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Student Learning Autonomy Transformation through the 'Source-Grounded AI' Feature of NotebookLM in the Basic Japanese Course I (A Case Study of International Relations Students at Universitas Jenderal Achmad Yani)

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Abstract

The increasing use of artificial intelligence in higher education has raised concerns about misinformation, overdependence, and the weakening of learner agency. This qualitative case study explores how NotebookLM, as a source-grounded AI tool, supports learner autonomy in Basic Japanese learning among International Relations students at Universitas Jenderal Achmad Yani. The study was conducted in a Basic Japanese 1 course, where lecturer-curated materials were uploaded to the Learning Management System and used by students as the main knowledge base for NotebookLM-assisted learning. Data were collected through digital engagement observations, student reflective logs, and document analysis of Japanese curriculum vitae assignments. The findings show that NotebookLM supported students in verifying basic Japanese vocabulary, reviewing unfamiliar writing forms, revisiting course materials, and applying source-based expressions to personalized learning outputs. Evidence of learner autonomy appeared in students' source consultation, independent vocabulary selection, self-monitoring, draft revision, and task-based decision-making. However, the study also found uneven patterns of AI use. Some students used NotebookLM critically as a learning support tool, while others tended to rely on it mainly for information retrieval. The findings suggest that NotebookLM does not automatically guarantee accuracy, eliminate AI hallucinations, or produce autonomous learners. Its pedagogical value depends on curated materials, clear task design, lecturer guidance, students' digital literacy, and reflective learning practices. The study concludes that source-grounded AI can strengthen scaffolded autonomy when integrated responsibly into foreign language education, especially for beginner learners from non-language-major backgrounds. It offers a model for AI-assisted language learning that balances innovation, verification, and learner responsibility.

Introduction

The rapid development of artificial intelligence (AI) has created new opportunities and concerns in higher education. In academic environments, AI is no longer discussed only as a tool for generating text, answering questions, or accelerating information search (Jayaron,

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2024; Motlagh et al., 2023; Dwivedi et al., 2023; Javaid et al., 2023). It is also debated as a technology that may reshape how students access knowledge, evaluate information, and regulate their own learning. The release of GPT-4 in March 2023 intensified scholarly discussion on the use of generative AI in academic work, particularly regarding authorship, reliability, ethics, and the risk of inaccurate information (Bockting et al., 2023; Owens, 2023; Stokel-Walker, 2023; Stokel-Walker & Van Noorden, 2023). These debates are also relevant in language education, where incorrect explanations, inaccurate vocabulary, or misleading grammar output may influence students' foundational understanding.

One of the central concerns in AI-assisted learning is the phenomenon of AI hallucination (Qamar et al., 2024; Talaver & Vakaliuk, 2024; Behzad, 2024; Torres-Martínez, 2025). Generative AI may produce responses that appear fluent and convincing but contain factual, conceptual, or linguistic errors. In foreign language learning, this risk has serious pedagogical implications. In Basic Japanese instruction, for example, inaccuracies in particles, sentence structure, hiragana, katakana, kanji, or transliteration may create early learning problems that become difficult to correct. This concern is especially important for beginner learners who may not yet have enough linguistic knowledge to evaluate the accuracy of AI-generated output. Therefore, the educational issue is not simply whether students can use AI, but how AI can be integrated in a controlled and pedagogically meaningful way (Sajja et al., 2025; Creely & Carabott, 2025; Bearman & Ajjawi, 2023).

NotebookLM offers one possible response to this concern because it works through a source-grounded approach. Unlike general-purpose AI tools that generate responses from broad model knowledge, NotebookLM allows users to upload selected materials and interact with those sources through summaries, questions, study guides, and other learning supports (Robinson, 2025; Shoitan et al., 2026; Molina & Medina, 2025). This design is related to retrieval-augmented generation (RAG), in which responses are produced by retrieving information from a defined knowledge base before generating an answer (Belcic, 2024; Cheng et al., 2025; Siriwardhana et al., 2023; Abo El-Enen et al., 2023). However, RAG-based systems should not be understood as entirely error-free. They may reduce the risk of hallucination by grounding responses in uploaded materials, but inaccuracies can still occur when the source material is incomplete, when retrieval is imperfect, or when students misinterpret the generated response. For this reason, NotebookLM needs to be examined critically as a digital scaffolding tool, not as a technology that automatically guarantees accuracy.

