2. Make and share educational digital learning materials that people can use on their mobile devices.
3. Hold programs to raise awareness about how to use mobile devices for work and school.
4. Make sure all students have access to a reliable internet connection so they can learn without interruptions.
5. Encourage digital literacy programs to help students use technology safely and with confidence.

CONCLUSION

The objective of the study was to investigate the utilization of mobile learning devices among undergraduate students in Aizawl District emphasizing device preferences, level of usage of mobile devices for learning and the impact of demographic variables including gender, family income and father's education.

The results showed that smartphones are the most popular mobile learning device, with all of the students who responded used them for educational purposes. Other devices, such as laptops and tablets were used minimally. In terms of usage levels, the majority of students demonstrated average usage levels of mobile learning engagement.

Further investigation revealed that demographic factors such as gender, family income, and father's education did not significantly affect mobile learning utilization. This shows that students from all over the district are using mobile learning in the same way.

The study emphasizes the pivotal role of smartphones in enabling mobile learning for undergraduate students in Aizawl District and underscores the equitable nature of mobile learning engagement across demographic divides. These results form a basis for creating inclusive mobile-based educational strategies customized to the requirements of students in the area.

REFERENCES

1. Census of India. (2011). District Census Handbook: Aizawl District. Government of India.
2. Department of Higher & Technical Education, Government of Mizoram. (n.d.). Colleges and Universities in Mizoram.
3. Foti, M., K & Mendez, J. (2014). Mobile Learning: How Students Use Mobile Devices to Suppport Learning. Journal of Literacy and Technology. 15(3).https://shorturl.at/0neD5
4. Ghosh, S., & Chakraborty, R. (2018). Mobile learning among first-year medical undergraduates: Usage, perception, and effectiveness. Journal of Medical Education and Curricular Development, 5, 1–8.
5. Kopackova, H. (2014). Preparedness for mobile learning at higher education. 2014 IEEE 12th IEEE International Conference on Emerging eLearning Technologies and Applications (ICETA), 39-44. https://doi.org/10.1109/DT.2014.6868706
6. Traxler, J. (2018). Learning with mobiles in developing countries: Research, policy and practice. In J. Voogt, G. Knezek, R. Christensen, & K.-W. Lai (Eds.), Second handbook of information technology in primary and secondary education (pp. 1131–1144).
7. Traxler, J. (2018). Mobile learning and the democratization of education in developing countries. International Review of Research in Open and Distributed Learning, 19(3), 1–17.
8. Traxler, J. (2018). Mobile learning: The future of education in a digital world. Routledge.

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Examining the Views of Degree College Students in Mizoram on Mobile Learning

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Abstract : The study investigates the opinion of degree college students in Mizoram on mobile learning, emphasizing its effects on concentration, theoretical comprehension, classroom teaching, academic achievement, motivation, and future prospects. The study involved 500 students of various genders, locale and academic stream, utilizing an opinionnaire consisting of eight questions pertaining to mobile learning. The results show various viewpoints. While 55.2% of students stated that mobile learning makes it harder for them to concentrate, a vast majority (74.8%) believed it helped them understand theory better, and 70.4% thought it helped them do better in their studies. Also, 78.4% of the students stated that mobile learning would become more popular in the near future, and 58.8% agreed that mobile learning is just as good as traditional learning. Motivation was identified as a beneficial element with 69.4% recognizing mobile devices as a source of support in their studies. However, 53% were concerned that mobile learning would make classroom instruction less valuable, and a large 62.8% were against teachers using it in the classroom. The study emphasizes the necessity of a balanced strategy that utilizes mobile learning as a supplement rather than a substitute for conventional instruction.

Keywords **- Mobile learning, Student opinions, Degree colleges, Mizoram, Classroom instruction, Academic success, Motivation.**

I. INTRODUCTION

The rapid advancement of mobile technologies has transformed not only the way people communicate and access information but also how they learn. Over the past two decades, the integration of mobile devices such as smartphones, tablets and laptops into education has led to the emergence of "mobile learning" as a significant mode of knowledge acquisition. Mobile learning is typically defined as the use of portable devices to access educational resources and support learning processes across varied contexts, anytime and anywhere (Crompton, 2013). Unlike traditional methods, mobile learning emphasizes flexibility, learner autonomy and interactivity, thereby challenging conventional notions of time, place and teacher-centered instruction.

Globally, the use of mobile learning has been promoted as a way to democratize education especially in contexts where infrastructure and resources are limited. Studies have shown that mobile learning enhances inclusivity, fosters self-directed learning and supports constructivist approaches where learners build knowledge actively through digital engagement (Kukulska-Hulme, 2009). In higher education, mobile technologies have proven especially useful for bridging gaps between classroom teaching and independent study, offering learners opportunities for review, collaborative learning and access to updated information (Ally & Prieto-Blázquez, 2014). However, critics have also pointed to challenges such as distraction, over-reliance on technology and the risk of undermining traditional classroom interactions (Lepp, Barkley, & Karpinski, 2015).

In the Indian context, the growth of affordable smartphones and expanding internet connectivity has brought new possibilities for higher education. According to recent reports, India has one of the world's largest bases of mobile phone users and this has significantly shaped digital education initiatives (Kumar & Bhatt, 2020). While universities and colleges in metropolitan cities have increasingly adopted online and blended learning strategies, students in rural and remote areas often depend heavily on mobile devices as their primary means of accessing educational resources. This makes mobile learning not only a supplement but in some cases, a necessity.

Mizoram, a small hilly state in northeast India, presents a unique context for studying mobile learning. With its dispersed population, limited connectivity in certain regions and strong reliance on higher education for career advancement, mobile learning holds promise as a tool to overcome geographical and infrastructural barriers. At the same time, the socio-cultural dynamics of Mizoram such as close-knit community interactions and traditional classroom-centered learning may shape student perceptions differently from those in other parts of India. Understanding how degree college students in Mizoram perceive mobile learning is therefore essential for designing educational strategies that are both effective and contextually relevant.

This study aims to examine the opinions of degree college students in Mizoram toward mobile learning, focusing on dimensions such as concentration, theoretical comprehension, classroom relevance, academic success, motivation and its perceived future potential. By doing so, it contributes to the broader literature on mobile learning while addressing a local gap in research. The findings are expected to inform not only educators and policymakers in Mizoram but also contribute to ongoing national and global debates about the role of mobile technologies in reshaping higher education.

II. SIGNIFICANCE OF THE STUDY

Mobile learning has become an important educational approach, offering flexibility, accessibility and opportunities for learner autonomy (Crompton, 2013; Kukulska-Hulme, 2009). Studies highlight its potential to enhance motivation, support independent study and provide instant access to resources (Ally & Prieto-Blázquez, 2014). At the same time, researchers caution against challenges such as digital distraction, reduced attention span and the possibility of undermining classroom interactions (Lepp, Barkley, & Karpinski, 2015).

In India, the rapid spread of affordable smartphones has enabled mobile learning, particularly in urban universities with strong digital infrastructure (Kumar & Bhatt, 2020). However, less attention has been given to rural and remote regions where educational needs and challenges differ. Mizoram, with its hilly terrain and dispersed population, presents a unique case: while mobile learning has the potential to reduce geographical barriers, student attitudes may be influenced by strong traditions of face-to-face learning.

This study is therefore significant in documenting the perspectives of degree college students in Mizoram. By analyzing opinions across dimensions such as concentration, classroom value, academic performance and motivation, it aims to address a regional research gap and provide practical insights for educators and policymakers seeking to balance mobile learning with traditional methods.

III. RESEARCH GAP OF THE STUDY

Mobile learning has become a widely discussed topic in educational research due to its potential to enhance accessibility, flexibility and learner engagement. Early studies emphasized the role of mobile technologies in creating learner-centered environments where students are not limited by physical classrooms or rigid schedules (Crompton, 2013). Scholars such as Kukulska-Hulme (2009) highlighted how mobile learning supports language acquisition and self-directed learning, particularly in contexts where traditional classroom resources are limited.

In the Indian context, the growth of affordable smartphones and internet penetration has opened new avenues for higher education. Kumar and Bhatt (2020) observed that mobile learning adoption in India is increasing rapidly but remains uneven due to disparities in digital literacy, socio-economic status and infrastructural challenges. Studies have also noted that rural students often view mobile learning as a bridge to overcome geographical isolation (Traxler, 2018), though issues of distraction and over-reliance on devices persist (Lepp, Barkley & Karpinski, 2015).

