Developing JF standard-based digital grammar resources for intermediate Japanese language education: Research and best practices

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KEYWORDS	ABSTRACT
	Japanese language education in Indonesia faces critical challenges in intermediate grammar instruction regarding alignment with international standards, active learning integration, and digital resource availability. This study evaluates existing intermediate Japanese grammar materials against JF Standard requirements and develops a practical framework for creating digital resources. Employing design-based research methodology, this study analyzed materials from 10 Indonesian universities, conducted needs analysis surveys with 105 intermediate learners, developed the "Nihongo with Irma Sensei" prototype, and validated materials through expert evaluation and field testing. Findings reveal substantial gaps: 0% inclusion of JF Standard components (Can-do statements, communicative competence frameworks, learner portfolios), 15% active learning integration, and 8% digital availability. Field testing showed 96% participant interest in digital materials and 96.1% acknowledged enhanced comprehension. The study identifies five best practices: contextualized presentation through multimedia, interactive exercises with immediate feedback, multimodal approaches, strict JF Standard alignment, and user-centered design. This research demonstrates the feasibility and effectiveness of JF Standard-aligned digital materials leveraging multimedia technologies to facilitate contextualized and communicative language learning.

Introduction

Japanese language education in Indonesia has experienced remarkable growth, with over 133 higher education institutions offering Japanese programs by 2012 (Djafri, 2018). However, Japan Foundation surveys between 2009-2012 consistently identified inadequate learning materials as the primary obstacle, affecting 44.4% of institutions. At the intermediate level, learners struggle with developing nuanced language understanding due to gaps between theoretical knowledge and practical application (Tania, 2023; Ngoc Vu et al., 2023; Soukotta, 2023). Existing grammar resources typically offer decontextualized examples, limiting interactive practice and hindering effective communication (Suparmi et al., 2022).

The Common European Framework of Reference for Languages (CEFR) revolutionized language education by establishing can-do descriptors and competency-based frameworks (Council of Europe, 2001). Building upon CEFR principles, the Japan Foundation developed the JF Standard through three interconnected components (Japan Foundation, 2010; Masaki, 2023; Ayaka, 2023): the **JF Standard Tree** (visualizing relationships between communicative activities and competencies), **Can-do statements**

(performance descriptors across six proficiency levels A1-C2), and **learner portfolios** (tools for documenting progress and reflection).

Research demonstrates that grammatical competence impacts various language skills including writing, listening, speaking, and attitudes towards learning (Quines, 2023; Mahdi & Ismail, 2022). A balanced approach integrating explicit grammar instruction within communicative contexts is increasingly advocated (Eddeen, 2022; Mardieva, 2022; Alkhawaldeh, 2020). Active learning encompasses pedagogical approaches engaging learners as participants rather than passive recipients, manifesting through discovery-based activities, collaborative problem-solving, and authentic communication tasks (Cambridge Assessment International Education, 2008; Satrio & Murtisari, 2023; Alla et al., 2023).

Digital technologies in language education offer enhanced personalized learning experiences, increased engagement, and diverse materials (Bondarenko & Gudkova, 2023; Pichkova et al., 2023; Masterson, 2020; Isaiah et al., 2022). Studies demonstrate that multimedia tools like video-based instruction effectively enhance grammar comprehension (Tadiosa & Diva, 2023; Sik & Razi, 2023; Ghinea & Chen, 2006). Digital platforms enable integration of various learning resources and support technology-enhanced language teaching approaches (Cyfeku, 2022; Duran & Weichselbaumer, 2020; Fandi, 2022). Multimodal approaches combining visual, auditory, and interactive elements enhance learning outcomes by catering to diverse learning styles (Huang & Cao, 2023; Patrick & Tina, 2023; Archer, 2022; Xiaoyu et al., 2023). The COVID-19 pandemic particularly demonstrated the critical role of digital technologies in maintaining educational continuity (Lorena et al., 2023; Karpenko & Golovko, 2023).