This issue becomes relevant in the context of Basic Japanese Course I for International Relations students at Universitas Jenderal Achmad Yani. These students are not enrolled in a Japanese literature or language education program, yet they are required to engage with a foreign language that has a writing system, grammar structure, and cultural conventions different from Indonesian (Al-Jarf, 2026; Sakai, 2025; Haristiani & Christinawati, 2024). At the same time, International Relations students must develop academic and professional identities connected to global communication. In this course context, students often face difficulty when they must process large amounts of instructional material, understand new linguistic forms, and apply them to communicative tasks. When the Learning Management System (LMS) functions only as a document repository, students may download materials passively without actively questioning, reorganizing, or applying them (Mignon, 2022; Ivanova, 2026). This condition creates a pedagogical need for learning support that helps students interact more actively with lecturer-curated materials.

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The concept of learner autonomy provides a useful theoretical lens for examining this issue. Holec defines learner autonomy as the ability to take responsibility for one's own learning, including determining objectives, selecting methods, monitoring progress, and evaluating outcomes (Jayanti, 2023, Paraschiva, 2025). Little (2022) further explains that language learner autonomy involves learners who plan, implement, monitor, and evaluate their learning while using the target language as a medium of agency. Based on this view, autonomy should not be reduced to independent access to technology. It involves self-regulation, reflection, decision-making, and metacognitive control. Therefore, the use of NotebookLM does not automatically create autonomous learners. Its educational value depends on how students use it to ask questions, verify meaning, review source-based explanations, monitor their understanding, and apply Japanese language forms in meaningful tasks (Sawaguchi, 2025; Sato, 2022; Sawaki et al., 2024; Nakrowi & Lumettu, 2025).

Previous discussions on AI-assisted language learning have often emphasized the potential of generative AI for feedback, writing support, conversation practice, and personalized learning. However, fewer studies have examined how source-grounded AI tools may support beginner foreign language learners through lecturer-verified materials. Research on NotebookLM in language education remains limited, particularly in Basic Japanese learning for non-language-major students. This gap is important because beginner learners require both linguistic accuracy and structured guidance. A source-grounded system may support students by helping them interact with reliable course materials, but its actual role in shaping learner autonomy must be explored through students' learning practices rather than assumed from the tool's technical features.

This study addresses that gap by examining the use of NotebookLM as a digital scaffolding tool in Basic Japanese Course I. The study focuses on how International Relations students interact with lecturer-curated materials through NotebookLM and how this interaction relates to learner autonomy. Rather than claiming that NotebookLM eliminates hallucinations or directly transforms learning outcomes, this research explores how students perceive, use, and negotiate the tool in their learning process. The emphasis is placed on students' engagement with source-based explanations, their confidence in using Japanese language elements, and their ability to apply course materials in the creation of a Japanese curriculum vitae or Rirekisho.

Accordingly, the objective of this qualitative case study is to explore how NotebookLM's source-grounded features function as digital scaffolding for autonomous learning among International Relations students in Basic Japanese Course I at Universitas Jenderal Achmad Yani. Specifically, this study investigates how students use NotebookLM to engage with lecturer-verified materials, how they perceive its support for understanding basic Japanese language elements, and how the tool contributes to their learning agency, confidence, and self-directed practice. By positioning NotebookLM critically within the framework of learner autonomy and digital scaffolding, this study seeks to contribute to the emerging discussion on responsible, source-based AI integration in foreign language education.

Method

Research Design

This study employs a qualitative case study design to investigate the role of NotebookLM as a source-grounded AI tool in supporting learner autonomy in a Basic Japanese 1 course. A case study approach is appropriate because the research focuses on a bounded system, namely one class of International Relations students engaging with a specific AI-assisted instructional

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intervention in its real educational setting. The design allows for an in-depth exploration of behavioral, cognitive, and reflective dimensions of learner autonomy within authentic learning activities. Rather than measuring outcomes quantitatively, this study focuses on understanding how autonomy emerges through interaction between students, instructional materials, and AI-mediated scaffolding.