Motivation and academic achievement have been recurring themes in the literature. Ally and Prieto-Blázquez (2014) argued that mobile technologies can enhance student motivation by promoting interactive and collaborative learning experiences. However, other studies caution that the effectiveness of mobile learning depends on pedagogical integration rather than technology alone (Park, 2011). This tension reflects a broader debate on whether mobile learning should supplement or replace traditional methods.

Despite the global and national research, there remains a gap in studies focusing specifically on the socio-cultural and geographical context of Mizoram. The unique challenges of the state—such as its hilly terrain, dispersed population, and infrastructural constraints—make it essential to examine student perspectives locally. This study seeks to address that gap by investigating the views of degree college students in Mizoram on mobile learning and its implications for higher education in the region.

IV. RESEARCH METHODOLOGY

The research employed a descriptive survey methodology. A questionnaire of eight topics was developed and disseminated among 500 college students in Mizoram. The sample covered several demographics including gender (male and female), locality (urban and rural) and academic disciplines (Arts, Science, Commerce).

The questionnaire consisted of statements regarding essential aspects of mobile learning, including its influence on concentration, the capacity to support theoretical learning, effect on classroom instruction, contribution to academic achievement, prospective potential, relative efficiency compared to traditional learning, role in motivation and preference for teacher integration. Responses were classified as "Yes" or "No" and examined using item-wise tabulation and percentage distribution analysis.

V. FINDINGS AND DISCUSSION

Findings

The analysis of responses from 500 degree college students in Mizoram revealed nuanced perspectives on mobile learning across dimensions of concentration, theoretical comprehension, classroom teaching, academic success, motivation and future outlook. The data demonstrate both enthusiasm for mobile learning and apprehensions about its limitations.

1. Concentration and Distraction: More than half of the respondents (55.2%) admitted that mobile learning reduces their ability to concentrate. This suggests that while mobile devices provide access to vast academic resources, they also expose learners to potential distractions such as social media, entertainment apps and messaging platforms. Gender differences were negligible, indicating that distraction is a universal concern among students. Interestingly, rural students (57.91%) reported higher levels of distraction than their urban counterparts (51.80%), possibly due to limited access to quiet, resource-rich study environments in rural areas. Arts students (56.59%) expressed the greatest difficulty with concentration, reflecting the heavy reading and interpretation demands of their discipline whereas Commerce students (46.67%) reported fewer problems, perhaps because their learning often involves structured, task-oriented exercises that align well with digital platforms.

2. Theoretical Learning Enhancement: An overwhelming 74.8% of students believed that mobile learning enhances their grasp of theoretical concepts. The uniformity across demographics (male 75.88%, female 73.66%; rural 75.18%, urban 74.32%) demonstrates broad acceptance of mobile learning as an effective supplementary tool. The highest enthusiasm came from Commerce students (76.67%), who may benefit from quick access to case studies, financial data and market updates while Science students (71.67%) also acknowledged its usefulness, particularly for simulations and digital experiments. This reflects the role of mobile devices in making abstract concepts more comprehensible through multimedia explanations, visual aids and interactive tools.

3. Value of Classroom Instruction: Just over half (53%) of the respondents believed that mobile learning diminishes the value of classroom teaching. This concern was more pronounced among urban students (55.41%) compared to rural (51.08%) possibly because urban students have more exposure to digital alternatives and may fear reduced classroom interaction. Among academic streams, Arts students (54.39%) were most cautious likely due to the discussion- and debate-oriented nature of their discipline which requires active classroom participation. Commerce students (40%) were least likely to perceive a decline which suggests that their subjects can transition more easily between classroom and digital modes. The findings indicate that while students see mobile learning as useful, they remain attached to the interpersonal and structured dynamics of face-to-face instruction.

4. Academic Success: A strong majority (70.4%) of students reported that mobile learning improves academic performance. The pattern was consistent across gender and locality, showing that mobile devices are broadly recognized as tools that help students achieve better outcomes. Commerce students showed an especially high level of agreement (93.33%), possibly due to their frequent engagement with online resources such as business simulations, market analysis tools and e-learning modules. Science students (71.67%) and Arts students (68.54%) also reported benefits, suggesting that mobile devices assist across disciplines though the nature of support varies. These findings highlight that mobile learning is not only viewed as supplementary but also as a strategic tool for boosting achievement.

5. Future of Mobile Learning: The study found significant optimism about the future of mobile learning with 78.4% of students predicting an increase in its use. Male students (80.54%) were slightly more optimistic than females (76.13%) and rural students (78.78%) demonstrated more faith than their urban peers (77.93%). This rural optimism could stem from the recognition of mobile learning as a means to overcome geographical barriers and limited institutional resources. Stream-wise, Commerce students again showed the greatest confidence (86.67%) followed by Arts (78.54%) and Science (73.33%). The general consensus reflects that students believe mobile learning is not a passing trend but a growing educational reality.

6. Effectiveness Compared to Traditional Learning: When comparing mobile learning to traditional learning, 58.8% of students believed both to be equally effective. Interestingly, rural students (60.43%) were more likely to hold this view compared to urban students (56.76%) suggesting that students with fewer opportunities for physical classroom instruction may value digital alternatives more. Among disciplines, Science students (70%) showed the strongest belief in mobile learning's effectiveness, possibly due to the increasing role of simulations, visualizations and online laboratories in STEM education. Commerce students (66.67%) also reported confidence whereas Arts students (56.59%) were more cautious reflecting the discipline's reliance on discussion and interpretation that thrives in face-to-face settings.

7. Motivation: Mobile devices were identified as strong motivators by 69.4% of respondents. Female students (71.19%) reported slightly higher levels of motivation than males (67.70%). Motivation was consistent across locality with both urban and rural students hovering around 69%. Among disciplines, Science students (73.33%) reported the highest motivation, highlighting the role of interactive digital content in sparking interest and engagement in scientific topics. Commerce students (63.33%) showed lower levels of motivation which might reflect their more structured and examination-oriented curriculum. Overall, the data indicate that mobile learning acts not only as an academic aid but also as a motivational tool.

8. Teacher Integration of Mobile Learning: Despite positive attitudes towards mobile learning for independent study, 62.8% of students opposed its integration by teachers in classroom settings. This hesitation was seen across gender, locality and streams although Commerce students (43.33%) showed slightly more openness compared to Arts (36.34%) and Science (40%). Students' resistance may stem from concerns about distraction, reduced interaction with teachers or fears that lessons may lose their structured flow. This finding highlights a paradox: while students value mobile learning individually, they are cautious about it being imposed within classroom contexts.

Discussion

The results demonstrate that degree college students in Mizoram perceive mobile learning as beneficial in enhancing theoretical learning, supporting academic success and motivating students. These findings are consistent with previous studies indicating that mobile learning enhances accessibility and promotes flexible learning opportunities (Traxler, 2018; Kukulska-Hulme, 2009).

However, concerns remain regarding distraction and its potential to reduce classroom engagement. This aligns with earlier research that highlighted issues of multitasking and reduced attention spans when using mobile devices for academic purposes (Lepp et al., 2015). Additionally, while many students acknowledged the potential of mobile learning, resistance to teacher-led integration suggests a preference for maintaining traditional classroom dynamics, a phenomenon observed in similar studies in India and beyond (Kumar & Bhatt, 2020).

Interestingly, rural students demonstrated more optimism about the future of mobile learning compared to urban counterparts. This suggests that mobile learning may be perceived as a tool to overcome geographical barriers to education. Commerce students, who largely endorsed mobile learning may find it particularly useful due to the nature of their curriculum which often involves digital simulations, case studies and online resources.

The mixed perceptions highlight the need for a balanced approach. Mobile learning should be integrated as a supplement rather than a substitute for classroom learning. Teachers must be trained in effective digital pedagogy to minimize distractions and maximize learning outcomes (Ally & Prieto-Blázquez, 2014).

VI. IMPLICATIONS

The findings of this study carry important implications for educators, policymakers, and students in Mizoram and beyond.

1. For Educators: The results highlight the need for teachers to adopt a blended learning approach that leverages the strengths of mobile learning without replacing traditional methods. Since many students value classroom instruction but also appreciate the flexibility of mobile devices, teachers should integrate mobile learning selectively—for example, through supplementary readings,

quizzes or language translation apps. At the same time, student programs should train teachers in effective digital pedagogy to reduce distractions and promote meaningful engagement.

