

Postgraduate Seminar Series

Venue: Graduate Seminar Room

Date & Time: August 01, 2026 at 3:30 PM

Speaker Information

Md. Asaduzzaman (Std No. 0421052104) is a full time M.Sc. student in the department of CSE, BUET. He completed her undergraduate studies from Daffodil International University (DIU) in 2021. His research interest lies in the field(s) of Pedagogy, Machine Learning, and Deep Learning. He is currently doing his postgraduate thesis under the supervision of Dr. Abu Sayed Md. Latiful Hoque. He will be speaking about his ongoing research in this talk.



INTEGRATION OF LEARNING TECHNOLOGIES IN E-LEARNING SYSTEMS BASED ON IEEE LEARNING TECHNOLOGY SYSTEMS ARCHITECTURE

The rapid evolution of digital technologies has transformed the landscape of education, making e-learning systems indispensable for modern learning environments. The IEEE Learning Technology System Architecture (LTSA) provides a standardized framework for designing interoperable and scalable e-learning systems. However, existing e-learning platforms often implement generic blended learning approaches without fully leveraging LTSA's capabilities or integrating diverse pedagogical techniques to address varied learner needs.

This thesis presents a comprehensive framework for integrating multiple learning technologies---Active Learning (AL), Problem-Based e-Learning (PBeL), Outcome-Based Learning (OBL), and Imagineering Learning (IL) into e-learning systems while maintaining full compliance with IEEE LTSA's third-layer architecture. The research addresses critical limitations in existing systems, including restricted learner interaction, inadequate personalization, limited pedagogical diversity, and insufficient mechanisms for measuring experiential learning outcomes.

The proposed framework was implemented and evaluated using the Virtual Internship System (VIS), a web-based platform designed to provide industry-level practical training to computer science and IT graduates. The original VIS, which employed only Problem-Based e-Learning techniques, was redesigned and enhanced to incorporate all four learning methodologies while aligning its architecture with LTSA specifications.

The research methodology involved five key phases: (1) comprehensive analysis of existing e-learning architectures and LTSA-compliant systems, (2) detailed mapping of VIS components to LTSA's third-layer elements, (3) design and integration of AL, PBeL, OBL, and IL techniques into a unified framework, (4) implementation of the enhanced VIS system with all four learning technologies, and (5) rigorous evaluation through quantitative performance metrics and qualitative user feedback from six internship batches involving over 50 participants.

Evaluation results demonstrate significant improvements across multiple dimensions. The enhanced VIS achieved a 76.5% employment rate among participants, with 47.1% rating their learning experience as excellent and 41.2% as very good. Quantitative analysis revealed measurable improvements in task completion rates, technology proficiency, problem-solving capabilities, and professional skill development. Qualitative feedback indicated enhanced learner engagement, improved mentor-intern interactions, greater content accessibility, and more effective knowledge transfer compared to the original system.

The research makes several key contributions: (1) a unified architectural framework that successfully integrates four distinct learning methodologies while maintaining LTSA compliance, (2) a comprehensive mapping between VIS components and LTSA elements that demonstrates practical implementation of the standard, (3) a validated approach

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for enhancing existing e-learning platforms with multiple pedagogical techniques, and (4) empirical evidence supporting the effectiveness of integrated learning technologies in improving learner outcomes.

This work provides a foundation for developing next-generation e-learning systems that are pedagogically diverse, architecturally sound, and capable of delivering personalized learning experiences. The framework and methodologies presented can be adapted to various educational contexts beyond virtual internships, including traditional online courses, corporate training programs, and lifelong learning platforms.