IJSES
Volume 10, Issue 11, pp. 29-32, November 2026.
International Journal of Scientific Engineering and Science
ISSN (Online): 2456-7361

Integrating Webquest 3.0 and Okmindmap into Graduation Thesis Supervision at Thai Binh University

Bui Thi Hoa[1], Ngo Thi Anh Hang[2], Tran Thu Ha[3]
[1, 2]Faculty of Technology and Engineering, Thai Binh University, Vietnam
[3]Department of Mathematics and Informatics, Thai Binh University of Medicine and Pharmacy, Thai Binh, Vietnam
Email address: hatt.tbump@gmail.com

Abstract*—In the era of information explosion, self-research capacity and knowledge management are vital factors determining the quality of university graduation theses. However, "information noise" and linear note-taking habits remain major barriers causing learners to lose focus and passively absorb knowledge. This paper proposes a solution by intergrating the WebQuest 3.0 method combined with the OKMindmap tool ecosystem on a Cloud-based Web 2.0 platform for thesis supervision. The model operates under a dual mechanism: WebQuest 3.0 acts as a "filter" guiding students to verified digital resources, while OKMindmap serves as a "living knowledge map" supporting systemization, multimedia integration, and real-time collaboration with advisors. The model was experimentally implemented with 70 senior students at Thai Binh University. Survey results indicate that over 80% of students made breakthroughs in retention and systems thinking, while 95% mastered research progress and transitioned from individual learning to co-creating shared knowledge.*

***Keywords*—** *WebQuest 3.0, OKMindmap, Graduation thesis, Self-directed research, Knowledge management, Systems thinking.*

I. Introduction

The pronounced shift toward a learner-centered paradigm has made the cultivation of systems thinking and self-directed learning competencies an urgent imperative in higher education. Particularly during the execution of graduation projects and theses—a phase in which students confront vast volumes of information across digital environments—learners can no longer rely on passive absorption; instead, they must actively filter, manage, and transform raw data into structured personal knowledge.

Practical experience in thesis supervision reveals that unguided online information retrieval frequently encounters significant limitations: prolonged search processes, topical digression, exposure to unverified sources resulting in "information noise," and a lack of critical evaluation. To address these barriers, the WebQuest methodology serves as a structured pedagogical inquiry framework. Through carefully designed tasks and curated, instructor-vetted resource links, WebQuest enables students to approach research problems systematically.

Nevertheless, transforming information gathered through WebQuest into a coherent knowledge structure requires an effective cognitive visualization tool. Mind Mapping, grounded in radiant thinking theory [1], has been widely demonstrated to enhance knowledge organization and reduce cognitive load. The emergence of the OKMindmap ecosystem (developed by Prof. Won-Ho) on a Cloud-based Web 2.0 infrastructure represents a major advancement, enabling users to embed documents, videos, and WebQuest links directly into map nodes while supporting real-time collaborative supervision and progress tracking.

Motivated by these practical and pedagogical needs, this study investigates the integration of the WebQuest 3.0 methodology (for research orientation) and the OKMindmap platform (for execution and knowledge management) in guiding graduation theses. Specifically, the research evaluates the impact of this combined model on developing systems thinking, learner autonomy, and knowledge management capabilities among undergraduate students at Thai Binh University.

II. Research Methodology And Process

A. Methodological Foundation and Integrated Tools

1) Transition from Traditional WebQuest to WebQuest 3.0: Originally introduced by Bernie Dodge in 1995, traditional WebQuest is an inquiry-based learning strategy centered on structured online exploration. In the era of artificial intelligence, this model has evolved into WebQuest 3.0 (advanced by B. L. Diem et al. at Can Tho University [2], [4]), deeply integrating generative AI tools (ChatGPT, Gemini, NotebookLM) and creative programming environments (such as Scratch) to foster guided self-directed learning and computational thinking.

2) The OKMindmap Ecosystem: Developed on a Cloud-based Web 2.0 architecture, OKMindmap visualizes the entire research lifecycle through three core affordances: Ubiquitous Access across internet-connected devices without complex software installation, Multimedia Integration allowing direct embedding of documents, videos, and AI synthesis outputs into nodes, and Real-time Collaboration enabling synchronous co-editing and advisor feedback within a unified workspace.