2. For Policymakers: The optimism among students regarding the future of mobile learning suggests that government and institutional policies should prioritize digital infrastructure, especially in rural and remote areas of Mizoram. Improved internet connectivity, affordable devices and access to quality digital content can reduce inequalities and ensure that mobile learning serves as an inclusive tool. Additionally, policies should address the risks of over-dependence and distraction by encouraging balanced usage.

3. For Students: The study shows that mobile devices can enhance motivation, theoretical understanding and academic success. However, students must also develop self-regulation skills to minimize distraction from social media, gaming or non-academic browsing. Awareness programs and digital literacy initiatives could help students use mobile learning more effectively for academic purposes.

4. For Curriculum Developers: The resistance to teacher-led mobile learning integration points to a gap between student expectations and curriculum design. Curriculum planners should include mobile-compatible materials, interactive learning activities and flexible assessments that make use of digital tools while preserving the importance of face-to-face interactions.

Overall, the implications stress the importance of balance, ensuring that mobile learning is used as a supportive resource rather than a substitute for traditional classroom practices. If implemented thoughtfully, mobile learning can bridge educational gaps and contribute significantly to the academic growth of students in Mizoram.

VII. CONCLUSION

The study reveals that while degree college students in Mizoram recognize the potential of mobile learning to enhance theoretical understanding, academic success and motivation, they also express concerns regarding concentration, classroom relevance and teacher integration. The findings emphasize the importance of adopting a blended learning approach where mobile learning complements traditional methods. Policymakers and educators must ensure equitable access, provide quality digital content and address challenges such as distraction and resistance to change. As mobile technology continues to evolve, fostering a learner-centered, inclusive and balanced educational ecosystem will be essential for maximizing the benefits of mobile learning in higher education.

REFERENCES

[1] A. Ally, M., & Prieto-Blázquez, J. (2014). What is the future of mobile learning in education? *RUSC. Universities and Knowledge Society Journal, 11*(1), 142–151. https://doi.org/10.7238/rusc.v11i1.2033

[2] Crompton, H. (2013). A historical overview of mobile learning: Toward learner-centered education. In Z. Berge & L. Muilenburg (Eds.), *Handbook of Mobile Learning* (pp. 3–14). Routledge.

[3] Kumar, V., & Bhatt, R. (2020). Mobile learning adoption in higher education: A review. *Education and Information Technologies, 25*(4), 2489–2510. https://doi.org/10.1007/s10639-019-10083-2

[4] Kukulska-Hulme, A. (2009). Will mobile learning change language learning? *ReCALL, 21*(2), 157–165. https://doi.org/10.1017/S0958344009000202

[5] Lepp, A., Barkley, J. E., & Karpinski, A. C. (2015). The relationship between cell phone use, academic performance, anxiety, and satisfaction with life in college students. *Computers in Human Behavior, 31*, 343–350. https://doi.org/10.1016/j.chb.2013.10.049

[6] Park, Y. (2011). A pedagogical framework for mobile learning: Categorizing educational applications of mobile technologies into four types. *The International Review of Research in Open and Distributed Learning, 12*(2), 78–102. https://doi.org/10.19173/irrodl.v12i2.791

[7] Traxler, J. (2018). Learning with mobiles in developing countries: Technology, language, and literacy. *International Journal of Mobile and Blended Learning, 10*(2), 1–15. https://doi.org/10.4018/IJMBL.2018040101

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Title of PhD thesis	Mobile Learning among Degree College Students of Mizoram: An Analytical Study	
Name & Institutional Address of the Supervisor	Institute of Advanced Studies in Education (IASE), Republic Veng, Aizawl, Mizoram, 796005	
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Annexure-II

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ABSTRACT

MOBILE LEARNING AMONG DEGREE COLLEGE STUDENTS OF MIZORAM: AN ANALYTICAL STUDY

AN ABSTRACT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

LALRINZUALI FANAI

MZU REGISTRATION NO.: 1806122

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DEPARTMENT OF EDUCATION

INSTITUTE OF ADVANCED STUDIES IN EDUCATION

(An affiliated Institute of Mizoram University)

SCHOOL OF EDUCATION

DECEMBER, 2025

MOBILE LEARNING AMONG DEGREE COLLEGE STUDENTS OF MIZORAM: AN ANALYTICAL STUDY

BY

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DEPARTMENT OF EDUCATION

INSTITUTE OF ADVANCED STUDIES IN EDUCATION

Submitted

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

ABSTRACT

INTRODUCTION

The rapid advancement of digital technologies and the widespread use of mobile devices have significantly influenced the landscape of higher education. Among these developments, mobile learning (m-learning) has emerged as an important mode of learning, enabling students to access academic resources anytime and anywhere. In the context of degree college students, mobile learning offers a flexible and accessible approach that supports both formal and informal learning practices.

This study focuses on mobile learning among degree college students in Mizoram, examining the extent and patterns of mobile device usage for academic purposes. It situates mobile learning within the broader framework of technology integration in higher education, particularly in line with the objectives of the National Education Policy (NEP) 2020 which emphasizes digital learning, accessibility and inclusivity.

Mobile devices are increasingly used by students for activities such as accessing study materials, communication with peers and teachers and engaging in self-directed learning. However, despite these advantages, challenges such as digital inequality, limited internet connectivity, and potential distractions continue to affect the effective use of mobile learning. Therefore, this study seeks to understand how mobile learning is being utilized by degree college students and to examine the factors influencing its usage.

NEED AND IMPORTANCE OF THE STUDY:

The increasing use of mobile devices among students has created new possibilities for learning in higher education. In regions like Mizoram, where geographical and infrastructural challenges can limit access to conventional educational resources, mobile learning offers a practical and accessible alternative. Despite policy emphasis under the National Education Policy (NEP) 2020 on

technology integration and inclusive education, there is limited empirical evidence on how mobile learning is actually utilized by degree college students in this context.

This study is therefore needed to examine the extent and patterns of mobile learning usage and to understand whether it effectively supports students' academic needs. It also seeks to explore whether mobile learning contributes to more flexible and learner-centered education or remains limited to basic usage. The findings of this study are important for educators, policymakers, and institutions, as they can provide insights for improving digital learning practices, ensuring equitable access, and strengthening the effective integration of mobile technologies in higher education in Mizoram.

Besides the aforesaid rationale of the study, the investigator is also interested in answering the following research questions:

1) What are the opinions of degree college students regarding mobile learning?
2) To what extent do degree college students in Mizoram make use of mobile learning?
3) What are the effects of gender, academic stream, locale, family income and father's educational background on the use of mobile devices for learning among degree college students in Mizoram?
4) Does mobile learning usage have an impact on the academic performance of degree college students in Mizoram?
5) What types of mobile learning devices are used by degree college students and to what extent are they utilized?
6) What are the factors contributing to disparities in mobile learning usage among degree college students in Mizoram?
7) Is the Mizoram University Curriculum suitable for mobile learning?

STATEMENT OF THE PROBLEM

Considering the research questions that demanded prompt responses, the current study is stated as: "**Mobile Learning among Degree College Students of Mizoram: An Analytical Study.**"

OBJECTIVES OF THE STUDY

The objectives of the study are as follows:

1) To investigate the opinion of degree college students in Mizoram regarding mobile learning.
2) To construct and standardize a mobile device use for learning scale.
3) To assess the extent of mobile device usage for learning among degree college students in Mizoram.
4) To compare the use of mobile devices for learning by degree college students of Mizoram in relation to gender, academic streams, locale, family income and father's educational background.
5) To find out the relationship between the use of mobile devices for learning and the academic achievement of degree college students of Mizoram.
6) To identify the types of mobile devices used and the extent of their usage among degree college students in Mizoram.
7) To investigate the factors contributing to disparities in mobile device usage for learning among degree college students in Mizoram.
8) To examine the suitability of the Mizoram University curriculum for supporting mobile learning.

NULL HYPOTHESES OF THE STUDY

The following null hypotheses are formulated for statistical analysis:

1) There is no significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram.

2) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams.

3) There is no significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram.

4) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income.

5) There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

OPERATIONAL DEFINITIONS OF THE TERMS USED

The key terms used in the title of the study are operationally defined as follows:

Mobile learning : Mobile learning is learning that takes place through mobile technologies using handheld devices such as smartphones, tablets, portable notebooks, e-book readers, iPads, etc.

