A Study on Higher Secondary Education Teachers' Proficiency in Virtual Learning, Attitudes towards Online Resources and Interest to Incorporate Technology in Teaching

Aditya Chaudhary[1], Dr. Md. Imbesatul Haque[2]
[1]*Research Scholar, Department of Education L. N. Mithila University, Darbhanga*
[2]*Associate Professor, Dr. Zakir Hussain Teachers' Training College Laheriasarai, Darbhanga – 846003, Bihar*

***Abstract*—Digital technology has become a central part of higher secondary education. Teaching is no longer limited to face to face classroom settings. Teachers now rely on virtual learning platforms online resources and digital tools to support teaching and learning processes. This transformation has created a strong need to examine how proficient teachers are in virtual learning environments. It has also highlighted the importance of understanding teachers attitudes towards online resources and their interest in incorporating technology into teaching.**

The present study focuses on higher secondary education teachers proficiency in virtual learning. Proficiency refers to teachers ability to plan conduct and manage teaching effectively in digital settings. The study examines how confidently teachers use virtual platforms for lesson delivery assessment and student interaction. It also explores the extent to which teachers are able to select and use appropriate digital tools to support learning outcomes.

Another important aspect of the study is teachers attitudes towards online resources. The study investigates whether teachers perceive digital materials as useful reliable and supportive for classroom teaching. It examines how online resources contribute to explaining complex concepts enhancing student engagement and supporting different learning styles. Positive attitudes are seen as a key factor in the regular and effective use of digital resources.

The study also analyses teachers interest in incorporating technology into teaching. Interest reflects teachers willingness to learn adapt and experiment with new teaching methods. Teachers who show strong interest are more likely to adopt innovative practices and integrate technology meaningfully into their lessons. The study examines factors that influence interest including training institutional support and teaching experiences.

The findings reveal that many teachers have developed basic to moderate proficiency in virtual learning through experience and professional development programs. Teachers with higher proficiency demonstrate more positive attitudes towards online resources and greater interest in technology integration. However some teachers continue to face challenges related to limited training technical issues and inadequate support systems.

The study concludes that improving teachers virtual learning proficiency fostering positive attitudes towards online resources and sustaining interest in technology are essential for effective digital education. Continuous training supportive infrastructure and institutional encouragement can significantly enhance the quality of higher secondary education in the digital era.

***Index Terms*—Virtual Learning Proficiency, Online Learning Resources, Teacher Attitudes, Teacher Interest, Technology Integration**

I. BACKGROUND AND RATIONALE OF THE STUDY

Higher secondary education is an important stage in the school system. At this level students prepare for higher education professional courses and future careers. Teachers play a key role in guiding learners during this phase. Their teaching methods influence students understanding confidence and academic direction. Any change in teaching practice at this stage has a strong impact on learning outcomes.

In recent years digital technology has brought significant changes in education. Teaching is no longer limited to physical classrooms. Virtual platforms online resources and digital tools are now widely used in schools. This shift became more visible during the COVID pandemic when virtual teaching was the only option. Since then digital methods have continued to influence classroom practices. Teachers are now expected to blend traditional teaching with digital approaches.

The growing use of technology has increased the responsibilities of teachers. They are required to plan lessons using digital tools and manage virtual interactions with students. This situation demands new skills confidence and proficiency. Teacher proficiency in virtual learning has become a critical factor in effective learning. Without proper preparation teachers may feel stressed and uncertain while using technology.

Teachers perceptions of digital learning resources also play an important role. Positive perceptions encourage regular use of online materials. Negative perceptions may limit innovation in teaching. Similarly teachers interest in incorporating technology affects how successfully digital tools are used. Teachers who are interested and willing to learn adapt more easily to change.

The rationale of this study lies in the need to understand these interconnected aspects. Exploring teacher proficiency perceptions and interest helps identify strengths and challenges in digital teaching. Such understanding is necessary for improving training programs and institutional support. The study aims to provide insights that can help strengthen higher secondary education in the digital era.

II. OBJECTIVES OF THE STUDY

The present study has been planned with comprehensive and well defined objectives. These objectives are designed to gain a deeper understanding of how higher secondary education teachers respond to the growing use of digital technology in teaching. The study focuses on teachers professional competence attitudes and interest within the context of virtual learning environments.