Research Setting and Participants

The study was conducted at Universitas Jenderal Achmad Yani (Unjani), specifically in the International Relations Department. The participants consisted of 23 undergraduate students enrolled in the Basic Japanese 1 course during one academic semester. These students were selected through purposive sampling because they represented non-language-major learners who were required to study Japanese as a supporting competency for global communication and international studies. Their academic background made them relevant participants because they were learning Japanese not as a major field of study, but as an additional foreign language skill connected to their disciplinary needs.

The selection criteria included active enrollment in the Basic Japanese 1 course, no formal academic background in Japanese language education, participation in instructional activities involving NotebookLM, and willingness to provide reflective feedback and learning artifacts. The participants were considered appropriate for this study because their learning context reflected the challenges commonly experienced by beginner foreign language learners from non-language-major programs. In this context, students needed to understand basic Japanese vocabulary, writing systems, and sentence patterns while also applying them to a meaningful academic task, namely the creation of a Japanese curriculum vitae. Therefore, the participant group provided a suitable case for examining how source-grounded AI could support scaffolded learner autonomy in an authentic classroom setting.

Instructional Intervention and Learning Procedure

The learning process was designed as a structured digital intervention integrating NotebookLM as a source-grounded AI scaffold. The instructional procedure began with the lecturer preparing validated learning materials in the form of grammar modules, vocabulary lists, and cultural notes. These materials were curated to ensure consistency, accuracy, and alignment with the Basic Japanese 1 syllabus. All instructional materials were then distributed through the university Learning Management System (LMS). Students were instructed to use these lecturer-verified documents as the sole knowledge base when interacting with NotebookLM. This restriction was applied to maintain a controlled source-grounded learning environment and to ensure that AI responses remained anchored to course materials rather than open-web knowledge.

As part of the learning task, students were assigned to produce a Japanese Curriculum Vitae (Rirekisho). In completing this task, students used NotebookLM to explore vocabulary, sentence structures, and expressions related to personal identity, academic background, hobbies, and field of study. This activity required students to actively transform static course materials into personalized linguistic output, thereby enabling observation of autonomous learning behavior. NotebookLM was used through its main functions, including source-based question answering, automated summaries, study guides, and audio overviews. Students were encouraged to interact with these features outside classroom hours to support independent learning. This design positioned NotebookLM as a scaffolding tool rather than a replacement for instruction, ensuring that students remained engaged in active learning and interpretation of materials.

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Data Collection Techniques

Data were collected using three qualitative sources to ensure triangulation. First, digital engagement observation was conducted by tracking how students interacted with LMS materials and how they transformed these materials into NotebookLM-based learning outputs. Observation focused on behavioral indicators such as initiative in exploring content, frequency of tool use, and depth of interaction with AI-generated explanations. Second, reflective logs were collected from students to capture their learning experiences. These logs focused on students' perceptions of understanding Japanese language structures, their confidence in using AI-supported explanations, and their awareness of how NotebookLM influenced their learning strategies. The reflective data provided insight into metacognitive processes and learner self-assessment. Third, document analysis was conducted on students' final Rirekisho assignments. The analysis examined linguistic accuracy, vocabulary usage, alignment with lecturer-provided materials, and evidence of personalization. This step allowed the researcher to evaluate how students transformed source materials into structured outputs using AI assistance.

Operational Definition of Learner Autonomy

Learner autonomy in this study is operationalized through three observable dimensions. The first dimension is self-regulated learning behavior, which refers to students' ability to initiate learning activities without direct instruction. The second dimension is independent decision-making, which refers to how students select relevant vocabulary, expressions, and structures when constructing their Rirekisho. The third dimension is metacognitive awareness, which refers to students' ability to evaluate their understanding, identify learning gaps, and revise their outputs based on feedback from NotebookLM or course materials. These indicators were used as analytical lenses during data interpretation to ensure that autonomy was not assumed from technology use alone but identified through concrete learning behaviors.