Indonesian researchers have developed various digital Japanese learning applications focusing on basic elements. Rusli & Nurahman (2012) developed Android-based vocabulary learning. Syafitri & Sari (2015) created interactive media using Adobe Flash. Sunarti et al. (2016) developed Hiragana and Katakana applications. Komarudin & Noor (2017) created interactive animations for basic letters. However, existing digital resources do not adequately address JF Standard intermediate-level grammar material, focusing instead on basic skills rather than systematic grammar instruction (Rosi et al., 2019).

Current intermediate Japanese grammar materials in Indonesia demonstrate three critical gaps: (1) misalignment with JF Standard frameworks, (2) limited active learning integration, and (3) absence of digital accessibility. This study addresses these gaps through four research questions: RQ1: To what extent do current intermediate Japanese grammar materials align with JF Standard requirements? RQ2: How effectively do existing materials integrate active learning principles and digital technologies? RQ3: What framework can guide development of JF Standard-aligned digital grammar resources? RQ4: How do learners and experts perceive the effectiveness and usability of JF Standard-based digital grammar materials?

Method

This study employed design-based research methodology following McKenney & Reeves' (2019) framework consisting of three phases: (1) analysis and exploration, (2) design and construction, and (3) evaluation and reflection. The mixed-methods approach integrated quantitative material analysis with qualitative stakeholder perspectives (Mulyadi, 2013).

Research Setting and Participants: The research was conducted across 10 universities and foreign language institutions in the Jabodetabek region: University of Indonesia (UI), Jakarta State University (UNJ), Darma Persada University (UNSADA), National University (UNAS), Al Azhar Indonesia University (UAI), Bina Nusantara University (BINUS), Muhammadiyah University Prof. Dr. Hamka (UHAMKA), STBA LIA, STBA JIA, and Pakuan University. Field testing involved 105 intermediate Japanese language learners enrolled in undergraduate programs. Expert evaluators were selected based on expertise in Japanese language education and instructional design.

Phase 1: Analysis and Exploration

Material Analysis: Qualitative analysis examined existing intermediate Japanese grammar materials, focusing on *Minna no Nihongo Chuukyuu* and *New Approach* textbooks. Data collection encompassed: (1) analysis of content alignment with JF Standard requirements, (2) examination of active learning integration, (3) assessment of digital format availability, and (4) evaluation using JF Standard assessment criteria.

Needs Analysis Survey: Comprehensive surveys gathered information on learners' perceptions and experiences with current materials, preferences for digital resources, challenges in grammar learning, and desired features. Surveys included closed-ended questions (quantitative data) and open-ended questions (qualitative insights).

Phase 2: Design and Construction

Based on Phase 1 findings, the "Nihongo with Irma Sensei" prototype was developed featuring: (1) **Interactive Website Components** organized into modules corresponding to JF Standard intermediate-

level (B1) Can-do descriptors, (2) **Instructional Videos** demonstrating real-life usage by native speakers, (3) **Animations** visualizing complex grammar concepts, (4) **Interactive Exercises** (multiple-choice, fill-in-the-blank, drag-and-drop, open-ended writing), (5) **Immediate Feedback Mechanisms** supporting self-assessment, and (6) **Contextualized Examples** through dialogues and scenarios with multimedia annotations.

Phase 3: Evaluation and Reflection

Expert Evaluation: Subject matter experts evaluated the prototype using structured instruments assessing: accuracy and appropriateness of grammar content, effectiveness of multimedia elements, user interface design, and alignment with JF Standards and pedagogical principles. Feedback was documented, analyzed, and used for revision.

Field Testing: The revised prototype was field-tested with 105 learners who engaged with materials, completed exercises, and provided feedback through online surveys (Likert scales for effectiveness, usability, satisfaction) and semi-structured interviews for deeper insights.

Data Analysis: Quantitative survey data were analyzed using descriptive and inferential statistics. Qualitative data (open-ended responses, interview transcripts) were analyzed using thematic analysis. Triangulation of quantitative and qualitative data provided comprehensive understanding of materials' effectiveness, usability, and satisfaction.