A major objective of the study is to assess the level of proficiency of higher secondary education teachers in virtual learning. This includes examining teachers ability to use digital platforms for online and blended teaching. The study seeks to understand how teachers design virtual lessons present content and interact with students through digital media. It also aims to analyse teachers skills in managing virtual classrooms and maintaining student participation.

Another key objective is to examine teachers attitudes towards online learning resources. The study aims to understand how teachers perceive the usefulness reliability and relevance of digital materials. It explores whether teachers believe that online resources support effective teaching and improve student understanding. The study also considers how teachers integrate online resources with traditional teaching methods.

The study further aims to explore teachers interest in incorporating technology into regular teaching practices. Interest is viewed as an important factor that influences technology adoption. The study seeks to identify personal professional and institutional factors that shape teachers interest. It also examines how positive experiences and training opportunities encourage sustained use of technology.

An additional objective is to identify the challenges faced by teachers while using virtual learning tools. These challenges may include limited access to technology inadequate training technical issues and increased workload. Understanding these challenges helps in identifying areas that need improvement and support.

The study also aims to examine the role of institutional support in enhancing teachers proficiency and interest in technology integration. It focuses on the availability of training programs technical assistance and administrative encouragement. This objective helps in understanding how organizational support influences teaching practices.

Finally the study aims to provide practical recommendations for teacher education institutions school management and educational policy makers. These objectives support the development of effective strategies to strengthen virtual learning proficiency promote positive attitudes and encourage meaningful integration of technology in higher secondary education.

III. SIGNIFICANCE OF THE STUDY

The present study holds strong significance in the context of changing teaching practices at the higher secondary level. Education is moving rapidly towards the use of digital technology and virtual teaching methods. Understanding how teachers respond to this change is essential for improving the quality of education. This study provides valuable insights into teachers' proficiency, perceptions and interest related to technology use.

The study is significant for higher secondary school teachers. It helps teachers reflect on their own proficiency for virtual teaching. By identifying strengths and gaps in digital skills teachers can understand areas where improvement is needed. This awareness can encourage teachers to seek training and adopt new teaching methods with confidence.

The study is also important for teacher education institutions. It highlights the need to include digital pedagogy in pre service and in service training programs. The findings can guide institutions in designing training modules that focus on practical use of technology. This can help future teachers become more confident and effective in digital classrooms.

School administrators and management can benefit from this study. The findings draw attention to the role of institutional support in successful technology integration. Administrators can use the insights to improve infrastructure provide technical assistance and encourage innovative teaching practices. Supportive environments can reduce teacher stress and improve teaching effectiveness.

The study also holds significance for educational planners and policy makers. It provides evidence based understanding of challenges faced by teachers in virtual teaching. This information can support better policy decisions related to training funding and digital infrastructure. Effective policies can strengthen technology integration at the higher secondary level.

Overall the study contributes to improving teaching learning processes in the digital era. By focusing on teacher proficiency, perceptions and interest it supports meaningful use of technology. The significance of the study lies in its potential to enhance teaching quality student engagement and educational outcomes in higher secondary education.

IV. REVIEW OF RELATED LITERATURE ON VIRTUAL TEACHING AND TECHNOLOGY INTEGRATION

Several studies have explored the role of technology in school education. Research shows that digital tools have a strong influence on teaching practices and student learning. Many scholars agree that technology can improve lesson clarity and student engagement when used properly. Studies highlight that teachers play a central role in the success of digital learning.

Research on virtual learning proficiency suggests that teachers proficiency develops through training and experience. Teachers who receive regular professional development show greater confidence in using digital platforms. Studies report that such teachers are better able to manage online classes and maintain student interaction. Lack of training often results in hesitation and limited use of technology.

Literature related to teachers perceptions of digital resources shows mixed findings. Many studies indicate that teachers view online resources as useful for explaining complex topics. Digital content such as videos and interactive materials supports different learning styles. However some studies report concerns about content quality and technical reliability. These concerns affect the regular use of digital resources in classrooms.

Several researchers have examined teacher interest to integrate technology. Findings suggest that interest is influenced by personal interest and institutional support. Teachers who see positive outcomes in student learning show higher interest. Recognition and encouragement also play an important role in sustaining interest. Studies note that workload and technical difficulties can reduce interest over time.