Data Analysis

Data were analyzed using thematic analysis. The analysis followed a systematic process consisting of data familiarization, initial coding, theme development, and interpretation. First, all data from observations, reflective logs, and documents were read repeatedly to gain a comprehensive understanding of student behavior patterns. Second, initial codes were generated to identify meaningful segments related to autonomy, such as initiative in learning, reliance on AI explanations, and evidence of self-correction. Third, codes were grouped into broader themes, including autonomous engagement, scaffolded comprehension, linguistic confidence development, and source-based validation behavior. Finally, themes were interpreted in relation to learner autonomy theory and digital scaffolding frameworks. To enhance trustworthiness, triangulation was applied across the three data sources. In addition, peer debriefing was conducted with another researcher to reduce subjective bias in coding interpretation. The analysis also maintained an audit trail to document decisions made during coding and theme development.

Research Validity

To ensure credibility, this study applied methodological triangulation by combining observation, reflective data, and document analysis. Transferability was supported through thick description of the learning context, participant profile, and instructional design. Dependability was maintained through systematic documentation of the research process.

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Result and Discussion

The findings of this study show that NotebookLM functioned as a supportive digital scaffold in the Basic Japanese 1 course, but its role should not be interpreted as an independent cause of learner autonomy. The data from student assignments, reflective logs, and digital engagement observations indicate that students used the tool in different ways. Some students used it to verify vocabulary, review course materials, and revise their Japanese CV drafts. Others used it mainly to retrieve ready-made information. This variation is important because it shows that the use of AI does not automatically produce autonomous learning. Learner autonomy appeared when students demonstrated initiative, self-monitoring, independent decision-making, and reflective use of course materials.

Table 1. Thematic Evidence Matrix

Theme	Main Evidence Source	Indicator of Learner Autonomy	Interpretation
Source-based linguistic verification	Japanese CV assignments and source consultation records	Students checked vocabulary, terms, and writing forms using lecturer-curated materials	NotebookLM supported verification, but accuracy cannot be treated as direct proof of full language mastery
Self-directed engagement with materials	Observation records and reflective logs	Students revisited materials, asked questions, selected relevant vocabulary, and revised drafts	Autonomy appeared through planning, selection, monitoring, and task-based decision-making
Reflective confidence	Reflective logs	Students reported greater confidence when reviewing vocabulary and sentence structures	NotebookLM was perceived as supportive, but it cannot be claimed to directly reduce cognitive load without stronger evidence
Multimodal personalization	Final Japanese CV assignments	Students adapted content to represent personal identity, academic background, and interests	Personalization showed engagement, but it became evidence of autonomy only when linked to language-related decisions
Challenges and uneven use	Observation records and draft comparison	Some students relied on AI output without enough checking or reflection	AI-assisted learning requires lecturer guidance, prompt literacy, and critical evaluation

Source-Based Linguistic Verification

The first finding concerns how students used NotebookLM to verify basic Japanese vocabulary, academic terms, and personal information. Several Japanese CV assignments showed consistent use of course-related terms such as International Relations, university, university student, name, address, and hobby in Japanese form. Students also attempted to represent Indonesian names, local places, hobbies, and academic identities through Japanese writing conventions. These patterns suggest that students did not rely only on memory or guessing.

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They used the uploaded materials and NotebookLM responses as references when preparing their assignments. This finding is important because the participants were beginner learners from the International Relations Department, not students from a Japanese language or literature program. For this group, basic Japanese writing forms can be difficult because students must deal with unfamiliar scripts, sentence patterns, and phonetic adaptation. The ability to select and apply relevant terms therefore indicates a form of source-based learning behavior. Students were not only completing a task. They were also trying to connect lecturer-provided materials with personal and academic information that mattered to them.

However, linguistic accuracy should be interpreted carefully. Correct terms in the final Japanese CV do not automatically prove that students fully understood the rules behind the language forms. Some students may have copied or retrieved accurate terms from NotebookLM without deep understanding. Therefore, the stronger evidence of learner autonomy lies in the process of verification, not only in the final product. Autonomy was more visible when students consulted sources, compared possible expressions, adjusted the content to their own identity, and revised their work before submission.