3) STEM Pedagogical Framework on WebQuest 3.0: The integrated model adopts an interdisciplinary STEM approach

http://ijses.com/
All rights reserved

International Journal of Scientific Engineering and Science
Volume 10, Issue 11, pp. 29-32, November 2026. ISSN (Online): 2456-7361

aimed at solving authentic real-world problems by combining the Engineering Design Process, Computational Thinking, and localized contextual problem-solving.

4) Complementary Synergy Mechanism: Integrating OKMindmap into the WebQuest 3.0 workflow overcomes the fragmentation of isolated data retrieval. Query outputs and curated resources are transformed into interconnected visual "knowledge nodes," promoting radiant thinking [1] and maintaining continuous advisor-student alignment.

B. Combined WebQuest 3.0 – OKMindmap Supervision Process

This study proposes a four-stage graduation thesis supervision workflow integrating the digital ecosystem (WebQuest 3.0, AI, OKMindmap, Scratch) within a STEM pedagogical framework:

• Stage 1 – STEM Task Design and Knowledge Space Initialization (Task & Resources): The advisor formulates the thesis topic as an "Open-ended and Complex Real-world Problem" on a master OKMindmap template, embedding curated WebQuest 3.0 hyperlinks and vetted scholarly repositories.

• Stage 2 – Information Exploration, Processing, and AI Scaffolding (Process & AI Scaffolding): Students access the master map and utilize generative AI tools (ChatGPT, Gemini, NotebookLM) under instructor scaffolding to summarize, synthesize, and filter information noise, constructing structured sub-nodes that cultivate computational thinking.

• Stage 3 – Real-time Collaboration, Modeling, and Progress Monitoring (Collaboration & Engineering Design): Students model technical or pedagogical solutions through interactive simulations (Scratch/OctoStudio) or system prototypes, while advisors provide synchronous inline feedback directly on individual map nodes.

• Stage 4 – Thesis Completion and Knowledge Evaluation (Evaluation & Knowledge Generation): Research outcomes are evaluated multidimensionally via STEM rubrics and peer review. The finalized mind map serves as a logical skeleton to draft, refine, and defend the graduation thesis.

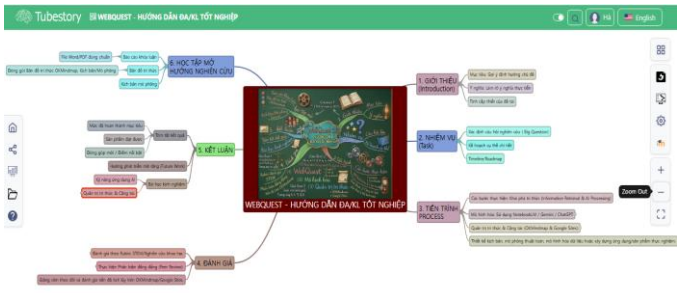


Fig. 1. Overview mind map of the graduation thesis supervision process based on WebQuest 3.0 and OKMindmap.

III. Results And Discussion

The proposed model was experimentally implemented during the supervision of specialized coursework projects and graduation theses at Thai Binh University. Data were collected through artifact analysis of student deliverables, qualitative feedback surveys, and quantitative post-thesis evaluations.

A. Quantitative Evaluation of Model Effectiveness

Survey results collected from the experimental student cohort at Thai Binh University upon completing their graduation theses are summarized in Table I. The findings demonstrate highly positive learner perceptions regarding the combined WebQuest 3.0 and OKMindmap model. Mean scores across all evaluation criteria on a 5-point Likert scale were notably high (ranging from 4.29 to 4.62), reflecting strong student consensus on the model's effectiveness. Furthermore, standard deviations (SD) remained consistently low (< 0.65), indicating high response consistency and minimal dispersion. Notably, convenience in real-time collaboration and receiving advisor feedback achieved the highest rating (4.62 ± 0.49), followed by effectiveness in guiding information retrieval and filtering noise (4.45 ± 0.52).