Mobile learning devices: Mobile learning devices are handheld devices and may be classified as cell phones (mobile phones), laptop computers, tablets, Kindles, personal digital assistants (PDAs), etc.

Degree College Students: Students who are studying in an institution in Mizoram that offers undergraduate degrees and grants a degree in the field of arts, science and commerce.

DELIMITATIONS OF THE STUDY

The present study is delimited to degree college students in Mizoram for the academic year 2024-2025 and does not include students enrolled in professional or vocational courses.

METHOD OF THE STUDY

This study adopted a sequential explanatory mixed-methods design which involves two distinct phases: a quantitative phase and a qualitative phase. This design is selected not only to quantify the mobile learning usage among degree college students of Mizoram but also to explore deeper insights into students' experiences, perceptions and contextual factors influencing mobile learning.

The quantitative research design comprised a descriptive survey method in which a mobile device use for learning scale was developed to analyse the mobile learning usage among degree college students of Mizoram. It also measured the types and extent of usage of mobile device for learning, relationship and comparisons based on demographic and academic variables and the correlation between the usage of mobile device for learning and academic achievement.

The qualitative part of the research design looked deeper into students' opinions toward mobile learning, causes of disparity of using mobile devices for learning and the suitability of Mizoram University curriculum for mobile learning.

POPULATION AND SAMPLE

Population

In the present study, the population comprised of all degree college students enrolled in institutions affiliated with Mizoram University. Based on data from the Higher and Technical Education Department, Government of Mizoram, a total of 30

colleges are affiliated with Mizoram University, comprising an overall student population of 18,530 and 999 teachers. The details of the population are presented in the following tables.

District-wise statistics of degree college students in Mizoram

District	Male	Female	Total
Aizawl	6622	5980	12602
Lunglei	886	816	1702
Kolasib	408	330	738
Champhai	445	391	836
Serchhip	232	270	502
Lawngtlai	547	257	804
Siaha	272	269	541
Mamit	121	128	249
Hnahthial	102	76	178
Khawzawl	53	52	105
Saitual	112	161	273
TOTAL			**18530**

Source: Higher & Technical Education Department, Government of Mizoram 2023-24.

District-wise statistics of degree college teachers in Mizoram

District	Male	Female	Total
Aizawl	191	269	460
Lunglei	77	72	149
Kolasib	29	29	58
Champhai	28	32	60
Serchhip	30	22	52
Lawngtlai	42	24	66
Siaha	11	14	25
Mamit	27	23	50
Hnahthial	13	13	26
Khawzawl	15	9	24
Saitual	11	18	29
		TOTAL	**999**

Source: Higher & Technical Education Department, Government of Mizoram 2023-24

Sample

For the quantitative part of the study, multistage random sampling was utilised. Five (5) Districts - Aizawl, Kolasib, Mamit, Lunglei and Champhai were randomly selected, each representing a distinct geographical region namely Central, North, West, South and East. From each selected district, respondents were randomly chosen for a total sample of 500. For the qualitative part of the study, purposive sampling was used to select a smaller group comprising 33 students and 26 teachers. The following table presents the details of the samples selected.

Details of sample selected for quantitative study (N= 500)

Name of District	Male			Female			Total		
	Arts	Science	Commerce	Arts	Science	Commerce	Arts	Science	Commerce
Central	108	72	38	98	65	34	206	137	72
South	18	Nil	Nil	8	Nil	Nil	26	Nil	Nil
West	3	Nil	Nil	5	Nil	Nil	8	Nil	Nil
East	7	7	Nil	7	6	Nil	14	13	Nil
North	7	6	Nil	6	5	Nil	13	11	Nil
							267	**161**	**72**
Total							**500**		

Details of sample selected for students for interview (N=33)

Name of District	Total
Central	9
South	9
West	3
East	6
North	6
TOTAL	**33**

Details of sample selected for teachers for interview (N=26)

Name of Stream	Number of Teachers
Arts	11
Science	8
Commerce	7
Total	26

TOOLS USED

The following tools developed by the researcher were employed for the current study:

1. Opinionnaire for Degree College students on mobile learning.
2. Mobile device use for learning scale.
3. Interview schedule for Degree College students.
4. Interview schedule for College teachers on the suitability of Mizoram University Curriculum.

1. Opinionnaire for degree college students on mobile learning:

The investigator developed opinionnaire to study the opinion of degree college students on mobile learning. The opinionnaire consists of 8 questions and each question has 2 options for the respondents.

Degree college students are the primary users and beneficiaries of mobile learning technologies in academic settings. Their experiences, preferences and challenges provide valuable insights into the effectiveness and usability of mobile learning tools. Keeping this in mind, the investigator developed opinionnaire for degree college students.

2. Mobile Device use for Learning Scale developed by the researcher:

To assess the level of usage of mobile device for learning among degree college students in Mizoram, the investigator developed and standardized a mobile device use for learning scale. The usage scale comprised of 21 items. The scale is designed according to Likert's five-point scale, with a maximum

score of 105 and a minimum score of 21. The reliability of the test was 0.76 (split-half) and 0.76 (test-retest). The specifics of the attitude scale's creation are outlined in the analysis and interpretation chapter (Chapter IV).

3. Interview Schedule for Degree College Students.

To study the disparities in the use of mobile devices for learning of degree college students of Mizoram, the investigator developed an interview schedule for degree college students. This interview schedule consists of eight (8) questions and was divided into six components as follows:

1) Device and Internet Access
2) Skills and Confidence
3) Learning context
4) Usage and challenges
5) Language and Content Accessibility
6) Perceptions and inclusivity

4. Interview Schedule for College Teachers on the suitability of Mizoram University curriculum

To study the suitability of Mizoram University curriculum, the investigator developed an interview schedule for college teacher. There are six (6) questions in this interview schedule.

COLLECTION OF DATA

For the purpose of collecting quantitative data, the investigator personally visited the selected colleges of Mizoram. After getting permission from the respective Principal, the investigator administered the mobile device use for learning scale and opinionnaire to the students and for qualitative data, the investigator conducted an interview schedule to the students and the teachers.

For the purpose of finding the relationship between the usage of mobile devices for learning and academic achievement, academic achievement scores of

degree college students were obtained through the college administration with proper authorization. These data were recorded in their original form to ensure accuracy and validity.

TABULATION OF DATA

All the data collected were first scrutinized and classified. Scoring of each respondents on usage scale was done according to the scoring procedure. After the data were scrutinized, classified and scored, it was tabulated by entering into excel sheets for statistical treatment. Keeping in view the objectives of the study, the tabulated data were analysed using appropriate statistical techniques.

STATISTICAL TECHNIQUES USED

For the present study, the investigator employed descriptive statistical measures such as measures of central tendency and percentages to find out the nature of score distribution for describing frequencies and for classification of respondents in different categories.

The difference between the mean scores of the different groups based on gender, academic stream, locale, family income and father's educational qualification were tested for significance by applying the t-test and ANOVA. The Pearson Product Moment Correlation was employed for establishing validity and reliability of the constructed usage scale and relationship between the usage of mobile devices for learning and academic achievement of degree college students of Mizoram.

MAJOR FINDINGS

The major findings of the present study are as follows:

Objective 1: To investigate the opinion of degree college students in Mizoram regarding mobile learning.

1) Opinion of degree college students on distraction and concentration during mobile learning activities:

Q.1 Learning with mobile devices affect my concentration.		
Respondents	**Yes**	**No**
Overall (N=500)	276 (55.2%)	224 (44.8%)
Male (N=257)	142 (55.25%)	115 (44.75%)
Female (N=243)	134 (55.14%)	109 (44.86%)
Urban (N= 222)	115 (51.80%)	107 (42.20%)
Rural (N= 278)	161 (57.91%)	117 (42.09%)
Arts (N=410)	232 (56.59%)	178 (43.41%)
Science (N=60)	30 (50%)	30 (50%)
Commerce (N=30)	14 (46.67%)	16 (53.33%)

55.2% of students believed mobile learning affects their concentration, while 44.8% reported no such impact. The findings were consistent across male (55.25%) and female (55.14%) students, with slightly higher agreement among rural students (57.91%) compared to urban students (51.80%). Arts students (56.59%) were more likely to acknowledge distraction than those in science (50%) or commerce (46.67%). Overall, the results highlight that a majority of students perceive mobile learning as a factor influencing their ability to concentrate, suggesting a need to address potential distractions associated with mobile devices in educational contexts.