The findings also suggest that NotebookLM helped reduce the possibility of unsupported AI output because students worked with lecturer-curated materials. However, the study should not claim that NotebookLM completely prevented AI hallucinations. Source-grounded tools can reduce the risk of inaccurate output, but they still depend on the quality of uploaded materials, the clarity of student prompts, and the student's ability to interpret the response. For this reason, NotebookLM should be described as a verification support tool rather than a system that guarantees accuracy.

Self-Directed Engagement with Learning Materials

The second finding shows a shift in how several students interacted with learning materials. Before the use of NotebookLM, the Learning Management System mainly functioned as a storage space for course documents. Students could download materials, but this activity did not necessarily show active engagement. Through NotebookLM, the same materials became more interactive because students could ask questions, request summaries, review terms, and explore examples from the uploaded sources. This changed the learning process from simple material access to more active source engagement.

Observation data indicated that students used NotebookLM to search for vocabulary related to personal identity, academic background, hobbies, hometowns, and professional interests. This behavior reflects independent decision-making because students needed to choose which information was relevant for their Japanese CV. They also needed to decide which expressions were appropriate, how the information should be organized, and how personal details could be presented in a formal document. These decisions are closely related to learner autonomy because students moved beyond passive reception of material and began to manage parts of their own learning task.

The Japanese CV task also encouraged students to apply language in a meaningful context. A CV is not only a grammar exercise. It requires students to present themselves in a structured and socially recognizable format. In this task, students had to connect basic Japanese vocabulary with identity, education, hobbies, and future professional orientation. NotebookLM supported this process by helping students access relevant source-based information, but the students still had to make choices about content and presentation. This shows that autonomy emerged through the interaction between task design, source materials, AI support, and student agency.

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Reflective logs also showed that some students used NotebookLM outside formal class hours. They returned to the uploaded materials, reviewed unclear expressions, and made revisions before submitting their work. This behavior indicates self-regulated learning because students monitored their own progress and used available resources to improve their output. However, this autonomy was not fully independent. It was scaffolded by lecturer-selected materials, structured assignment instructions, and classroom explanation. Therefore, the finding is better described as scaffolded autonomy rather than complete independence.

Reflective Confidence in Basic Japanese Learning

The third finding relates to students' perceived confidence in learning basic Japanese. Reflective logs showed that several students felt more comfortable working with unfamiliar vocabulary and writing forms after using NotebookLM. This was especially relevant because Japanese includes multiple writing systems and grammar patterns that differ from Indonesian and English. For beginner learners, these differences can create hesitation, especially when students must produce written output for assessment. NotebookLM helped some students review explanations repeatedly and check their draft before submission.

Some students also reported that audio-based explanations were useful because they allowed them to listen to learning material rather than only read it. This multimodal support appeared to make the material more approachable. However, this finding should not be overstated. The available data show that students perceived the feature as helpful, but they do not prove that the feature directly improved pronunciation or reduced cognitive load. A stronger claim would require additional evidence, such as interviews, pre-test and post-test data, pronunciation assessment, or validated cognitive load measurement.

The more appropriate interpretation is that NotebookLM made the learning process feel more manageable for some students. Students could break down difficult material, review summaries, and check terms before finalizing their work. This kind of support can contribute to learning confidence because students feel that they have a tool to help them when they study independently. Still, confidence should not be treated as the same as autonomy. Confidence becomes relevant to autonomy only when it leads to self-checking, revision, and responsible use of sources.

In the strongest cases, students did not simply accept AI-generated responses. They used NotebookLM to compare terms, return to the original course materials, and revise their Japanese CV drafts. This shows that confidence was linked to self-monitoring and evaluation. Students became more willing to engage with Japanese materials because they had a structured support system. This suggests that NotebookLM may support autonomy indirectly by making students more willing to take responsibility for checking and improving their own work. At the same time, confidence may also create a new risk. If students trust NotebookLM too strongly, they may assume that all AI-supported responses are correct. This can reduce critical thinking and weaken autonomy. Autonomous learners should not only know how to use AI. They should also know how to question it, verify its output, and ask for clarification when needed. Therefore, lecturer guidance remains important to help students understand that AI is a learning support tool, not a final authority.

