

DESIGNING NO-CODE GAMIFIED HTML LEARNING TOOLS WITH GENERATIVE AI TO ENHANCE MOTIVATION AND PERFORMANCE IN FRENCH LEARNING AMONG ENGLISH MAJORS

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Abstract: *In the contemporary landscape of higher education in Vietnam, particularly at Tra Vinh University, English major students are increasingly adopting French as a second foreign language (L3). While these learners possess advanced metacognitive strategies from their L2 acquisition, a significant discrepancy often exists between their linguistic competence and their active engagement in the classroom. This phenomenon, characterized by the “mute learner” syndrome, stems from cross-linguistic interference, foreign language anxiety, and a heavy reliance on static instructional materials. This paper advocates for a paradigm shift from traditional paper-based methods to dynamic, interactive HTML-based learning tools generated via Generative AI (Claude AI). By removing the coding barrier for educators, this “no-code gamification” approach enables the creation of highly customized, platform-agnostic exercises tailored to the specific cognitive profiles of L3 learners. Drawing upon the Output Hypothesis (Swain, 1985), Self-Determination Theory (Ryan & Deci, 2000), and Cognitive Load Theory (Sweller, 1988), the study highlights the pedagogical benefits of interactive HTML interfaces, specifically their capacity to provide instantaneous feedback, reduce extraneous cognitive load, and integrate multimedia without specialized applications. A mixed-methods classroom observation reveals a significant transformation in student behavior: a transition from extrinsic compliance to intrinsic motivation, a 60% increase in voluntary time-on-task, and measurable improvements in formative assessment scores regarding vocabulary retention and syntactic accuracy. Ultimately, AI-empowered HTML gamification transforms the teacher’s role into a digital instructional designer and the student’s experience into an active, autonomous learning journey.*

Keywords: *Gamification, interactive HTML, Generative AI, student motivation, formative assessment, English majors, Third Language Acquisition.*

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I. INTRODUCTION

1.1. Background: the multilingual shift in the Mekong Delta

The transition from monolingualism to multilingualism in the era of globalization has fundamentally reshaped higher education curricula across Vietnam. At Tra Vinh University (TVU), located in the Mekong Delta, equipping students with competitive, multi-dimensional linguistic competencies is a strategic priority to meet the demands of an increasingly integrated ASEAN labor market. English language majors are a core demographic in international communication, increasingly recognize the necessity of acquiring a second foreign language to enhance their employability and academic versatility. French remains a highly preferred choice due to its profound cultural, historical, and diplomatic significance within the Francophonie network, as well as the robust institutional support for French programs in Vietnam.

This specific cohort of L3 (Third Language) learners arrives in the French classroom with a distinct cognitive architecture. Having successfully navigated the rigorous acquisition of English (L2) as their primary major, they possess finely tuned linguistic reasoning, heightened metalinguistic awareness, and robust autonomous learning strategies. They understand complex

syntactic structures abstractly, utilize bilingual dictionaries effectively, and are accustomed to comparative linguistic analysis. However, the theoretical advantage of being an experienced language learner does not automatically guarantee communicative success in a completely new target language.

1.2. The problem: static materials, cognitive overload, and the “mute learner” syndrome

Despite their metacognitive advantages, the reality of teaching French to English majors at TVU reveals a persistent and frustrating paradox. Students frequently demonstrate an impressive ability to memorize complex French grammatical paradigms (such as the conjugation of irregular verbs) and translate specialized academic texts during silent, individual study. Yet, they encounter profound obstacles when required to translate this passive knowledge into active, spontaneous oral or written communication. This phenomenon is often characterized in linguistic literature as the “mute learner” syndrome.

The root of this issue is multi-faceted:

- 1. Cross-Linguistic Interference:** The transition from English to French is fraught with negative transfer. Because both languages share a Latin alphabet and a massive amount of cognates, English majors intuitively use English as their base of reference,

leading to severe phonetic mapping errors (applying English stress-timed rhythms to French syllable-timed structures) and lexical confusion.