2) Opinion of degree college students on the enhancement of theoretical learning through mobile learning:

Q.2 Mobile Learning can enhance the theoretical part of the subject.		
Respondents	**Yes**	**No**
Overall (N=500)	374 (74.80%)	126 (25.20%)
Male (N=257)	195 (75.88%)	62 (24.12%)
Female (N=243)	179 (73.66%)	64 (26.34%)
Urban (N= 222)	165 (74.32%)	57 (25.68%)
Rural (N= 278)	209 (75.18%)	69 (24.82%)
Arts (N=410)	308 (75.12%)	102 (24.88%)
Science (N=60)	43 (71.67%)	17 (28.33%)
Commerce (N=30)	23 (76.67%)	7 (23.33%)

A substantial majority (74.80%) agreed that mobile learning enhances theoretical learning, while only 25.20% disagreed. Male (75.88%) and female (73.66%) students showed comparable levels of agreement, with minimal variation between urban (74.32%) and rural (75.18%) respondents. Stream-wise analysis indicated strong support across disciplines, with Commerce students showing the highest agreement (76.67%), followed by Arts (75.12%) and Science (71.67%). Overall, the results highlight widespread recognition of mobile learning as a valuable tool for strengthening theoretical knowledge among degree college students, irrespective of demographic or academic differences.

3) Opinion of degree college students on the influence of mobile learning on the value of classroom instruction:

Q.3 Mobile learning decreases the value or importance of classroom instruction.		
Respondents	**Yes**	**No**
Overall (N=500)	265 (53%)	235 (47%)
Male (N=257)	134 (52.14%)	123 (47.86%)
Female (N=243)	131 (53.91%)	112 (46.09%)
Urban (N= 222)	123 (55.41%)	99 (44.49%)
Rural (N= 278)	142 (51.08%)	136 (48.92%)

Arts (N=410)	223 (54.39%)	187 (45.61%)
Science (N=60)	30 (50%)	30 (50%)
Commerce (N=30)	12 (40%)	18 (60%)

A slight majority (53%) of respondents agreed that mobile learning decreases the importance of classroom instruction while 47% disagreed. Female students (53.91%) and urban students (55.41%) expressed stronger concern compared to their male and rural counterparts. Arts students (54.39%) also showed higher agreement while Commerce students (60%) largely disagreed indicating greater acceptance of mobile learning. Science students were evenly divided. The findings show that although mobile learning is perceived by many as diminishing traditional classroom value, significant variation exists across demographic and academic groups.

4) Opinion of degree college students regarding the potential of mobile learning to enhance their success rates:

Q.4 Using mobile devices for learning increases my success rate.		
Respondents	**Yes**	**No**
Overall (N=500)	352 (70.40%)	148 (29.60%)
Male (N=257)	184 (71.60%)	73 (28.40%)
Female (N=243)	168 (69.14%)	75 (30.86%)
Urban (N= 222)	156 (70.27%)	66 (29.73%)
Rural (N= 278)	196 (70.50%)	82 (29.50%)
Arts (N=410)	281 (68.54%)	129 (31.46%)
Science (N=60)	43 (71.67%)	17 (28.33%)
Commerce (N=30)	28 (93.33%)	2 (6.67%)

A substantial majority (70.40%) believed mobile learning positively contributes to their success while 29.60% disagreed. The results showed minimal variation across gender with 71.60% of male and 69.14% of female students supporting the statement. Similarly, perceptions were consistent across students from urban (70.27%) and rural (70.50%) indicating that residential location has little impact on students' views. Academic discipline, however, showed greater variation: 68.54% of arts students, 71.67% of science students, and a notably high 93.33% of

commerce students agreed that mobile learning improved academic outcomes. Overall, the findings highlight a strong, positive perception of mobile learning among students, indicating its significance in fostering academic achievement.

5) Opinion of degree college students with respect to the future of mobile learning:

Q.5 Use of mobile learning will increase in the near future.		
Respondents	**Yes**	**No**
Overall (N=500)	392 (78.40%)	108 (21.60%)
Male (N=257)	207 (80.54%)	50 (19.46%)
Female (N=243)	185 (76.13%)	58 (23.87%)
Urban (N= 222)	173 (77.93%)	49 (22.07%)
Rural (N= 278)	219 (78.78%)	59 (21.22%)
Arts (N=410)	322 (78.54%)	88 (21.46%)
Science (N=60)	44 (73.33%)	16 (26.67%)
Commerce (N=30)	26 (86.67%)	4 (13.33%)

78.4% students believe mobile learning will increase in the near future. Male students (80.54%) expressed slightly higher optimism compared to female students (76.13%). Rural students (78.78%) were marginally more positive than urban students (77.93%) indicating that mobile learning is viewed as an opportunity to bridge educational gaps. Among academic streams, Commerce students (86.67%) were most optimistic followed by Arts (78.54%) and Science (73.33%) students indicating disciplinary differences in adaptability toward mobile learning. Overall, the findings highlight a strong positive outlook among students toward mobile learning as an emerging mode of education, with implications for policy and practice in higher education.

6) Opinion of degree college students regarding the efficiency of mobile learning in comparison to traditional learning:

Q.6 Mobile learning is as effective as traditional learning.		
Respondents	**Yes**	**No**
Overall (N=500)	294 (58.80%)	206 (41.20%)
Male (N=257)	147 (57.20%)	110 (42.80%)
Female (N=243)	147 (60.49%)	96 (39.51%)
Urban (N= 222)	126 (56.76%)	96 (43.24%)
Rural (N= 278)	168 (60.43%)	110 (39.57%
Arts (N=410)	232 (56.59%)	178 (43.31%)
Science (N=60)	42 (70%)	18 (30%)
Commerce (N=30)	20 (66.67%)	10 (33.33%)

58.80% of respondents believe mobile learning is as effective as traditional classroom instruction, while 41.20% disagreed. Female (60.49%) and rural (60.43%) students showed slightly higher acceptance compared to male (57.20%) and urban (56.76%) students. Discipline-wise, science students (70%) demonstrated the strongest agreement, followed by commerce (66.67%) and arts students (56.59%). These results suggest that overall, students hold a favorable view of mobile learning, with particularly strong acceptance among science stream learners who may be more adaptable to technology-based education. The study underscores the growing relevance of mobile learning as a viable alternative to traditional teaching methods, particularly in fostering accessibility and technological engagement among students.

7) Opinion of degree college students on motivation when employing mobile learning for educational purposes:

Q.7 Using mobile devices for educational purposes motivates me.		
Respondents	**Yes**	**No**
Overall (N=500)	347 (69.40%)	153 (30.60%)
Male (N=257)	174 (67.70%)	83 (32.30%)
Female (N=243)	173 (71.19%)	70 (28.81%)
Urban (N= 222)	155 (69.82%)	67 (30.18%)
Rural (N= 278)	192 (69.06%)	86 (30.94%)

Arts (N=410)	284 (69.27%)	126 (30.73%)
Science (N=60)	44 (73.33%)	16 (26.67%)
Commerce (N=30)	19 (63.33%)	11 (36.67%)

69.40% of respondents agreed that mobile devices motivate them in their studies while 30.60% disagreed. Female students (71.19%) reported slightly higher motivation compared to male students (67.70%). Similarly, urban (69.82%) and rural (69.06%) students showed nearly identical levels of agreement showing that location does not significantly influence motivation. Across academic streams, Science students (73.33%) expressed the highest motivation followed by Arts (69.27%) while Commerce students (63.33%) reported the lowest. These findings highlight that mobile learning serves as a motivational tool for most degree college students with variations observed across academic disciplines.