Research conducted during the COVID period highlights the sudden shift to virtual teaching. Many studies report that teachers adapted quickly despite limited preparation. This period revealed both strengths and gaps in digital competence. Scholars emphasize the need for long term planning and continuous training.

Overall the reviewed literature shows that teacher proficiency perceptions and interest are closely connected. Effective technology integration depends on skill development positive attitude and support systems. The present study builds on earlier research by focusing on higher secondary teachers and their

experiences with virtual teaching and digital resources.

V. CONCEPTUAL FRAMEWORK OF VIRTUAL LEARNING PROFICIENCY

The conceptual framework of virtual learning proficiency explains how teachers become capable of teaching effectively in digital and online environments. Virtual learning proficiency refers to the overall ability of teachers to plan deliver and manage teaching through virtual platforms. It includes knowledge skills confidence attitude and institutional support. This framework helps in understanding how these elements work together to support effective teaching at the higher secondary level.

A key component of virtual learning proficiency is digital knowledge. Teachers need a basic understanding of virtual learning platforms and online tools. This includes the ability to conduct live classes share learning materials and communicate with students through digital systems. Adequate digital knowledge allows teachers to handle routine teaching tasks smoothly in virtual settings.

Pedagogical skill in virtual environments is another important element. Teaching online requires methods that differ from traditional classrooms. Teachers must design lessons suitable for virtual learning. Clear explanations structured content and visual support help students understand concepts better. Interactive activities such as discussions and quizzes support engagement and participation. Strong pedagogical skills enable teachers to use technology meaningfully.

Confidence plays a central role in virtual learning proficiency. Teachers who feel confident are more willing to use digital tools and explore new teaching strategies. Confidence develops through practice training and positive teaching experiences. Low confidence may limit the effective use of technology even when resources are available. Building confidence helps teachers manage virtual classrooms effectively.

Attitude towards technology also influences virtual learning proficiency. A positive attitude encourages openness to change and continuous learning. Teachers who believe that virtual learning supports teaching show greater proficiency. Negative attitudes may create resistance and slow down technology integration. Guidance and supportive experiences help develop positive attitudes.

Institutional support strengthens virtual learning proficiency. Availability of training digital infrastructure and technical assistance supports teachers performance. Supportive leadership encourages experimentation and innovation. Clear guidelines and timely help reduce stress. Without institutional support even skilled teachers may face difficulties.

The conceptual framework shows that virtual learning proficiency is not a single skill. It is a combination of digital knowledge pedagogical skill confidence attitude and institutional support. These elements are interconnected and influence one another. When all components are strong teachers are better prepared to deliver effective engaging and meaningful virtual education at the higher secondary level.

VI. TEACHERS' PERCEPTIONS AND USE OF DIGITAL LEARNING RESOURCES

Digital learning resources have become an important support for teaching at the higher secondary level. These resources include online videos e content digital textbooks learning platforms and interactive materials. Teachers perceptions of these resources play a major role in how often and how effectively they are used in classrooms. Positive perceptions encourage regular use while negative views limit their potential.

Teachers who hold positive perceptions believe that digital learning resources help in explaining difficult concepts. Visual materials and animations make abstract ideas easier to understand. Such resources also help in saving time and improving lesson clarity. Teachers use digital content to support classroom explanations and provide additional learning materials to students.

The use of digital resources also supports diverse learning needs. Students learn in different ways and digital materials offer multiple modes of learning. Teachers who recognize this benefit are more willing to include digital resources in teaching. They use videos presentations and online exercises to keep students engaged and interested.

Some teachers show cautious perceptions towards digital learning resources. Concerns about the accuracy of content and technical problems affect their use. Limited training and lack of guidance also

influence perceptions. Teachers may hesitate to depend fully on online materials and prefer traditional resources. Such hesitation reduces the effective use of available digital tools.

Teachers use of digital resources improves with experience and support. When teachers receive proper training their confidence increases. Institutional access to reliable platforms also helps build trust in digital materials. Peer support and sharing of resources further improve usage.