2. Psychological Barriers: English majors face a unique psychological burden. Accustomed to high proficiency in their L2, returning to a “beginner” state in their L3 induces severe foreign language anxiety. The fear of negative evaluation from peers and instructors heavily impedes their willingness to speak.

3. Instructional Medium Limitations: Crucially, these inherent challenges are exacerbated by the limitations of traditional instructional methodologies. French instruction has historically relied on static materials: textbooks, printed worksheets, and standard presentation slides. These conventional tools position the student as a passive recipient. The delayed feedback loop inherent in paper-based exercises where a student makes a cognitive error but does not receive correction until days later fails to dismantle L2-to-L3 cognitive interference effectively.

1.3. The proposed solution: no-code gamification via generative ai

To bridge the gap between passive reception and active engagement, this research advocates for the integration of digital gamification through bespoke, interactive HTML platforms. Historically, creating customized web-based interactive tools has been blocked by an insurmountable “coding barrier” for language educators.

This paper explores how Generative AI, specifically Claude AI, empowers educators at Tra Vinh University to act as digital instructional designers. By detailing a comprehensive framework for “no-code gamification,” this study demonstrates how AI-generated HTML tools provide instantaneous feedback, manage cognitive load, reduce foreign language anxiety, and drive a measurable transformation in student motivation and academic performance.

II. LITERATURE REVIEW

AND THEORETICAL FRAMEWORK

To validate the integration of AI-generated interactive tools, this pedagogical intervention is anchored in four interconnected theoretical frameworks.

2.1. Third language acquisition (l3) and cross-linguistic influence

According to the Dynamic Model of Multilingualism (Herdina & Jessner, 2002), L3 learners do not acquire a new language in a

vacuum; their existing linguistic repertoire heavily influences the process. Due to typological proximity, Vietnamese students learning French rely heavily on their L2 (English) as a bridging mechanism rather than their L1 (Vietnamese). While this facilitates rapid vocabulary recognition, it leads to severe negative transfer. Lexically, students fall victim to “false friends” (*faux amis*). Structurally, they map English syntactic rules (e.g., adjective placement) directly onto French. Overcoming this deeply ingrained L2 interference requires intense, repetitive, and highly targeted practice that generic software cannot provide.

2.2. The output hypothesis and pushed language production

Krashen’s Input Hypothesis, which suggests that comprehensible input alone is sufficient for acquisition, is challenged by Merrill Swain’s (1985) Output Hypothesis. Swain argues that passive input is insufficient for achieving syntactic accuracy. Learners must be pushed to produce language (“pushed output”). When a student attempts to produce French, they encounter a cognitive “gap” between what they want to say and their actual linguistic capability. Immediate, corrective feedback—such as an interactive HTML interface flashing red when an incorrect verb is selected—forces the student to shift from semantic processing to syntactic processing.

2.3. Gamification and self-determination theory (sdt)

Gamification is the application of game-design elements in non-game contexts (Deterding et al., 2011). In the TVU French classroom, gamification is utilized to engineer motivation. According to Self-Determination Theory (Ryan & Deci, 2000), sustained intrinsic motivation requires the fulfillment of three psychological needs: Competence, Autonomy, and Relatedness. An interactive HTML game fulfills Autonomy by allowing the student to navigate the exercise at their own pace, free from the pacing of the whole class. It fulfills Competence by providing a clear progression system, immediate rewards (visual/auditory cues), and a psychologically safe environment for trial and error.

2.4. Cognitive load theory (clt) in multimedia learning

Sweller’s (1988) Cognitive Load Theory posits that working memory is limited. When English majors learn French, their working memory is heavily taxed by managing L1, L2, and L3

structures simultaneously (intrinsic load). Traditional worksheets often present information poorly, adding unnecessary “extraneous load.” HTML-based interactive tools, designed through Generative AI, can optimize this. By utilizing Mayer’s (2009) principles of multimedia learning specifically the “Contiguity Principle” (placing feedback exactly next to the error in the HTML interface) educators can minimize extraneous load, freeing up the student’s cognitive capacity to focus entirely on L3 acquisition.