8) Opinion of degree college students regarding the integration of mobile learning by teachers in the classroom:

Q.8 Do you want your teachers to integrate mobile learning in the classroom?		
Respondents	**Yes**	**No**
Overall (N=500)	186 (37.20%)	314 (62.80%)
Male (N=257)	97 (37.74%)	160 (62.26%)
Female (N=243)	89 (36.63%)	154 (63.37%)
Urban (N= 222)	83 (37.39%)	139 (62.61%)
Rural (N= 278)	103 (37.05%)	175 (62.95%)
Arts (N=410)	149 (36.34%)	261 (63.66%)
Science (N=60)	24 (40%)	36 (60%)
Commerce (N=30)	13 (43.33%)	17 (56.67%)

Only 37.20% of students were in favor of integrating mobile learning while a majority of 62.80% opposed it. Gender-based analysis indicated similar attitudes among males (37.74%) and females (36.63%). Residential background showed

minimal variation with 37.39% of urban students and 37.05% of rural students supporting mobile learning. Stream-wise, Commerce students expressed the highest support (43.33%) followed by Science (40%) and Arts (36.34%). Overall, the results highlight a prevailing resistance among students toward the incorporation of mobile learning in classrooms, irrespective of demographic or academic differences.

Objective 2: To construct and standardize mobile device use for learning scale.

The objective of this phase of the study was to construct and standardize a Mobile Device Use for Learning Scale considering the socio-cultural, educational and regional aspects of degree college students in Mizoram. The process followed systematic scale construction procedures:

1) *Item Development & Validation:*
    a. An initial item pool of 40 statements was created from literature review and expert consultations.
    b. After expert validation, 19 items were removed, and 21 items were retained for the first trial.
2) *First & Second Try-outs:*
    a. The first try-out with 20 undergraduate students ensured clarity and comprehension.
    b. The second try-out with 130 students allowed for item discrimination using the upper 27% – lower 27% method and t-tests. All 21 items showed t-values above 2.64, significant at the 0.01 level, confirming strong discriminatory power.
3) *Reliability Testing:*
    a. Test-retest reliability with a two-week interval yielded a correlation coefficient of 0.756 ($p < .01$).
    b. Split-half reliability produced a coefficient of 0.764 ($p < .01$). Both results indicate a high degree of consistency.

4) *Scoring & Norms:*

a. The final scale, a five-point Likert format, assigns higher scores to more positive usage patterns.

b. The maximum score is 105 and the minimum is 21.

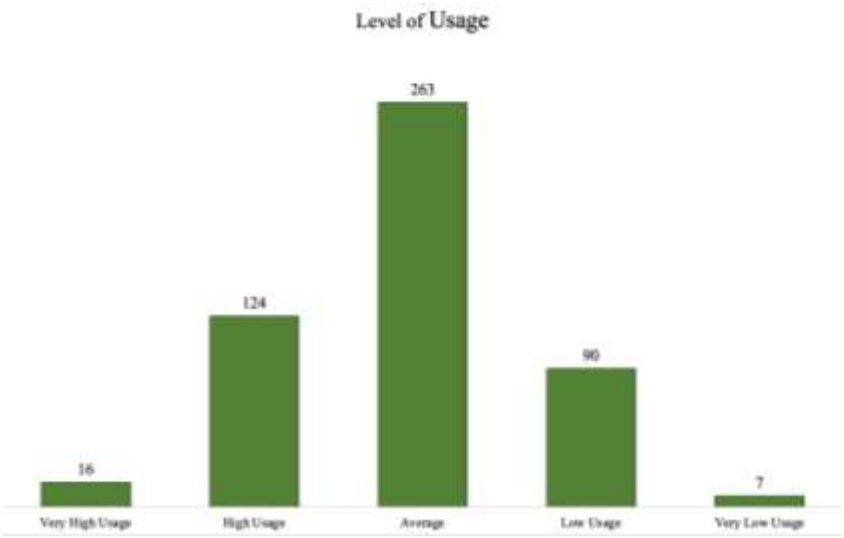
c. Based on administration to 500 students (M = 74.574, SD = 10.416), z-score norms and raw score ranges were developed, categorizing usage into five levels: Very High, High, Average, , Low and Very Low Usage.

5) *Standardization Outcome:*

The scale is both reliable and valid for assessing the extent and nature of mobile device use for learning among degree college students.

Objective 3: To assess the extent of mobile device usage for learning among degree college students in Mizoram.

	Very High Usage	**High Usage**	**Average**	**Low Usage**	**Very Low Usage**
Level of Usage	16 (3.2%)	124 (24.8%)	263 (52.6%)	90 (18%)	7 (1.4%)



The majority of students 263 (52.6%) reported an average level of usage indicating that mobile devices are moderately integrated into their academic activities. A substantial proportion 124 (24.8%) indicated a high level of usage while only a small segment 16 (3.2%) fell into the very high usage category. On the other hand, 90 (18%) students reported a low level of usage and just 7 (1.4%) students showed very low usage. These findings show that while mobile learning is gaining ground among students, its integration is still uneven with most learners engaging at a moderate rather than intensive level

Objective 4: To compare the use of mobile devices for learning by degree college students of Mizoram in relation to gender, academic streams, locale, family income and father's educational qualification.

1. A comparison of the use of mobile devices for learning between male and female degree college students of Mizoram.

Comparison of the level of usage of mobile devices for learning between male and female degree college students of Mizoram

A mobile device use for learning scale that was developed by the investigator was given to 500 degree college students in Mizoram in order to collect data.

	Very High Usage	**High Usage**	**Average**	**Low Usage**	**Very Low Usage**
Male	11 (4.28%)	57 (22.18%)	145 (56.42%)	43 (16.73%)	1 (0.39%)
Female	5 (2.06%)	67 (27.57%)	118 (48.56%)	47 (19.34%)	6 (2.47%)

Male students mostly show moderate mobile learning use with the majority at an average level and fewer at high or extreme levels. Female students also cluster around average usage but a slightly higher proportion fall into both high and low categories indicating more variation in their engagement compared to males.

Comparison of the use of mobile devices for learning between male and female degree college students of Mizoram by test of significance

To examine whether male and female degree college students in Mizoram differ in their use of mobile devices for learning, the hypothesis "There is a significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram" was reformulated into a null hypothesis. The null hypothesis stated that "There is no significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram."

In order to test the null hypothesis, the mean and standard deviation of the two groups were determined individually, a t-test was performed and comparison was made between mean scores of male and female students of Mizoram.

Group	**N**	**Mean**	**SD**	**SED**	**t-value**	**Sig.Level**
Male	257	75.09	9.89	0.93	1.14	Not Significant
Female	243	74.03	10.94			

The data depicted in the above table reveals that the calculated value of 't' is less than the critical value of 't' with the degrees of freedom (df) 498 i.e. 1.97 at 0.05 and 2.59 at 0.01 level. When it comes to the use of mobile devices for learning, this shows that there is no significant difference between males and female students. Therefore, the null hypothesis "There is no significant difference in the use of mobile devices for learning between male and female degree college students of Mizoram" cannot be rejected.

2. A comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to academic stream.

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to academic stream

	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Arts	15 (3.66%)	97 (23.66%)	223 (54.39%)	72 (17.56%)	3 (0.73%)
Science	0	19 (31.67%)	26 (43.33%)	13 (21.67%)	2 (3.33%)
Commerce	1 (3.33%)	8 (26.67%)	14 (46.67%)	5 (16.67%)	2 (3.33%)

The comparison shows clear differences in mobile learning across streams. Arts students mostly demonstrate moderate usage with over half at an average level and fewer at high or very high levels indicating mobile learning is used but not deeply integrated. Science students cluster around average and high usage but none report very high use, likely due to the limitations of mobile devices for experiments and complex tasks. Commerce students also show mainly average usage with some at high levels, indicating regular but not intensive use, possibly because their work often requires tools better suited to computers.

Comparison of the use of mobile device for learning among degree college students of Mizoram in relation to academic stream by test of significance

For comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams, the hypothesis which stated that “There is significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams” was converted to a null hypothesis which stated that “There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams.”

To compare the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams, ANOVA was performed and the results are presented in the following table.

Sources of variance	Degrees of freedom	Sum of the squares	Mean Square	F Ratio
Between Set	(s-1) = 3-1 =2	253.731	126.866	1.17
Within set	N-s=500-3=497	53882.531	108.416	

Table shows that the calculated F-ratio was 1.17, which is lower than the critical value of 4.66 at 0.01. Hence, the null hypothesis "There is no significant difference the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams" cannot be rejected. Hence, there is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to academic streams.