Results and Discussion

Current State of Intermediate Grammar Materials (RQ1)

Analysis utilizing JF Standard rubrics revealed substantial misalignment between current intermediate-level Japanese grammar materials and JF Standard competencies. Essential components were completely absent:

1. **JF Standard Tree (0% inclusion):** Existing materials did not describe relationships between communicative language activities and competencies, preventing learners from identifying what they can accomplish and what language competencies are required.
2. **Can-do Statements (0% inclusion):** Materials lacked Can-do statements explaining what learners can accomplish at each proficiency level, undermining learners' capacity to evaluate progress or connect grammar to authentic contexts.
3. **Portfolios (0% inclusion):** Materials did not provide tools for recording and reflecting on learning processes, limiting opportunities for metacognitive development crucial for autonomous learning.

Content analysis revealed: 80% of respondents indicated grammar explanations were insufficiently detailed, 60% found example sentences lacking contextual relevance, and 40% needed more practice exercises. Most resources relied on decontextualized examples and lacked communicative integration, prioritizing form over function through repetitive drills rather than meaningful communication.

Active Learning and Digital Integration (RQ2)

Analysis revealed minimal active learning integration (15% of materials) with limited discovery-based activities, collaborative tasks, reflective components, or self-assessment opportunities. Most materials followed traditional presentation-practice-production sequences positioning learners as passive recipients.

Digital format availability was severely limited (8% of institutions), problematic given the proliferation of digital learning environments, contemporary learners' expectations for multimedia-rich content, and COVID-19's demonstration of online learning necessity (Yella, 2022). Existing digital Japanese resources focus primarily on basic skills (Hiragana, Katakana, vocabulary) rather than intermediate grammar. Even comprehensive resources like Marugoto and Minato websites present integrated skills without specifically addressing grammar in depth.

Development Framework and Prototype (RQ3)

Based on needs analysis and literature review, a comprehensive framework incorporating five core design principles was established:

1. **Contextualized Presentation:** Present grammar within real-life contexts through multimedia resources (videos, animations) to enhance understanding and practical application, aligning with communicative language teaching principles (Nathaniel et al., 2022; Yella, 2022).
2. **Interactive Engagement:** Incorporate exercises with varying difficulty, immediate feedback, and self-assessment tools to enhance engagement and promote self-regulated learning (Satrio & Murtisari, 2023; Soo, 2023).

3. **Multimodal Approach:** Employ visual, auditory, and interactive elements to cater to diverse learning styles and enhance retention (Patrick & Tina, 2023).
4. **JF Standard Alignment:** Ensure strict alignment with JF Standard components to support international proficiency benchmarks and communicative competence (The Japan Foundation, 2010; Nagai & O'Dwyer, 2011).
5. **User-Centered Design:** Involve end-users throughout development through needs analysis, prototyping, and iterative testing.

The "Nihongo with Irma Sensei" prototype featured modular organization corresponding to B1 Can-do descriptors, comprehensive grammar explanations with contextualized examples, multimedia integration (instructional videos, animations, audio), interactive exercises with immediate feedback, and digital portfolio features for progress tracking and reflection.

Evaluation Results (RQ4)

Expert Evaluation: Experts commended comprehensive grammar explanations, effective multimedia integration, strong JF Standard alignment, and potential for contextualized learning. One expert stated: "The website does an excellent job of mapping grammar content to Can-do descriptors and ensuring learners are exposed to language in authentic contexts." Another noted: "Instructional videos and animations are well-designed and effectively demonstrate practical usage of grammatical structures."

Experts suggested improvements: refining user interface for better navigation, expanding interactive exercise types, incorporating more learner-generated content and peer collaboration opportunities, developing extensive cultural contextualization, and adding social learning features.