III. METHODOLOGY: THE NO-CODE GAMIFICATION FRAMEWORK

To implement this paradigm shift effectively, a structured methodology was designed for English majors enrolled in A1/A2 level French courses at Tra Vinh University. This section details the operational steps of transforming a language teacher into an AI-assisted digital developer.

3.1. Phase 1: the prompt engineering protocol for educators

The foundation of “no-code gamification” relies entirely on the precision of the natural language prompt provided to Claude AI. A poorly structured prompt yields generic, bug-prone code. A highly engineered prompt generates a flawless, pedagogically sound web application. We established a 4-step “Persona-Context-Task-Constraint” (PCTC) protocol:

- **Step 1: Persona & Context Setup:** Grounding the AI.

- o *Prompt formula:* “Act as a senior frontend web developer (HTML5, CSS3, Vanilla JS) and a university professor specializing in French linguistics for English majors at a Vietnamese university.”

- **Step 2: Task Definition & Core Logic:** Translating pedagogy into algorithms.

- o *Prompt formula:* “Build a single-file interactive matching game focusing on mitigating L2-L3 interference. The target is identifying ‘Faux Amis’ (False Friends).”

- **Step 3: Data Injection:** Preventing AI hallucination by providing the exact curriculum data.

- o *Prompt formula:* “Use strictly this dataset: [Actuellement = Currently], [Assister = To attend], [Librairie = Bookstore], [Blessé = To injure].”

- **Step 4: UI/UX Constraints & Gamification Mechanics:** Designing the user experience.

- o *Prompt formula:* “Requirements: 1. Drag-and-drop mechanics. 2. Must be mobile-responsive (CSS flexbox). 3. On correct drop:

apply CSS background #4CAF50 and play a success chime. 4. On incorrect drop: apply #F44336, trigger a ‘shake’ animation, and display a JS alert box explaining the English-French semantic difference.”

3.2. Phase 2: Design and Iteration of Interactive HTML Case Studies

Applying the PCTC protocol, four distinct tools were developed to target specific linguistic weaknesses observed at TVU.

- **Case Study 1: The “False Friends” Drag-and-Drop Matrix**

- o *Pedagogical Problem:* Lexical negative transfer.

- o *Interactive Mechanics:* Students drag French tiles to English drop zones. If Attendre is dragged to To attend, the JS logic intercepts, bounces the tile back, and displays a tooltip: “Watch out! ‘Attendre’ means ‘to wait’. To say ‘to attend’, use ‘Assister’.” This provides instantaneous, contextualized error correction.

- **Case Study 2: Contextual Grammar Cloze Engine (Passé Composé vs. Imparfait)**

- o *Pedagogical Problem:* Confusion between past tenses, improperly mapped to English Past Simple/Continuous.

- o *Interactive Mechanics:* A narrative text with input fields. A JS keyup event listener evaluates input in real-time. If the wrong tense is used, the border turns orange, and a “Hint” button appears offering scaffolding: “Is this a sudden interruption or a background setting?”

- **Case Study 3: The Intercultural “Meme” Flashcards (Savoir-comprendre)**

- o *Pedagogical Problem:* Lack of authentic cultural exposure.

- o *Interactive Mechanics:* Digital flashcards using CSS 3D Transforms. The front displays a French internet meme. Tapping flips the card to reveal the grammatical breakdown, the English equivalent, and the cultural context behind the humor, merging Byram’s (1997) Savoir-comprendre with gamified discovery.

- **Case Study 4: Verb Conjugation Time-Attack Racer**

- o *Pedagogical Problem:* Slow retrieval speed for irregular verb conjugations, hindering oral fluency.