3. A comparison of the use of mobile devices for learning between urban and degree college students of Mizoram.

Comparison of the level of usage of mobile devices for learning between urban and rural degree college students of Mizoram

	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Urban	5 (2.25%)	64 (28.83%)	110 (49.55%)	42 (18.92%)	1 (0.45%)
Rural	11 (3.96%)	60 (21.58%)	153 (55.04%)	48 (17.27%)	6 (2.16%)

Both urban and rural students mostly fall under average mobile learning usage, showing it is commonly used in both contexts. Urban students have higher levels of high usage, likely due to better access to internet and devices, while rural students generally use mobile learning more at a basic level. Interestingly, a slightly higher share of rural students falls under very high usage, suggesting a small group uses mobile learning intensively despite challenges. Low usage is similar in both

groups, though very low usage is slightly higher among rural students, possibly due to limited access and digital constraints.

Comparison of the use of mobile devices for learning between urban and rural degree college students of Mizoram by test of significance

To compare the use of mobile devices for learning between urban and rural degree college students in Mizoram, the hypothesis which stated that "There is a significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram" was converted into a null hypothesis which stated that, "There is no significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram."

In order to test the null hypothesis, the mean and standard deviation of the two groups were determined individually, a t-test was performed and comparison was made between mean scores of rural and urban students of Mizoram, the details are presented in the following table.

Group	N	Mean	SD	SED	t-value	Sig. Level
Rural	278	74.03	10.55	0.29	4.24	0.05
Urban	222	75.26	10.22			

The data depicted in the above table revealed that the calculated value of 't' is more than the critical value of 't' with the degrees of freedom (df) 498 i.e. 1.97 at 0.05 and 2.59 at 0.01 level. When it comes to the use of mobile devices for learning this shows that there is a significant difference between rural and urban degree college students. Therefore, the null hypothesis "There is no significant difference in the use of mobile devices for learning between urban and rural degree college students of Mizoram." can be rejected.

4. A comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to family income.

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to family income

Level of Usage	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Below 1 Lakh	7 (3.8%)	42 (22.83%)	99 (53.8%)	34 (18.48%)	2 (1.09%)
Between 1 to 5 Lakhs	8 (3.32%)	64 (26.56%)	125 (51.87%)	40 (16.6%)	4 (1.66%)
Between 5 to 10 Lakhs	1 (1.64%)	12 (19.67%)	30 (49.18%)	17 (27.87%)	1 (1.64%)
Above 10 Lakhs	0	4 (7.14%)	9 (64.28%)	1 (7.14%)	0

The findings indicate that students across all income groups generally report average mobile learning usage. Those from lower-income families appear to use mobile devices moderately, with some limitations possibly affecting higher usage. The middle-income group shows slightly higher engagement, indicating that better access may support usage to some extent. However, students from higher-income families do not show a clear increase in usage, which may be because they have access to other learning resources. Overall, income seems to have some influence on access and usage, but the relationship is not very strong.

Comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to family income by test of significance

For comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to family income, the hypothesis which stated that “There is significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income” was converted to a null hypothesis which stated that “There is no significant difference in

the use of mobile devices for learning among degree college students of Mizoram in relation to family income."

To compare the use of mobile devices for learning among degree college students of Mizoram in relation to family income, ANOVA was performed and the results are presented in the following table.

Sources of variance	Degrees of freedom	Sum of the squares	Mean Square	F Ratio
Between Set	(S - 1) = 4 - 1 = 3	501.85	167.28	**1.55**
Within set	N – S = 500 – 4 = 496	53634.41	108.13	

Table shows that the calculated F-ratio was 1.55, which is lower than the critical value of 4.66 at 0.01. Hence, the null hypothesis "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income" cannot be rejected. Hence, there is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to family income.

5. A comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

Comparison of the level of usage of mobile devices for learning among degree college students of Mizoram in relation to father's educational background.

Level of Usage	Very High Usage	High Usage	Average	Low Usage	Very Low Usage
Below HSLC	6 (2.79%)	50 (23.26%)	111 (51.63%)	46 (21.4%)	2 (0.93%)
HSLC	3 (4%)	21 (28%)	39 (52%)	12 (16%)	0
HSSLC	5	16	35	10	0

	(7.58%)	(24.24%)	(53.03%)	(15.15%)	
Undergraduate	1 (1.03%)	24 (24.74%)	49 (50.52%)	18 (18.56%)	5 (5.15%)
Master Degree or Above	1 (2.13%)	13 (27.66%)	29 (61.7%)	4 (8.51%)	0

The findings suggest a slight relationship between father's education and mobile learning usage, though differences are not very large. Across all groups, most students report average usage. Students with less-educated fathers tend to show moderate use with fewer at extreme levels, possibly due to limited exposure or support. As parental education increases, there is a small rise in high and very high usage, indicating better awareness and encouragement. However, among graduate-level fathers, some students show lower usage, possibly due to access to alternative learning resources. Overall, higher parental education appears to support more balanced and consistent mobile learning engagement.

Comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to father's educational background by test of significance

For comparison of the use of mobile devices for learning among degree college students of Mizoram in relation to father‘s educational background, the hypothesis which stated that "There is significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father‘s educational background" was converted to a null hypothesis which stated that "There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father‘s educational background.

To compare the use of mobile devices for learning among degree college students of Mizoram in relation to father‘s educational background, ANOVA was performed and the results are presented in the following table

Sources of variance	Degrees of freedom	Sum of the squares	Mean Square	F Ratio
Between Set	(s-1) = 5-1 =4	1014.62	4	**2.36**
Within set	N-s=500-5=495	53121.64	495	

Table shows that the calculated F-ratio was 2.36, which is lower than the critical value of 4.66 at 0.01. Hence, the null hypothesis “There is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father’s educational background” cannot be rejected. Hence, there is no significant difference in the use of mobile devices for learning among degree college students of Mizoram in relation to father’s educational background.

Objective 5: To find out the relationship between the level of usage of mobile devices for learning and academic achievement of degree college students of Mizoram.

The statistical analysis using Pearson’s product–moment correlation revealed a correlation coefficient of $r(498) = 0.064$, indicating a very weak positive relationship between the two variables. This means that students who reported higher scores in mobile device usage for learning tended to have slightly higher examination marks. However, the association was extremely small in magnitude and lacked practical significance. The p-value of 0.153 exceeded the conventional significance threshold of 0.05 confirming that the correlation was not statistically significant. Therefore, there is insufficient evidence to assert that higher usage of mobile devices for learning is systematically linked to improved academic performance in this context.

Objective 6: To identify the types of mobile devices used and the extent of their usage among degree college students in Mizoram.

Types of mobile devices used for learning by degree college students of Mizoram

Types of Mobile Devices Used	No. of Students
Smartphone	447 (89.4%)
Smartphone, Laptop	40 (8%)
Smartphone, Tablet/iPAD	7 (1.4%)
Smartphone, Tablet/iPAD, Laptop	4 (0.8%)
Smartphone, Tablet/iPAD, Laptop, PDA	2 (0.4%)
Total Students	500

The study found that smartphones are by far the most dominant mobile learning device among degree college students in Mizoram, with 447 out of 500 respondents (89.4%) reporting exclusive use of smartphones only for academic purposes. A smaller segment of students (8%) reported using smartphones alongside laptops and only a handful incorporated tablets/iPads into their learning toolkit. The combination of smartphone, tablet/iPad, laptop and PDA use was reported by just 0.4% of the students, underscoring the near obsolescence of PDAs in contemporary academic contexts.

Extent of use of mobile devices for learning by degree college students of Mizoram on a daily basis.

Extent of use of Mobile Devices for Learning	No. of Students
1 Hour	140 (28%)
1 to 2 Hours	171 (34.2%)
2 to 3 Hours	104 (20.8%)
3 to 4 Hours	54 (10.8%)
4 to 5 Hours	16 (3.2%)
More than 5 Hours	15 (3%)

In terms of daily usage, 34.2% of students reported spending between 1–2 hours on mobile learning, followed by 28% who dedicated just 1 hour. Around 20.8% used mobile devices for 2–3 hours, while longer durations 3–4 hours (10.8%), 4–5 hours (3.2%) and more than 5 hours (3%) were relatively uncommon. The data indicates a moderate engagement level with the majority (63%) using mobile devices for learning for less than two hours daily.

***Objective No.7: To investigate the factors contributing to disparities in mobile device usage for learning among degree college students in Mizoram*:**

To investigate the causes for the disparities in the use of mobile devices for learning of degree college students of Mizoram an interview was conducted with thirty-six (36) students from different colleges. This study investigates the factors contributing to disparities in the use of mobile devices for learning among degree college students. The findings are presented below.