TABLE I. Student Evaluation Survey Results on the Combined WebQuest 3.0 – OKMindmap Model

No.	Evaluation Criteria	Agreement (%)	Mean ± SD
1	Effective support in guiding search and filtering information noise	91.3%	4.45 ± 0.52
2	Enhancement of systems thinking and thesis knowledge management	88.6%	4.38 ± 0.61
3	Increased self-directed learning autonomy and problem-solving skills	85.7%	4.31 ± 0.58
4	Convenience in collaboration and real-time feedback with advisors	94.2%	4.62 ± 0.49
5	Effective utilization of AI and multimedia tools (Scratch, Video)	87.5%	4.29 ± 0.63

Note: Mean = Average score (5-point Likert scale); SD = Standard Deviation.

B. Development of Systems Thinking and Knowledge Management

Empirical implementation revealed a distinct cognitive shift from linear note-taking to network-based radiant thinking [1] among students. Given the substantial volume of literature and technical documentation required for a graduation thesis, utilizing OKMindmap as the execution workspace for WebQuest 3.0 provided a clear "logical skeleton" that helped students deconstruct complex problems.

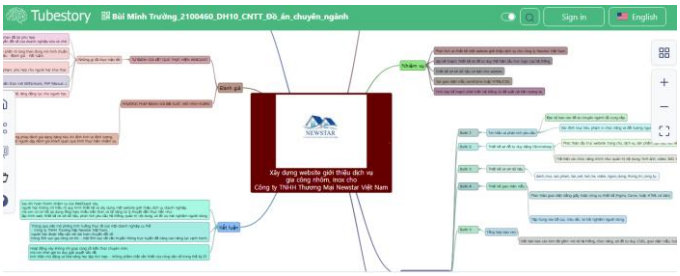


Fig. 2. Student-created OKMindmap knowledge artifact at Thai Binh University: IT specialization project (Corporate Website Development).

A concrete artifact from an Information Technology project (Fig. 2) demonstrates the model's capacity to structure the entire web development lifecycle for a local aluminum and stainless-steel manufacturing enterprise. Through the integrated platform, the student mapped a rigorous five-step workflow: requirements analysis, database design, UI prototyping

http://ijses.com/
All rights reserved

International Journal of Scientific Engineering and Science
Volume 10, Issue 11, pp. 29-32, November 2026. ISSN (Online): 2456-7361

(Wireframe/HTML/CSS), implementation, and final reporting. This visual architecture prevented cognitive overload and enabled full mastery of the software development lifecycle within a single interactive environment.

The adaptability of the combined WebQuest 3.0 and OKMindmap model was further validated through graduation theses in Korean Language Studies (Fig. 3 and Fig. 4). Students seamlessly integrated multimedia learning materials—ranging from alphabet charts, phonological assimilation rules, and thematic dialogues (Family, Weather, School, Locations) to interactive simulation scripts (Scratch/OctoStudio)—directly into map branches. These artifacts confirm that the model is not confined to technical disciplines; rather, it effectively visualizes linguistic structures, transforming complex grammar rules into dynamic visual schemas that enhance retention.

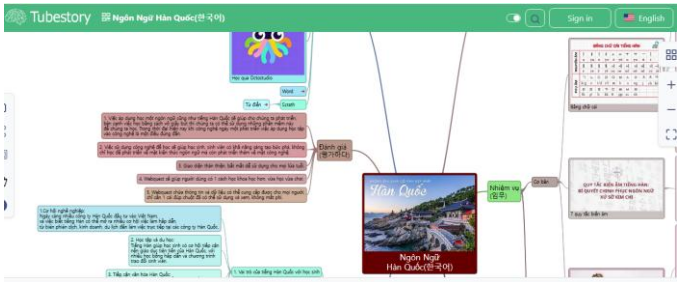


Fig. 3. Multimedia learning material integration map for Korean Language Studies.

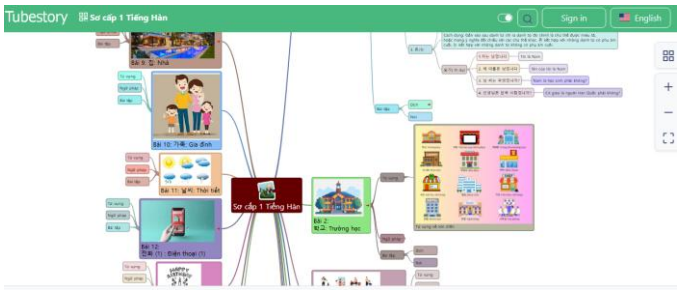


Fig. 4. Detailed vocabulary and grammatical structure map (Elementary Korean I).