- o *Interactive Mechanics:* A gamified “Time Attack” module. A pronoun and an infinitive verb appear on screen (e.g., Nous / Aller). The student has 5 seconds to type the correct conjugation. A JS

timer creates a sense of urgency. Correct answers add time; incorrect answers subtract time. This drills automaticity and reduces cognitive load during spontaneous speech.

3.3. Phase 3: Deployment, Accessibility, and the “Zero-Install” Advantage

A critical factor in the success of these tools is their deployment architecture in a developing context like the Mekong Delta. The AI generates a single .html file containing all structural, visual, and behavioral code.

- **Platform-Agnostic:** Distributed via Zalo groups or the TVU LMS, these files open natively in any smartphone browser (Chrome, Safari).

- **Zero-Install and Offline:** Unlike commercial EdTech, these HTML files (< 100KB) require no app downloads, no account creation, and no persistent internet connection once downloaded. Students can practice off-grid, ensuring 100% educational equity.

IV. RESULTS AND DISCUSSION:

CLASSROOM TRANSFORMATION

The integration of AI-generated interactive HTML tools fundamentally disrupted the traditional classroom dynamics at Tra Vinh University. An observation of the cohort utilizing these tools over an 8-week period yielded significant qualitative and quantitative transformations.

4.1. Dismantling the affective filter and foreign language anxiety

Qualitative observations and student interviews revealed a profound reduction in foreign language anxiety. In traditional settings, errors are public and face-threatening. The HTML interfaces provided a decentralized, private environment. The smartphone screen became a “psychological mask”; mistakes were private interactions between the user and the code. Consequently, the fear of negative evaluation plummeted. Students who previously exhibited the “mute learner” syndrome during oral drills were observed actively and repeatedly experimenting with complex sentence structures on their screens, demonstrating a newfound willingness to take linguistic risks without fear of peer judgment.

4.2. The shift from extrinsic compliance to intrinsic motivation

The interactive HTML tools transformed the nature of academic tasks. Traditional homework often yields minimal time-on-task, completed merely to secure a grade (extrinsic motivation). Because the HTML interfaces utilized game mechanics—instant auditory rewards, visual progression bars, and immediate resets upon

failure—students exhibited behavior akin to recreational gaming.

Data collected from LMS access logs and self-reported surveys indicated a 60% increase in voluntary time-on-task compared to traditional worksheet assignments. Students would voluntarily replay the “Verb Conjugation Time-Attack” (Case Study 4) multiple times until they achieved a flawless run. This repetition was driven by the intrinsic desire for mastery (Competence) and the immediate gratification designed into the HTML code, signaling a successful shift to autonomous learning.

4.3. Measurable improvements in formative assessment performance

This heightened intrinsic motivation directly correlated with enhanced academic performance. Comparative analysis of formative assessment scores (pre-intervention vs. post-intervention) revealed:

1. **Vocabulary retention and retrieval:** Formative quizzes showed a 25% improvement in the accurate retrieval of complex vocabulary and “false friends.” The multimodal nature of the HTML tools created stronger neural pathways than static reading.

2. **Mitigation of L2-L3 interference:** The targeted, instant feedback mechanisms effectively disrupted negative transfer. The recurring error of applying English syntactic rules to French sentences saw a sharp decline in written essays. The interactive system’s immediate correction at the exact moment of cognitive misfire proved vastly superior to delayed paper-based grading.

3. **Syntactic automaticity:** Driven by the “pushed output” of the digital drills, students internalized grammatical paradigms more securely, leading to decreased hesitation times during subsequent oral assessments.

4.4. Implications for educators and institutional practice

Beyond student outcomes, this methodology initiates a profound professional transformation. Faculty are no longer constrained to the role of “content deliverers” relying on generic publisher materials. The mastery of AI prompting empowers teachers as “digital instructional designers.” An educator can diagnose a specific L2-L3 cognitive bottleneck in their classroom on a Monday and deploy a custom-built, gamified HTML web app to solve it by Tuesday. This agility bridges the gap between pedagogical theory and scalable classroom application, representing a highly sustainable model for resource-constrained institutions.