1. **Device and Internet Access:** All students owned mobile devices, but disparities in and storage capacity limited some students' ability to access or store learning resources. Paid content restrictions also reduced access to certain educational materials. While some students reported good connectivity, others expressed difficulties. Students in urban centers like Aizawl experienced fewer connectivity issues, while those in smaller towns or villages reported challenges in maintaining stable access.

2. **Skills and Confidence:** In terms of digital skills, most students expressed confidence in using mobile devices for academic purposes. They reported using them for reading, watching videos and assignments with ease. However, a few students mentioned barriers related to skills and technical handling. This shows that while the majority are digitally competent, there remains a minority of learners who require digital literacy support. -based curriculum delivery.

3. **Learning Context:** Students reported using mobile devices both inside and outside classroom contexts with strong emphasis on supplementary learning, assignments and exam preparation. For instance, students reported using mobile learning to summarize lengthy answers which enhanced their retention of information. In addition, they indicated that mobile learning was highly beneficial during their studies particularly in completing assignments.

4. **Usage and Challenges:** A strong theme across responses was the positive contribution of mobile learning to language development, particularly English. Students frequently mentioned its role in vocabulary building, translation, and supplementary reading. However, not all students found mobile learning equally beneficial for language. These exceptions indicate that while mobile learning generally enhances language access, screen size, content quality and individual learning styles influence outcomes.

5. **Language and Content Accessibility:** Many students improved their language skills through mobile learning, using translation tools and supplementary reading. However, comprehension issues and paywalled resources limited access for some. Many students found that mobile learning improved their language skills, particularly when using videos, translation tools and supplementary reading materials. Few students specifically used mobile devices to access translations and improve understanding of content. However, content accessibility was not equal for all. Some students had trouble fully understanding some materials without help from other sources. While the majority benefited linguistically from mobile learning, a minority experienced barriers that reduced the inclusivity of the available content.

6. **Perceptions and Inclusivity:** Overall, students perceived mobile learning as flexible, supportive and effective in complementing traditional education. However, inclusivity issues arise when considering distractions and unequal access. Distractions were widely reported, with students rating them

between 3/10 to 7.5/10. The finding shows that while most students can adapt others may struggle to balance learning with entertainment, leading to uneven outcomes.

Objective 8: To examine the suitability of Mizoram University Curriculum for supporting mobile learning.

1. Overall Curriculum Suitability for Mobile Learning

1) Across all disciplines, teachers acknowledged that a significant portion of learning objectives can be achieved via mobile platforms.

2) While mobile learning can deliver a substantial amount of the curriculum content, teachers emphasized its role as a supplementary rather than a complete replacement for face-to-face instruction.

3) A recurring theme was reliance on printed books as the primary learning source, particularly in disciplines with limited digital resources.

2. Subject-wise Analysis

i) *Arts Stream*

- Subjects like Political Science, History, Sociology, Education, Public Administration and English can integrate interactive tools such as - discussion forums for debates, virtual tours for History, interactive policy simulations for Public Administration and e-reading and annotation tools for English.
- Mizo language faces severe digital content scarcity; only about 10% of its curriculum can be supported by mobile learning. Teachers often have to create and distribute their own PDF resources.
- In most Arts subjects, 60–80% of assignments (short essays, quizzes, source analyses) can be completed on mobile devices. Long research papers and extensive field-based work still require traditional methods.

ii) Science Stream

- Science subjects like Zoology, Botany, Biotechnology, Physics, Chemistry, Biochemistry, Mathematics, Home Science benefit from virtual labs for practical experiments, simulation apps for visualizing molecular, physical and biological processes and data analysis tools for statistical and experimental work.
- Hands-on experiments, specimen handling and field measurements cannot be fully replicated on mobile devices.
- Approximately 70–85% of theoretical and analytical tasks can be managed through mobile devices.

iii) Commerce Stream

- Commerce courses can effectively use simulation-based accounting software, case study apps for legal and management analysis, collaborative platforms for group projects and tax calculation tools for applied exercises.
- Most assignments like problem-solving, financial analysis, report writing and presentations can be completed via mobile devices except for certain high-complexity tasks needing extended in-person collaboration.

3. Pedagogical Benefits

From the teachers' perspectives, the Mizoram University curriculum can harness mobile learning in several ways:

1) Almost all subjects encourage independent study components, which align well with mobile access to e-books, videos and tutorials.
2) Multimedia content like videos, quizzes and simulations can make abstract concepts more tangible.

3) Messaging apps, discussion boards and cloud-based tools allow for seamless peer-to-peer and teacher-student interaction.

4) Mobile learning opens access to global knowledge repositories and specialized apps for subject-specific learning.

4. Challenges and Limitations

1) Especially acute in Mizo language and other region-specific subjects with limited online material.

2) Science and vocational courses cannot replicate all lab or field experiences virtually.

3) While quizzes and short assignments are feasible, longer research tasks are cumbersome to produce on mobile.

5. Assessment Feasibility

Stream-wise Feasibility of Mobile Learning in Mizoram University Curriculum

Stream	**Estimated Mobile Feasibility**	**Examples of Feasible Tasks**	**Examples of Non-Feasible Tasks**
Arts	60 – 80%	Quizzes, essays, document analysis, short research	Extensive fieldwork, long papers requiring multiple citations
Science	70 – 85%	Virtual labs, simulations, data analysis	Physical experiments, specimen handling
Commerce	75 – 90 %	Simulations, case studies, accounting exercises, reports	Large-scale collaborative audits or in-person presentations

The analysis indicates that the Mizoram University curriculum has a moderately high compatibility with mobile learning. Most subjects, particularly in Commerce and parts of Science can deliver the majority of their learning objectives through mobile platforms. Arts subjects also show strong potential with the exception of resource-limited disciplines like Mizo language.

Mobile learning can significantly enhance flexibility, accessibility and interactivity, making it especially valuable in geographically challenging regions like Mizoram. However, full-scale adoption requires bridging digital resource gaps and maintaining hybrid models for practical work.

Recommendations:

Taking into consideration the findings of the present study, the investigator recommends the following:

1) Integrate mobile learning with traditional classroom instruction to combine the advantages of both approaches while preserving the value of face-to-face interaction.

2) Fill up resource gaps in subjects like Mizo language and science practicals by developing authentic online materials that correspond with the syllabus and handle accuracy difficulties.

3) Provide professional development programs for teachers to strengthen skills in mobile pedagogy, content evaluation and effective integration of mobile learning into lessons.

4) Promote purposeful and academically focused mobile device use rather than simply increasing the amount of time spent on devices.

5) Adopt blended approaches for practical and hands-on subjects, combining physical activities with virtual simulations or demonstrations.

6) Invest in the creation of localized and culturally relevant educational resources.

7) Establish partnerships with local publishers and Mizoram University can help digitize and update textbooks, journals and other learning materials in subjects that are underrepresented.

8) Encourage the use of interactive tools such as online debates, mind-mapping apps and virtual case studies in Arts and Commerce.

9) Develop subject-specific digital content repositories validated by faculty to address reliability concerns reported by teachers across all streams.

Suggestions for further research:

In the light of the present study, the investigator suggests the following areas for further investigation:

1) To investigate the long-term effects of mobile learning on academic performance, skill development and learner autonomy in Mizoram.
2) A comparative study of assessing the effectiveness of traditional, fully mobile and blended learning models in Mizoram.
3) An evaluative study of mobile learning influences and learning outcomes in theory-heavy and practical-heavy disciplines in Mizoram.
4) To examine the impact of mobile learning on student engagement, motivation and collaboration in North East India.
5) A study on the Technology Acceptance Model (TAM) to identify factors affecting adoption and sustained use of mobile learning in Mizoram.
6) A critical analysis of mobile learning applications for subjects with limited existing digital resources in Mizoram.
7) Investigate strategies to improve students' digital literacy and ability for the credibility and accuracy of online information in Mizoram.
8) Effectiveness of mobile-based virtual laboratory simulations for science students in developing practical competencies in Mizoram.
9) Explore the relationship between mobile learning usage patterns (e.g., time spent, type of resources accessed) and specific cognitive skills like critical thinking, creativity and problem-solving in Mizoram.

10) A study of socio-economic factors such as family income, influence device ownership, internet access and mobile learning effectiveness in Mizoram.