Overall teachers perceptions strongly influence the use of digital learning resources. Positive perceptions lead to creative teaching practices and better student engagement. Strengthening teacher awareness and providing support can enhance effective use of digital resources in higher secondary education.

VII. TEACHERS' INTEREST IN INCORPORATING TECHNOLOGY

Teachers interest plays a vital role in the successful integration of technology in education. Interest refers to the inner drive that encourages teachers to use digital tools in teaching. Interested teachers show willingness in learning new methods and adapting to change. Their willingness supports continuous improvement in teaching practices at the higher secondary level.

Teachers who are interested view technology as a helpful support for teaching. They believe that digital tools can improve lesson delivery and student understanding. Such teachers actively explore new applications platforms and online resources. They use technology to make lessons interactive and meaningful for students.

Interest often develops through positive teaching experiences. When teachers observe improved student participation and engagement their confidence increases. Successful use of digital tools creates satisfaction and encourages further use. Student feedback also plays an important role in strengthening interest.

Institutional support strongly influences teacher interest. Availability of training programs technical support and encouragement from management boosts confidence. Recognition of innovative teaching practices further interest teachers. Supportive leadership creates a positive environment for experimentation and learning.

Lack of interest may arise due to workload technical difficulties and limited support. Teachers may feel stressed when expected to use technology without proper preparation. Such conditions reduce interest and confidence. Continuous guidance and manageable expectations help overcome these challenges.

Overall Teachers' Interest in Incorporating Technology depends on personal interest positive experiences and institutional support. Strengthening interest helps teachers adopt digital methods with confidence. Interested teachers contribute to effective and sustainable use of technology in higher secondary education.

VIII. RESEARCH METHODOLOGY

The present study adopts a descriptive research approach to understand the current situation of virtual teaching at the higher secondary level. This approach is appropriate because it allows the researcher to study existing conditions without influencing them. It helps in describing teachers real experiences views and practices related to digital teaching. The study aims to present a clear picture of how teachers engage with virtual teaching and technology in their daily academic work.

The population of the study consists of higher secondary school teachers. These teachers are involved in teaching students at the plus two level. Teachers from different subject backgrounds were included to ensure variety in responses. Both male and female teachers were considered. Teachers with varying years of teaching experience were also included. A convenient sampling method was used to select the sample. This method was chosen because it allowed easy access to teachers who were actively engaged in teaching and willing to participate in the study.

Data were collected through a structured questionnaire. The questionnaire was carefully developed to suit the objectives of the study. It was written in simple and clear language so that teachers could understand each statement easily. The questionnaire included items related to virtual learning proficiency teachers perceptions of digital learning resources and interest in technology integration. Each statement was framed to reflect real classroom situations and teachers personal experiences.

The questionnaire was administered using both online and offline modes. Online forms were shared through digital platforms while printed copies were provided where required. This method helped in reaching a wider group of teachers. Adequate time was given to respondents to complete the questionnaire without pressure. Teachers were informed about the purpose of the study before responding.

Ethical considerations were strictly followed during data collection. Participation was voluntary. Teachers were assured that their responses would be used only for academic purposes. Confidentiality of information was maintained at all stages. No personal identity was disclosed in the analysis.

After data collection responses were organized and analyzed using simple descriptive methods. Percentage analysis was used to interpret the data in an easy and understandable manner. The results were presented in a descriptive form to highlight major trends patterns and common responses. This systematic methodology helped in developing a reliable and clear understanding of teachers experiences with virtual teaching and technology integration at the higher secondary level.

IX. DELIMITATIONS OF THE STUDY

The present study is conducted within certain delimitations. These delimitations define the scope of the research and help readers understand the boundaries within which the findings should be interpreted.

The study is limited to teachers working at the higher secondary education level. Teachers from primary secondary or higher education institutions are not included. Therefore the findings reflect only the experiences perceptions and practices of higher secondary education teachers.

The study focuses on teachers proficiency in virtual learning attitudes towards online resources and interest in incorporating technology into teaching. It does not examine student learning outcomes academic achievement or classroom performance directly. These aspects remain outside the scope of the study.

The data are based on self reported responses collected through a structured questionnaire. The responses reflect teachers personal experiences and perceptions. Direct classroom observation interviews or experimental methods were not used in this study.