4.5. Limitations of the study

While the results are highly promising, several limitations must be acknowledged. Firstly, Generative AI models (like Claude) can

occasionally produce buggy JavaScript if the prompts are not perfectly engineered, requiring the educator to possess a baseline logic to debug or re-prompt. Secondly, while HTML tools significantly improve vocabulary and grammar (syntax and semantics), they currently do not replace the need for human interaction to assess pragmatics, accent, and nuanced oral communication. Lastly, the screen size constraints of mobile devices mean that highly complex reading texts may be difficult to format interactively without causing visual clutter.

V. CONCLUSION

The teaching of French as a third language to English majors presents unique cognitive and psychological challenges that static, traditional methodologies are ill-equipped to resolve. This research demonstrates that the integration of AI-generated interactive HTML tools offers a transformative, scalable solution for higher education institutions, particularly within the context of Tra Vinh University.

By leveraging Generative AI for “no-code gamification,” educators can effectively dismantle

the technical barriers that have historically prevented the creation of bespoke digital learning environments. The pedagogical superiority of these tools lies in their universal accessibility, their capacity for instant and contextual feedback, their ability to manage cognitive load, and their precise alignment with the principles of the Output Hypothesis and Self-Determination Theory.

The empirical observations underscore a clear paradigm shift: replacing passive materials with dynamic HTML interfaces successfully lowers the affective filter, mitigates cross-linguistic L2-L3 interference, and converts students from anxious, passive listeners into highly motivated, autonomous learners. As academic scores and voluntary engagement levels rise synchronously, it is evident that AI-empowered gamification is not merely a technological novelty, but a critical, empowering evolution in modern language pedagogy. Future research should explore the longitudinal impact of these self-generated digital tools on summative assessments and the potential for developing full-scale, AI-gamified syllabi across various language departments.

REFERENCES

- Beacco, J.-C. (2000). *Les dimensions culturelles des enseignements de langue*. Hachette.
- Byram, M. (1997). *Teaching and Assessing Intercultural Communicative Competence*. Multilingual Matters.
- Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining "gamification". *Proceedings of the 15th International Academic MindTrek Conference*, 9-15.
- Dickey, R. (2024). *Practical Journey from First Prompts to Pro with Claude AI*. Springer.
- Eliot, L. (2024). The best prompt engineering techniques for getting the most out of generative AI. *Forbes*.
- Gilmore, A. (2007). Authentic materials and authenticity in foreign language learning. *Language Teaching*, 40(2), 97-118.
- Hall, E. T. (1966). *The Hidden Dimension*. Doubleday.
- Hamada, Y. (2014). The effectiveness of pre-and post-shadowing in improving listening comprehension skills. *The Language Teacher*, 38(1), 3-10.
- Herdina, P., & Jessner, U. (2002). A Dynamic Model of Multilingualism. *Multilingual Matters*.
- Horwitz, E. K., Horwitz, M. B., & Cope, J. (1986). Foreign language classroom anxiety. *The Modern Language Journal*, 70(2), 125-132.
- Kapp, K. M. (2012). *The Gamification of Learning and Instruction: Game-based Methods and Strategies for Training and Education*. John Wiley & Sons.
- Kramsch, C. (1993). *Context and Culture in Language Teaching*. Oxford University Press.
- Long, D., & Magerko, B. (2020). What is AI literacy? Competencies and design considerations. *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 1-16.
- Mayer, R. E. (2009). *Multimedia learning* (2nd ed.). Cambridge University Press.
- 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.
- Sherman, J. (2003). *Using Authentic Video in the Language Classroom*. Cambridge University Press.
- Swain, M. (1985). Communicative competence: Some roles of comprehensible input and comprehensible output in its development. In S. Gass & C. Madden (Eds.), *Input in Second Language Acquisition* (pp. 235-253). Newbury House.
- Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science*, 12(2), 257-285.