Qualitative post-project reflections indicated strong learner satisfaction, with students noting that the methodology fostered a "scientific and effective approach to learning" and improved workflow organization:

"Completing the graduation thesis was a memorable and meaningful experience. It not only allowed me to synthesize and apply accumulated knowledge, but also trained my logical thinking, research capability, and independent working skills."

"Conducting the project through WebQuest combined with open educational resources was a novel and valuable experience. I felt much more proactive in searching and filtering information, thereby gaining deeper insight into my research topic."

"OKMindmap brought structure and discipline to my study routine, enabling me to follow tasks sequentially across branches without confusion and organize my research logically."

C. Active Learning Engagement and Collaborative Interaction

Granting students guided autonomy to explore curated WebQuest 3.0 resources and structure their findings on a cloud platform markedly enhanced engagement:

• Knowledge Retention and Structuring: Over 85% of students reported improved long-term retention resulting from visual knowledge mapping and active curation of supporting materials to populate map branches.

• Proactive Sharing and Peer Critique: Leveraging Web 2.0 collaborative affordances facilitated open knowledge exchange [5], shifting learners from passive lecture reception to active inquiry, critical thinking, teamwork, and independent research.

D. Multimedia Integration and STEM Creativity

In technical and simulation-oriented projects, students proactively embedded interactive programming scenarios (such as Scratch) and demonstration videos directly into map nodes. This transformed OKMindmap from a static presentation tool into a "living knowledge ecosystem" and interactive learning repository.

IV. Conclusion

This study proposed and experimentally validated a combined WebQuest 3.0 and OKMindmap supervision model within an AI- and STEM-integrated cloud ecosystem to innovate graduation thesis guidance at Thai Binh University. The principal findings are summarized as follows:

• Model Effectiveness: The proposed framework functions as both a "logical skeleton" and a "living digital knowledge map," enabling students to transition from linear note-taking to radiant systems thinking. It effectively mitigates information overload and passive learning habits while fostering learner autonomy, critical thinking, and real-world problem-solving skills.

• Optimized Four-Stage Workflow: Through a structured four-stage process—comprising STEM task initialization, AI-scaffolded information processing, real-time collaborative modeling, and rubric-based knowledge evaluation—students follow a rigorous scientific research roadmap supported by continuous advisor interaction.

• Practical Significance: High student agreement rates (exceeding 85% across all evaluated dimensions) confirm that the model serves as a practical pedagogical instrument for cultivating independent research competencies and digital literacy aligned with digital transformation in higher education.

Future Work: In future research, this model will be scaled across additional undergraduate courses and integrated with emerging automated mind-mapping and ontology-structuring AI technologies [3] to further optimize learning analytics and knowledge management.

References

[1] T. Buzan and B. Buzan, The Mind Map Book: How to Use Radiant Thinking to Maximize Your Brain's Untapped Potential. London, U.K.: BBC Books, 1993.

[2] B. L. Diem, H. T. T. Ho, P. N. Khang, Y.-G. Kim, and W. Ho, "Developing WebQuest 2.0 model for promoting computational thinking

http://ijses.com/
All rights reserved

skill," International Journal of Engineering and Technology, vol. 7, pp. 140–144, 2018.
[3] T. T. Ma, B. L. Diem, P. N. Khang, and W. Ho, "CAHIM: Constructing Auto-Generated Historical Mindmaps Based on Clustering and Ontology Structuring," Communications in Computer and Information Science, 2025.
[4] B. L. Diem, Y.-G. Kim, W. Ho, and B. L. D. Trang, "Developing WebQuest 2.0 model for promoting computational thinking," Can Tho University Journal of Science, 2019, doi: 10.22144/ctu.jen.2019.006.
[5] B. L. Diem, N. V. No, H. T. T. Ho, T. T. Tinh, and B. L. D. Trang, "Applying information and communication technology in teacher training: Practical experience at School of Education, Can Tho University," Can Tho University Journal of Science, vol. 54, no. 7, pp. 130–137, 2018.

http://ijses.com/
All rights reserved