Field Testing: Field testing with 105 learners yielded highly positive results. Quantitatively, 96% expressed interest in using digital materials for grammar learning, and 96.1% acknowledged website effectiveness in enhancing comprehension. Statistical analysis revealed significant differences based on prior digital learning experience ($p < 0.05$), with experienced users reporting higher satisfaction. Qualitative thematic analysis revealed five recurring themes:

Theme 1: Enhanced Comprehension Through Multimedia - "Videos and animations helped me visualize how grammar structures are used in real conversations. It made concepts more concrete and memorable."
Theme 2: Value of Interactive Practice - "Exercises were useful for practicing and reinforcing grammar points. Immediate feedback helped me identify strengths and weaknesses, which motivated me to keep practicing."
Theme 3: Appreciation for Contextualization - "Unlike my textbook with isolated example sentences, this website shows grammar in real situations, helping me understand not just what grammar means but how to use it to communicate."
Theme 4: Autonomy and Self-Paced Learning - "I like that I can study at my own pace and review sections whenever needed. Self-assessment tools help me know what to work on."
Theme 5: Suggestions for Enhancement - Participants suggested more opportunities for learner interaction (discussion forums, collaborative activities), diverse cultural contexts and regional accents, gamification elements, and more practice exercises at varying difficulty levels.

Discussion

The triangulation of expert evaluations and learner field testing provides robust evidence for JF Standard-based digital grammar materials' effectiveness. Both groups recognized value in contextualized presentation, interactive exercises, international standard alignment, and autonomous learning support. High satisfaction rates (96% interest, 96.1% effectiveness) combined with detailed qualitative feedback demonstrate that well-designed digital materials successfully address identified gaps.

Five Best Practices for Digital Grammar Material Development

Best Practice 1: Contextualized Presentation Through Multimedia
Providing grammar explanations and examples within real-life contexts through instructional videos and animations enhances learners' understanding and practical application ability (Nathaniel et al., 2022; Zhang, 2022; Yella, 2022). Positive feedback from learners and experts regarding contextualized examples supports this approach's effectiveness. Implementation should include: videos featuring native speakers in authentic contexts, animations visualizing abstract concepts, realistic dialogues and scenarios, cultural annotations connecting grammar to sociocultural contexts, and ensuring multimedia directly supports grammatical understanding.

Best Practice 2: Interactive Exercises with Immediate Feedback

Interactive exercises with varying difficulty enhance engagement and promote self-regulated learning (Satrio & Murtisari, 2023; Alla et al., 2023). Immediate feedback boosts motivation and achievements (Soo, 2023). Field testing demonstrated learners particularly valued feedback mechanisms enabling independent identification of strengths and weaknesses. Implementation should include: diverse exercise types, immediate feedback with explanations, self-assessment rubrics based on Can-do descriptors, varied difficulty levels, adaptive features, and collaborative exercises.

Best Practice 3: Multimodal Approach Addressing Diverse Learning Styles

Multimodal approaches combining visual, auditory, and interactive elements enhance learning outcomes by catering to diverse learning styles (Patrick & Tina, 2023). Multimedia learning principles suggest multiple modalities improve cognitive processing and retention. Implementation should include: visual aids (diagrams, charts, infographics), audio recordings for pronunciation, video demonstrations, animations for complex concepts, multiple representation formats for accessibility, and balanced elements avoiding cognitive overload.

Best Practice 4: Strict Alignment with JF Standards

Alignment with JF Standards ensures learners acquire necessary grammatical competence for effective communication (The Japan Foundation, 2010; Nagai & O'Dwyer, 2011). Digital materials integration significantly enhances education when aligned with established standards (Librenjak et al., 2016; Marasigan, 2023; Rosi et al., 2019). Implementation should include: mapping content to specific Can-do descriptors, organizing materials according to JF Standard Tree structure, integrating portfolio features, stating objectives in Can-do format, designing assessments measuring functional communicative abilities, and providing transparent proficiency level indicators.

Best Practice 5: User-Centered Design Involving Stakeholders

Involving end-users throughout development is crucial for creating engaging and effective materials meeting specific requirements (Duran & Weichselbaumer, 2020). Implementation should include: comprehensive needs analysis, target learner involvement in prototype testing, subject matter expert engagement, instructional designer inclusion, iteration based on feedback, ongoing evaluation processes, and interdisciplinary collaboration.