Multimodal Personalization of Learning Outputs

The fourth finding concerns how students personalized their Japanese CV assignments. Many students included details about hobbies, hometowns, academic identity, social media accounts, and personal interests. Some also added visual elements, such as photographs, icons, layout variations, and personal design choices. These features show that students were engaged with

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the task and treated it as more than a routine written assignment. The Japanese CV became a space for students to express identity while practicing foreign language use. However, visual design should not be treated as direct evidence of learner autonomy. A colorful or creative assignment does not automatically prove that a student can plan, monitor, or evaluate learning. Visual elements mainly show engagement, creativity, and personal investment. They become relevant to autonomy only when they are connected to language-related decisions. For example, a student who chooses a hobby, searches for the appropriate Japanese term, checks the expression against course materials, and revises the sentence demonstrates stronger autonomy than a student who only changes layout or adds decoration.

The personalization of the Japanese CV also shows that students connected language learning with identity construction. Instead of writing only generic information, several students adapted the assignment to reflect who they were as individuals and as International Relations students. This matters because language learning becomes more meaningful when students use the target language to express personal and academic identity. In this sense, personalization supported learner autonomy by creating opportunities for students to make choices about both language and self-representation.

Social media sharing appeared in some cases. Some students shared their work online and received positive comments from peers. This indicates pride and ownership, but it should be interpreted cautiously. Social media activity does not automatically prove intrinsic motivation or self-directed learning. It may reflect confidence, social engagement, or a desire for recognition. Its connection to autonomy becomes stronger only if students explain in their reflective logs that sharing their work motivated them to revise, continue learning, or take more responsibility for their Japanese study.

Therefore, multimodal personalization should be presented as supporting evidence, not as the main proof of autonomy. The central evidence remains students' source consultation, vocabulary selection, draft revision, and reflection on their learning process. Visual and digital creativity can enrich the findings, but it should not dominate the Results section. The study should prioritize learning behavior over aesthetic description.

Challenges and Uneven Patterns of AI Use

The fifth finding concerns the challenges and uneven patterns of NotebookLM use among students. Although the tool supported several students, the findings show that not all students used it in the same way. Some students used NotebookLM actively to review material, ask focused questions, and revise their work. Others appeared to use the tool mainly to retrieve terms or complete the task quickly. This difference is important because it shows that AI can support autonomy, but it can also encourage dependence if students use it without reflection.One challenge was surface-level learning. Some assignments contained accurate terms, but the evidence did not always show whether students understood the meaning or structure behind those terms. This means that correct output may reflect successful retrieval rather than genuine understanding.

The study should avoid claiming that all students achieved independent language mastery. A more accurate claim is that students were able to use source-grounded assistance to produce more accurate and personalized outputs, while the depth of their understanding varied. Another challenge was prompt quality. Students who asked specific questions were more likely to receive relevant responses. Students who used general prompts often received less focused output. This indicates that AI-supported autonomy requires prompt literacy. Students need to learn how to ask precise questions, compare answers, return to original materials, and evaluate

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whether the response fits the learning task. Without these skills, NotebookLM may become a shortcut instead of a learning tool. Technical familiarity also influenced the learning process. Some students needed time to understand how to upload materials, organize sources, and use NotebookLM features effectively. These procedural difficulties affected the depth of student engagement. This finding shows that digital access alone is not enough. Students also need practical training in how to use AI tools responsibly and productively for language learning.

The findings confirm that lecturer guidance remained essential. NotebookLM did not replace the lecturer. Its usefulness depended on the quality of curated materials, the clarity of the assignment, and the lecturer's explanation of how the tool should be used. This supports the idea that learner autonomy does not mean learning without guidance. In this study, autonomy developed within a structured learning environment where students gradually took more responsibility for their learning decisions.