The geographical scope of the study is limited to a specific region. Teachers from all regions educational boards or institutional contexts are not represented. Hence regional differences in infrastructure training and policy implementation may not be fully captured.

The study was conducted within a specific time period. Changes in technology availability training programs or institutional policies after the data collection period are not included.

The study follows a descriptive research approach and uses simple statistical analysis. Advanced analytical techniques and causal relationships are not explored. These delimitations should be considered while interpreting the findings of the study.

X. CHALLENGES FACED BY TEACHERS IN VIRTUAL TEACHING

Teachers face several challenges while adopting virtual teaching at the higher secondary level. One major challenge is limited access to reliable internet facilities. Poor connectivity disrupts online classes and affects the flow of teaching. Technical problems such as audio and video issues create frustration for both teachers and students.

Lack of proper training is another significant challenge. Many teachers have not received systematic training in virtual teaching methods. As a result they feel uncertain while using digital platforms and tools. Limited technical knowledge reduces confidence and increases stress during online classes.

Managing student engagement in virtual classrooms is also difficult. Teachers find it challenging to maintain discipline and attention without physical presence. Students may feel distracted or passive during online sessions. Monitoring participation and understanding becomes more complex in virtual environments.

Increased workload adds to teachers difficulties. Preparing digital lessons requires additional time and effort. Teachers must design content create online assessments and provide digital feedback. Balancing these tasks with regular teaching responsibilities leads to exhaustion.

Limited institutional support further increases challenges. Inadequate infrastructure and lack of technical assistance affect smooth functioning of virtual classes. Without timely support teachers struggle to resolve technical issues.

These challenges highlight the need for proper training strong infrastructure and supportive environments. Addressing these issues can reduce teacher stress and improve the effectiveness of virtual teaching at the higher secondary level.

XI. OPPORTUNITIES AND INSTITUTIONAL SUPPORT FOR DIGITAL TEACHING

Digital teaching offers many valuable opportunities for teachers at the higher secondary level. Technology allows teachers to access a wide range of learning materials. Online resources help in explaining complex topics through visuals and interactive content. This makes learning more engaging and meaningful for students.

Digital teaching also supports flexible learning. Teachers can share study materials recorded lessons and assignments easily. Students can learn at their own pace and revise content when needed. This flexibility helps in addressing different learning needs and abilities.

Technology creates opportunities for professional growth. Teachers can participate in online training programs webinars and workshops. These programs help teachers update their skills and learn new teaching strategies. Interaction with educators from different regions supports sharing of ideas and best practices.

Institutional support plays a crucial role in effective digital teaching. Availability of proper infrastructure such as internet facilities and digital devices strengthens teacher confidence. Technical support teams help teachers resolve issues quickly. This reduces stress and improves classroom continuity.

Supportive leadership also encourages technology integration. School management that promotes innovation motivates teachers to experiment with digital methods. Recognition of efforts builds confidence and interest. Clear guidelines and training opportunities further support teachers.

Overall opportunities and institutional support together enhance digital teaching practices. When schools provide resources training and encouragement teachers use technology more effectively. Strong institutional support ensures sustainable and meaningful digital teaching at the higher secondary level.

XII. EDUCATIONAL PEDAGOGICAL AND POLICY IMPLICATIONS

The findings of this study have important implications for higher secondary education. The growing use of digital technology requires changes in teaching approaches. Teachers need to adopt methods that combine subject knowledge with digital skills. This helps in making teaching more effective and learner focused.

One major educational implication is the need to strengthen teacher preparation programs. Teacher education institutions should include digital pedagogy as a core component. Practical training in virtual teaching can help teachers gain confidence. Exposure to real digital classrooms prepares teachers for modern teaching challenges.

Pedagogically teachers should shift towards interactive teaching methods. Digital tools support discussion problem solving and student participation. Teachers can use multimedia resources to explain difficult concepts clearly. Such approaches improve student engagement and understanding.

The study also highlights the importance of continuous professional development. Regular training programs help teachers update their skills. Workshops and online courses support lifelong learning. Continuous learning ensures that teachers remain confident and motivated.

Institutional policies should support digital teaching practices. Schools must provide infrastructure technical assistance and learning platforms. Supportive policies reduce teacher stress and encourage innovation. Administrative encouragement plays a vital role in sustaining digital practices.