Theoretical and Practical Implications

This research contributes theoretically by: (1) providing empirical evidence of material quality gaps (0% JF Standard inclusion), (2) developing comprehensive evaluation frameworks, (3) synthesizing JF Standard principles with communicative language teaching, active learning theory, and multimedia learning into coherent frameworks, and (4) identifying evidence-based design principles validated through expert evaluation and field testing.

Practical implications include: frameworks for evaluating materials based on international standards, guidance for integrating digital resources, models for communicative grammar instruction, tools for promoting learner autonomy, evidence supporting institutional investment, roadmaps for curriculum alignment, quality assurance criteria, models for interdisciplinary collaboration, concrete design principles, user-validated features, integration strategies, and assessment approaches aligned with communicative competence.

The finding that learners with extensive digital learning experience reported higher satisfaction highlights the importance of developing digital literacy alongside language competence, providing orientation and support for learners new to digital environments, ensuring institutional infrastructure supports digital learning, and considering hybrid approaches combining digital and traditional resources.

Furthermore, this study underscores the transformative potential of **JF Standard-aligned digital grammar instruction** in redefining how Japanese language learning is conceptualized and delivered. By integrating technology-enhanced pedagogies with learner-centered approaches, it moves beyond conventional grammar teaching toward interactive, meaningful, and contextualized learning experiences. The findings affirm that effective grammar instruction requires not only well-designed materials but also **a holistic ecosystem**—one that includes teacher professional development, institutional readiness, and learner empowerment through digital literacy. Consequently, this research positions digital innovation not merely as a supplementary tool, but as a **catalyst for pedagogical reform** that promotes inclusivity, sustainability, and lifelong language learning in an increasingly global and interconnected educational landscape.

Addressing Implementation Challenges

While demonstrating effectiveness, the study reveals implementation challenges. The 0% inclusion rate of JF Standard components and 8% digital availability represent critical areas requiring immediate

attention. Addressing gaps requires coordinated efforts among educators, institutions, material developers, and policymakers. Investment in digital resource development, faculty training, and curriculum alignment with international standards will enhance learning outcomes and prepare students for global communication contexts.

While the study demonstrates strong evidence of effectiveness, it also exposes key implementation challenges. The complete absence of JF Standard components and the limited 8% digital material availability highlight urgent areas for improvement. Overcoming these gaps demands **collaborative action** among educators, institutions, material developers, and policymakers to ensure coherent and sustainable reform. Strategic investment in **digital content development**, **teacher capacity building**, and **curriculum alignment with international standards** is essential to enhance instructional quality, foster equitable access to digital learning, and better prepare students for participation in **global communication and intercultural contexts**.

Conclusion

This comprehensive study bridges critical gaps in intermediate Japanese grammar instruction by systematically analyzing, developing, and validating JF Standard-based digital grammar materials. Findings reveal the current absence of JF Standard components (0%), minimal active learning integration (15%), and limited digital availability (8%), with 80% of learners reporting insufficiently detailed explanations. The developed prototype, *Nihongo with Irma Sensei*, received strong expert validation and positive field-testing results, with 96% of participants expressing interest and acknowledging its effectiveness. The study contributes both theoretical frameworks and practical strategies for implementing standards-based digital grammar instruction, demonstrating the feasibility and impact of multimedia-enhanced, JF Standard-aligned materials in fostering engaging, contextualized, and effective learning experiences. It recommends integrating Can-do statements into institutional curricula, expanding educator training in digital pedagogy, promoting collaborative material development grounded in universal design principles, and strengthening policy support for digital infrastructure and inter-institutional collaboration. While limited to the Indonesian higher education context and initial implementation at the B1 level, the research lays a foundation for future longitudinal studies, adaptation across proficiency levels, and exploration of emerging technologies such as AI and VR. Ultimately, advancing Japanese grammar instruction requires collective, evidence-based innovation centered on learner needs—empowering students to achieve communicative competence and deepening global intercultural understanding.

Declarations

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