The findings indicate that NotebookLM has pedagogical potential as a source-grounded digital scaffold in Basic Japanese learning. The tool helped students interact with lecturer-curated materials, verify basic Japanese expressions, and produce personalized Japanese CV assignments. However, the findings do not support a deterministic claim that NotebookLM alone transformed learner autonomy. Student autonomy emerged from a broader learning ecosystem that included course materials, task design, lecturer support, student motivation, and digital literacy.

This interpretation is consistent with the theory of learner autonomy, which defines autonomy as the learner's capacity to take responsibility for learning. In this study, autonomy appeared when students selected relevant vocabulary, checked language forms, monitored their work, revised their drafts, and used Japanese to express personal and academic identity. These actions show that learner autonomy is a process, not a simple outcome of technology use. NotebookLM supported this process, but it did not automatically create it.

The source-grounded feature of NotebookLM is especially relevant for beginner language learning. Students at the beginner level often lack the knowledge needed to judge whether AI-generated output is accurate (Er et al., 2025; Ziqi et al., 2026; Fleckenstein et al., 2024). By using lecturer-curated materials as the main source, NotebookLM provided a more controlled learning environment than general-purpose AI tools. This feature helped students work with more relevant information. Still, source grounding does not guarantee complete accuracy. Students must continue to verify outputs, compare them with the original materials, and seek lecturer clarification when needed (George, 2023; Hou et al., 2024; Burke, 2025).

The findings also show that the Japanese CV assignment played an important role in supporting autonomy. The assignment required students to make decisions about identity, academic background, interests, and presentation (Anyichie & Butler, 2023; Ho, 2022). These decisions encouraged students to use Japanese for a meaningful purpose. Therefore, the observed autonomy cannot be attributed only to NotebookLM. The assignment design itself created opportunities for independent decision-making and self-expression.

Multimodal personalization also contributed to student engagement. Students who added personal details and visual elements showed that they were willing to invest effort in the task (Kramer et al., 2023; Al Mamun & Lawrie, 2023). However, visual creativity should be interpreted as engagement rather than direct evidence of autonomy. Its relevance to autonomy depends on whether students used it together with language planning, source checking, and reflective revision. This distinction is important because the study focuses on learner autonomy, not digital design ability.

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The challenges found in this study also strengthen the credibility of the analysis. Not all students used NotebookLM critically. Some used it mainly for retrieval, and some may have trusted the output too quickly. This finding shows that AI integration in language learning requires explicit instruction. Students need guidance on prompt writing, source evaluation, revision strategies, and ethical AI use. Without this guidance, AI may support task completion but not necessarily deeper learning.

The study shows that NotebookLM can support autonomous learning practices when it is embedded in a structured instructional design. Its strongest contribution lies in helping students interact with verified materials, review unfamiliar language forms, and apply Japanese expressions to a meaningful personal task. However, the study should avoid overstating the tool's impact. NotebookLM did not independently eliminate hallucinations, reduce cognitive load, or guarantee autonomy. It supported emerging learner autonomy when combined with lecturer guidance, curated materials, reflective tasks, and student responsibility.

Conclusion

This study concludes that NotebookLM has pedagogical potential as a source-grounded digital scaffold for supporting learner autonomy in Basic Japanese learning among International Relations students. The findings show that students used the tool to engage with lecturer-curated materials, verify unfamiliar vocabulary and writing forms, revisit learning sources, and produce personalized Japanese CV assignments. However, the study does not claim that NotebookLM independently guarantees accuracy, eliminates AI hallucinations, or automatically transforms students into autonomous learners. Learner autonomy emerged more clearly when students demonstrated initiative, source consultation, self-monitoring, revision, and independent decision-making in applying Japanese expressions to meaningful personal and academic contexts. The results also indicate that the effectiveness of NotebookLM depends on a broader instructional ecosystem, including curated materials, clear task design, lecturer guidance, students' digital literacy, and reflective learning practices. Therefore, NotebookLM should be understood not as a replacement for teaching, but as a supportive learning tool that can strengthen scaffolded autonomy when used critically and responsibly in foreign language education.

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