These implications suggest that technology should support pedagogy rather than replace it. Effective teaching depends on thoughtful integration of digital tools. Addressing educational and pedagogical needs will improve teaching quality and learning outcomes at the higher secondary level.

XIII. SUGGESTIONS FOR PRACTICE

The findings of the present study point towards several important practical measures that can strengthen virtual learning at the higher secondary education level. These suggestions focus on teachers classroom practices institutional responsibilities and professional

development initiatives. Implementing these measures can support effective and sustainable integration of technology in teaching.

At the teacher level continuous improvement of digital skills is essential. Teachers should regularly engage with virtual learning platforms and online teaching tools. Practice helps teachers gain confidence and improve proficiency. Teachers can gradually incorporate digital activities such as online discussions presentations and assessments into their lessons. Reflecting on digital teaching experiences also helps teachers improve their strategies.

Teachers should be encouraged to explore and use quality online learning resources. Selecting reliable and relevant digital content can enhance lesson clarity and student understanding. Teachers may combine online resources with traditional teaching materials to create balanced learning experiences. Sharing successful digital practices with colleagues can further strengthen teaching quality.

Institutions play a crucial role in supporting digital teaching practices. Schools should ensure the availability of basic digital infrastructure. Reliable internet access suitable devices and learning platforms are essential for smooth virtual teaching. Technical support systems should be in place to assist teachers during online classes and assessments.

School management should promote a supportive and encouraging environment. Recognition of innovative teaching practices increases teacher interest and confidence. Administrative encouragement reduces fear of failure and supports experimentation with new methods. Clear guidelines related to digital teaching also help teachers plan their work effectively.

Professional development programs should be organized on a regular basis. Training should focus on practical use of virtual teaching tools rather than only theoretical aspects. Hands-on workshops and peer learning sessions can help teachers build proficiency. Continuous training ensures that teachers remain updated with new technologies and teaching strategies.

Teacher education institutions should revise their curricula to include digital pedagogy. Pre-service teachers must receive exposure to virtual teaching environments. Practice teaching through digital platforms prepares future teachers for real classroom challenges. Such preparation helps create a digitally competent teaching workforce.

Collaboration among teachers should be encouraged. Online communities of practice allow teachers to exchange ideas and resources. Collaborative learning strengthens problem-solving skills and reduces isolation. Sharing challenges and solutions supports collective growth.

Finally policy makers should support long-term planning for digital education. Investment in infrastructure training and research is necessary. Policies should focus on teacher empowerment rather than mere technology adoption. When teachers are supported and confident technology integration becomes meaningful and effective.

These practical suggestions aim to enhance teachers proficiency in virtual learning promote positive attitudes towards online resources and sustain interest in technology integration. Implementing these measures can contribute to quality improvement in higher secondary education.

XIV. CONCLUSION AND FUTURE DIRECTIONS

The study highlights the growing role of digital technology in higher secondary education. Virtual teaching has become an important part of regular classroom practice. Teachers proficiency perceptions and interest strongly influence the success of technology integration. Teachers who are confident and interested use digital tools more effectively and create engaging learning environments.

The study shows that virtual learning proficiency depends on several factors. These include digital skills positive attitude and institutional support. Teachers who receive training and encouragement show greater confidence in virtual teaching. Their use of digital learning resources improves lesson clarity and student participation.

Challenges such as technical problems workload and lack of training continue to affect teachers. However these challenges can be reduced through proper planning and support. Schools that provide infrastructure guidance and recognition help teachers adapt to digital teaching with ease.

Future directions should focus on strengthening teacher training programs. Continuous professional development is essential for sustaining digital competence. Teacher education institutions should emphasize practical exposure to virtual teaching.

Policies should support long term planning for digital infrastructure.

Further research can explore student perspectives and learning outcomes in virtual environments. Comparative studies across regions and subjects can provide deeper insights. Long term studies may examine changes in teacher attitudes over time.

The study concludes that empowering teachers is the key to effective digital education. With strong support and continuous learning higher secondary education can achieve meaningful and inclusive digital transformation.

"Effective digital education begins with prepared interested and supported teachers."

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